

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**

Enclosure 1

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

Fuel decay start date: 1970
 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: 50 years

Estimated
 Canister usage:
 HIC
 3.00

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	9.4369E-12	3.59	7.19	0.00E+00	3.39E-11	6.78E-11	Avg. MeV	
Am-241	1.1078E-01	3.59	7.19	1.50E-01	5.48E-01	9.47E-01	0.0150	2.441E+11
Am-242m	1.7940E-03	3.59	7.19	0.00E+00	6.45E-03	1.29E-02	0.0250	3.065E+10
Am-243	1.0724E-04	3.59	7.19	9.57E+00	9.57E+00	9.57E+00	0.0375	5.783E+10
C-14	2.5942E-05	3.59	7.19	0.00E+00	9.32E-05	1.86E-04	0.0575	4.042E+10
Cl-36	3.4243E-10	3.59	7.19	0.00E+00	1.23E-09	2.46E-09	0.0850	2.226E+11
Cm-243	2.8217E-04	3.59	7.19	0.00E+00	1.01E-03	2.03E-03	0.1250	1.312E+10
Cm-244	7.7027E-04	3.59	7.19	0.00E+00	2.77E-03	5.54E-03	0.2250	1.359E+10
Co-60	1.3011E-04	3.59	7.19	0.00E+00	4.68E-04	9.35E-04	0.3750	5.783E+09
Cs-134	1.2951E-07	3.59	7.19	0.00E+00	4.65E-07	9.31E-07	0.5750	2.449E+11
Cs-135	4.7693E-05	3.59	7.19	0.00E+00	1.71E-04	3.43E-04	0.8500	1.280E+09
Cs-137	9.3351E-01	3.59	7.19	0.00E+00	3.35E+00	6.71E+00	1.2500	7.576E+08
Eu-154	2.6341E-03	3.59	7.19	0.00E+00	9.47E-03	1.89E-02	1.7500	3.488E+07
Eu-155	4.0968E-04	3.59	7.19	0.00E+00	1.47E-03	2.94E-03	2.2500	4.208E+03
Fe-55	2.5543E-07	3.59	7.19	0.00E+00	9.18E-07	1.84E-06	2.7500	1.026E+05
H-3	1.2053E-03	3.59	7.19	0.00E+00	4.33E-03	8.66E-03	3.5000	6.062E+02
I-129	1.2891E-06	3.59	7.19	0.00E+00	4.63E-06	9.26E-06	5.0000	2.503E+02
Kr-85	7.0043E-03	3.59	7.19	0.00E+00	2.52E-02	5.03E-02	7.0000	2.760E+01
Np-237	4.3622E-06	3.59	7.19	0.00E+00	1.57E-05	3.13E-05	11.0000	3.093E+00
Pa-231	1.6733E-11	3.59	7.19	0.00E+00	6.01E-11	1.20E-10		
Pb-210	6.0684E-12	3.59	7.19	0.00E+00	2.18E-11	4.36E-11		
Pm-147	1.1315E-05	3.59	7.19	0.00E+00	4.07E-05	8.13E-05		
Pu-238	6.1482E-03	3.59	7.19	0.00E+00	2.21E-02	4.42E-02		
Pu-239	-3.5520E-02	3.59	0.00	1.23E+00	1.11E+00	1.23E+00		
Pu-240	2.0590E-02	3.59	7.19	8.27E-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					3.48E+00	6.91E+00		

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:	ALUM	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)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		3.59	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		7.19	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Fuel decay start date: 1980
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"
1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	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	3.5810E-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		
U-233	2.5856E-06	91,386.55	182,773.11	0.00E+00	2.36E-03	4.73E-03		
U-234	5.2665E-05	91,386.55	182,773.11	0.00E+00	4.81E+00	9.63E+00		
U-235	-1.4487E-06	91,386.55	0.00	5.00E-02	0.00E+00	5.00E-02		
U-236	7.5888E-06	91,386.55	182,773.11	0.00E+00	6.94E-01	1.39E+00		
U-238	-2.6129E-07	91,386.55	0.00	2.52E-01	2.28E-01	2.52E-01		
Y-90	6.4180E-01	91,386.55	182,773.11	0.00E+00	5.87E+04	1.17E+05		
Other Radionuclides					8.71E+04	1.74E+05		

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 %:			
	5	0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	32,848.60	91,386.55	
Bounding:	33,041.60	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
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	3.38	2.78	
Bounding:	6.76	5.53	
			1.06

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

^b 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: 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

Fuel decay start date:

1982

Estimates as of:

2030

Template: PWR (Light Water, Zirc. 0 to 5%, U)

*Template Burnup(MWd):

81.92

Template BOL Heavy Metal Mass (MT):

0.00176911

Template Decay Time:

35 years

Estimated

Canister usage:

18"x15"

1.00

II. Estimates

Radionuclide	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-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
Ci-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	3.851E+05
Np-237	1.1218E-05	10,273.05	10,378.50	0.00E+00	1.15E-01	1.16E-01	11.0000	4.183E+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-206	1.7474E-07	10,273.05	10,378.50	0.00E+00	1.80E-03	1.81E-03		
U-232	4.7368E-07	10,273.05	10,378.50	0.00E+00	4.87E-03	4.92E-03		
U-233	2.5097E-08	10,273.05	10,378.50	0.00E+00	2.58E-04	2.60E-04		
U-234	5.0000E-05	10,273.05	10,378.50	0.00E+00	5.14E-01	5.19E-01		
U-235	-1.4489E-06	10,273.05	0.00	1.28E-02	0.00E+00	1.28E-02		
U-236	7.5824E-06	10,273.05	10,378.50	0.00E+00	7.79E-02	7.87E-02		
U-238	-2.6129E-07	10,273.05	0.00	1.22E-01	1.20E-01	1.22E-01		
Y-90	9.1699E-01	10,273.05	10,378.50	0.00E+00	9.42E+03	9.52E+03		
Other Radionuclides					1.38E+04	1.39E+04		

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 %:	1.8	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
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	0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-DMFIDA
SNF ID #: 71
Fuel Units & Dates: 281 - HEX ARRAY 217 ROD
Heavy Metal Mass: BOL-9083.087kg EOL-8443.742kg
ROD Storage Site: HANFORD

Fuel decay start date: 1982
Estimate as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
Template Burnup (MWd/t): 5011.2
Heavy Metal Mass (MT): 0.0229181
Template Decay Time: 35 years

Estimated
Canister Usage:
18 x15
52.20

II. Estimates

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photon/sec (bounding)
Ac-227	6.1822E-12	638,157.18	1.276,314.37	0.00E+00	3.95E+06	7.89E+06	Avg. MWd	4.155E+16
Am-241	1.1066E-01	638,157.18	1.276,314.37	1.75E+04	8.81E+04	1.59E+05	0.0150	8.305E+15
Am-242m	1.8247E-03	638,157.18	1.276,314.37	0.00E+00	1.22E+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	8.646E+15
C-14	2.6042E-05	638,157.18	1.276,314.37	0.00E+00	1.66E+01	3.32E+01	0.0575	8.659E+15
C-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
Co-243	4.0623E-04	638,157.18	1.276,314.37	0.00E+00	2.59E+02	5.19E+02	0.1250	3.251E+15
Co-244	1.8024E-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	1.610E+16
Co-134	1.5566E-03	638,157.18	1.276,314.37	0.00E+00	9.83E+02	1.96E+03	0.5750	8.547E+15
Co-135	4.7693E-05	638,157.18	1.276,314.37	0.00E+00	3.04E+01	6.09E+01	0.9500	8.840E+14
Co-137	1.4007E+00	638,157.18	1.276,314.37	0.00E+00	8.94E+05	1.79E+06	1.2200	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+15
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+15
Fe-55	3.8028E-04	638,157.18	1.276,314.37	0.00E+00	2.43E+02	4.85E+02	2.2750	2.110E+16
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+16
I-129	1.2891E-06	638,157.18	1.276,314.37	0.00E+00	8.23E-01	1.65E+00	5.0000	3.728E+07
K-85	2.7848E-02	638,157.18	1.276,314.37	0.00E+00	1.78E+04	3.59E+04	7.0000	4.251E+16
Nb-237	3.7516E-06	638,157.18	1.276,314.37	0.00E+00	2.39E+00	4.79E+00	11.0000	4.882E+05
Pb-210	1.2409E-11	638,157.18	1.276,314.37	0.00E+00	7.97E-08	1.59E-08		
Pb-213	2.4200E-12	638,157.18	1.276,314.37	0.00E+00	1.54E-08	3.08E-08		
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	1.276,314.37	0.00E+00	1.21E+05	2.42E+05		
Pu-240	2.0890E-02	638,157.18	1.276,314.37	7.31E+04	8.63E+04	9.85E+04		
Pu-241	1.4798E+00	638,157.18	1.276,314.37	3.28E+08	2.94E+08	3.28E+08		
Pu-242	1.1252E-05	638,157.18	1.276,314.37	0.00E+00	2.67E+01	5.34E+01		
Ra-226	7.8824E-12	638,157.18	1.276,314.37	0.00E+00	5.01E-06	1.00E-05		
Ra-228	2.4038E-16	638,157.18	1.276,314.37	0.00E+00	1.54E-10	3.07E-10		
Ru-106	1.5080E-05	638,157.18	1.276,314.37	0.00E+00	9.61E+00	1.92E+01		
Sr-78	1.0127E-05	638,157.18	1.276,314.37	0.00E+00	8.48E+00	1.69E+01		
Sm-126	4.3902E-05	638,157.18	1.276,314.37	0.00E+00	2.90E+01	5.80E+01		
Sr-90	5.0088E-01	638,157.18	1.276,314.37	0.00E+00	3.20E+05	6.39E+05		
Tb-90	3.9412E-04	638,157.18	1.276,314.37	0.00E+00	2.52E+02	5.03E+02		
Tb-229	2.7219E-12	638,157.18	1.276,314.37	0.00E+00	1.74E-08	3.47E-08		
Tb-232	1.0441E-09	638,157.18	1.276,314.37	0.00E+00	6.69E-04	1.33E-03		
Tb-230	3.1689E-18	638,157.18	1.276,314.37	0.00E+00	2.02E-10	4.04E-10		
U-232	4.6638E-07	638,157.18	1.276,314.37	0.00E+00	2.89E-01	5.95E-01		
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	Total	2.88E+04
Other Radionuclides								
Total								
Thermal Power								
Nominal Heat Output (Watts)								
Bounding Heat Output (Watts)								
Total								

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Burnup Summary			Checks		
From SPD			Used			Basis for Parameter Differences:		
Reactor Moderator:	FAST	FAST	This Template was used for the following reason: The fuel matches on all parameters except enrichment.					
Fuel Cladding:	SST	SST						
BOL HMI Constituents:	Pu and U	Pu and U						
BOL Enrichment %:	0.71	10 to 30						

Burnup Summary (MWd) ³			Basis for Burnup used in estimate:		
From SPD			Estimated		
Nominal:	638,816.10	638,157.18	Nominal burnup calculated from the heavy metal mass destroyed.		
Bounding:	1,382,483.07	1,276,314.37	Bounding Burnup assumed to be twice nominal burnup.		

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

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

Fuel Radionuclide Inventory Worksheet

Fuel and Template Information

Fuel Name: FFTF-DFA/TDFA PINS
SNF ID #: 323
Fuel Units & Descr: 2768 - ROD
Heavy Metal Mass: BOL = 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 ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	9.18E+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-06	31,146.44	69,045.35	0.00E+00	8.11E-01	1.80E+00	0.0675	5.221E+14
Ci-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+06
Fe-55	3.8028E-04	31,146.44	69,045.35	0.00E+00	1.18E+01	2.63E+01	2.7600	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	6.753E+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	1.82E+03	7.0000	2.265E+06
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	8.41E+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-206	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	6.7451E-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:
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:		31,146.44	Nominal burnup taken from SFD and converted to MWd using BOL=475.192kg
Bounding:		69,045.35	Bounding burnup taken from SFD and converted to MWd using BOL=475.192kg

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA 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	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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
Cf-252	3.4243E-10	27,338.13	60,603.11	0.00E+00	9.36E-08	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	2.4068E-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

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	Pu and U	Pu and U
BOL Enrichment %:		10 to 30

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

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		27,338.13
Bounding:		60,603.11

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=417.09kg
Bounding burnup taken from SFD and converted to MWd using BOL=417.09kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.43	
Bounding:	0.95	

Estimated EOL HM/Given EOL HM
1.00

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

^aTotal burnup for all fuel associated with this worksheet must be 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

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"
1.09

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	5.453E+12
C-14	2.6042E-05	634.54	787.70	0.00E+00	1.85E-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
Co-243	4.0629E-04	634.54	787.70	0.00E+00	2.58E-01	3.20E-01	0.1250	2.007E+12
Co-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+08
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		
Ti-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					6.99E+02	1.12E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	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	10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		634.54	Nominal burnup taken from SFD and converted to MWd using BOL=6.513kg Bounding burnup taken from SFD and converted to MWd using BOL=9.513kg
Bounding:		787.70	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-AB-1
SNF ID #: 317
Fuel Units & Descr: 1 - HEX ARRAY 217 ROD
Heavy Metal Mass: BOL = 34.655kg
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): 0.0329161
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) ^a	Bounding Fuel Burnup (MWd) ^a	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	0.0675	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-06	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+06
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
Pu-231	1.2488E-11	251.33	502.65	0.00E+00	3.14E-09	6.28E-09		
Pu-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-06	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-06	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		
Ti-208	4.6636E-07	251.33	502.65	0.00E+00	1.17E-04	2.34E-04		
U-232	1.2638E-08	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-238	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 Claddings:	SST	SST	
BOL HM Constituents:	Pu and U	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd)^a

	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		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-ABA-1 THRU 6
SNF ID #: 318
Fuel Units & Descr: 6 - HEX ARRAY 91 ROD
Heavy Metal Mass: BOL= : EOL=257.428kg
ROD Storage Site: HANFORD

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"
1.20

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CM/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	3.26E-04	4.68E-04	0.0850	6.569E+13
Cr-243	1.5496E-14	5,934.58	8,479.48	0.00E+00	9.20E-11	1.31E-10	0.1250	4.255E+13
Cr-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	2.80E-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	3.7584E-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-06	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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		5,934.58	Nominal burnup taken from SFD and converted to MWd using BOL=264.158kg
Bounding:		8,479.48	Bounding burnup taken from SFD and converted to MWd using BOL=264.158kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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-MCH-1 (MOX) PMS
 SIF ID #: 321
 Fuel Units & Dates: 80 - ROD
 Heavy Metal Mass: BOL = EOL=14.348kg
 ROD Storage Site: HANFORD

Fuel decay start date: 1982
 Estimates as of: 2000
 Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
 Template Burnup(MWD): 5011.2
 Template BOL Heavy Metal Mass (MT): 0.0029181
 Template Decay Time: 56 years

Estimated
 Canister Usage:
 18"x15"
 0.02

II. Estimates							Gamma Sources	
	m	x_g	x_b	b	y_g	y_b	Photon Energy Group	Total Photons/sec (Bouding)
Radionuclides	CIWMD From Template	Nonfuel Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ¹	Initial Activity (Ci)	Nonfuel Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	6.1822E-12	1.038.59	2.077.18	0.00E+00	8.42E-09	1.28E-08	Avg. MW	6.834E+13
Am-241	1.1086E-01	1.038.59	2.077.18	2.97E+01	1.45E+02	2.60E+02	0.0150	1.352E+13
Am-242m	1.9247E-03	1.038.59	2.077.18	0.00E+00	2.00E+00	4.00E+00	0.0250	1.570E+13
Am-243	1.0740E-04	1.038.59	2.077.18	0.00E+00	1.12E-01	2.23E-01	0.0375	1.574E+13
C-14	2.6042E-05	1.038.59	2.077.18	0.00E+00	2.70E-02	5.41E-02	0.0675	7.518E+12
Ca-36	3.4243E-10	1.038.59	2.077.18	0.00E+00	3.56E-07	7.11E-07	0.0680	5.290E+12
Ca-243	4.0629E-04	1.038.59	2.077.18	0.00E+00	4.22E-01	8.44E-01	0.1250	6.067E+12
Ca-244	1.6024E-03	1.038.59	2.077.18	0.00E+00	1.68E+00	3.33E+00	0.2250	2.630E+12
Ca-60	3.4276E-03	1.038.59	2.077.18	0.00E+00	3.56E+00	7.12E+00	0.3750	1.068E+11
Ca-134	1.5566E-03	1.038.59	2.077.18	0.00E+00	1.62E+00	3.23E+00	0.5750	1.132E+12
Ca-135	4.7693E-05	1.038.59	2.077.18	0.00E+00	4.95E-02	9.91E-02	0.8500	1.332E+12
Ca-137	1.4007E+00	1.038.59	2.077.18	0.00E+00	1.45E+03	2.91E+03	1.2500	3.014E+10
Eu-154	1.6184E-02	1.038.59	2.077.18	0.00E+00	1.68E+01	3.36E+01	1.7500	6.035E+08
Eu-155	1.3774E-02	1.038.59	2.077.18	0.00E+00	1.43E+01	2.86E+01	2.2500	3.440E+07
Fe-55	3.8029E-04	1.038.59	2.077.18	0.00E+00	3.95E-01	7.90E-01	2.7500	1.780E+05
H-3	3.8454E-03	1.038.59	2.077.18	0.00E+00	3.99E+00	7.99E+00	5.0000	6.179E+04
H-329	1.2891E-06	1.038.59	2.077.18	0.00E+00	1.34E-03	2.68E-03	3.5000	7.050E+03
K-40	2.7848E-02	1.038.59	2.077.18	0.00E+00	2.89E+01	5.78E+01	7.0000	8.063E+02
Np-237	3.7516E-08	1.038.59	2.077.18	0.00E+00	3.90E-08	7.79E-08	11.0000	
Pb-231	1.2488E-11	1.038.59	2.077.18	0.00E+00	1.30E-08	2.59E-08		
Pb-210	2.4208E-12	1.038.59	2.077.18	0.00E+00	2.51E-09	5.02E-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	2.077.18	2.44E+02	2.47E+02	2.44E+02		
Pu-240	2.0890E-02	1.038.59	2.077.18	1.24E+02	1.45E+02	1.67E+02		
Pu-241	-1.4739E+00	1.038.59	0.00	5.58E+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		
Pu-236	7.8524E-12	1.038.59	2.077.18	0.00E+00	8.16E-09	1.63E-08		
Ra-226	2.4088E-16	1.038.59	2.077.18	0.00E+00	2.50E-13	5.00E-13		
Ra-108	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		
Se-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	5.66E-09		
Th-230	1.0441E-09	1.038.59	2.077.18	0.00E+00	1.09E-09	2.17E-09		
Th-232	3.1689E-16	1.038.59	2.077.18	0.00E+00	3.29E-13	6.58E-13		
Th-208	4.6538E-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-08	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	1.87E-04	3.75E-04		
U-236	1.8650E-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	1.04E+03		
Y-90	5.0088E-01	1.038.59	2.077.18	0.00E+00	5.20E+02	1.04E+03		
Other Radionuclides								
Thermal Heat								
Nominal Heat								
Output								
Heat Output (Watts)								
2.77E+01								4.43E+01
Total								Total

Thermal Power			
Nominal Heat Output (Watts)	Heat Output (Watts)	Bounding Heat Output (Watts)	
2.72E+01	4.33E+01		
Total	Total		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.
²Total burnup for all fuel associated with the worksheet must be 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 (PUUC) PWS
SNF ID #: 865
Fuel Units & Descr: 16 - ROD
Heavy Metal Mass: BOL = 2.558kg
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"
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	6.1822E-12	185.22	370.43	0.00E+00	1.15E-09	2.29E-09	Avg. MeV
Am-241	1.1066E-01	185.22	370.43	5.29E+00	2.58E+01	4.63E+01	0.0150 1.219E+13
Am-242m	1.9247E-03	185.22	370.43	0.00E+00	3.56E-01	7.13E-01	0.0250 2.411E+12
Am-243	1.0740E-04	185.22	370.43	0.00E+00	1.99E-02	3.98E-02	0.0375 2.799E+12
C-14	2.8042E-05	185.22	370.43	0.00E+00	4.82E-03	9.65E-03	0.0575 2.806E+12
Cl-36	3.4243E-10	185.22	370.43	0.00E+00	6.34E-08	1.27E-07	0.0850 1.341E+12
Cm-243	4.0629E-04	185.22	370.43	0.00E+00	7.53E-02	1.51E-01	0.1250 9.435E+11
Cm-244	1.6024E-03	185.22	370.43	0.00E+00	2.97E-01	5.94E-01	0.2250 1.082E+12
Co-60	3.4275E-03	185.22	370.43	0.00E+00	6.35E-01	1.27E+00	0.3750 4.690E+11
Cs-134	1.5566E-03	185.22	370.43	0.00E+00	2.88E-01	5.77E-01	0.5750 1.900E+13
Cs-135	4.7693E-05	185.22	370.43	0.00E+00	8.83E-03	1.77E-02	0.8500 1.865E+11
Cs-137	1.4007E+00	185.22	370.43	0.00E+00	2.59E+02	5.19E+02	1.2500 2.376E+11
Eu-154	1.6184E-02	185.22	370.43	0.00E+00	3.00E+00	6.00E+00	1.7500 5.375E+09
Eu-155	1.3774E-02	185.22	370.43	0.00E+00	2.55E+00	5.10E+00	2.2500 1.081E+06
Fe-55	3.8028E-04	185.22	370.43	0.00E+00	7.04E-02	1.41E-01	2.7500 6.141E+06
H-3	3.8454E-03	185.22	370.43	0.00E+00	7.12E-01	1.42E+00	3.5000 3.174E+04
I-129	1.2891E-06	185.22	370.43	0.00E+00	2.39E-04	4.78E-04	5.0000 1.102E+04
Kr-85	2.7848E-02	185.22	370.43	0.00E+00	5.16E+00	1.03E+01	7.0000 1.257E+03
Np-237	3.7516E-06	185.22	370.43	0.00E+00	6.95E-04	1.39E-03	11.0000 1.438E+02
Pa-231	1.2488E-11	185.22	370.43	0.00E+00	2.31E-09	4.63E-09	
Pb-210	2.4206E-12	185.22	370.43	0.00E+00	4.48E-10	8.97E-10	
Pm-147	1.5671E-02	185.22	370.43	0.00E+00	2.90E+00	5.80E+00	
Pu-238	1.4877E-02	185.22	370.43	0.00E+00	2.76E+00	5.51E+00	
Pu-239	-3.5520E-02	185.22	0.00	4.34E+01	3.68E+01	4.34E+01	
Pu-240	2.0690E-02	185.22	370.43	2.21E+01	2.59E+01	2.97E+01	
Pu-241	-1.4799E+00	185.22	0.00	9.91E+02	7.17E+02	9.91E+02	
Pu-242	1.1252E-05	185.22	370.43	5.89E-03	7.97E-03	1.01E-02	
Ra-226	7.8524E-12	185.22	370.43	0.00E+00	1.45E-09	2.91E-09	
Ra-228	2.4086E-16	185.22	370.43	0.00E+00	4.46E-14	8.92E-14	
Ru-106	1.5066E-05	185.22	370.43	0.00E+00	2.79E-03	5.58E-03	
Se-79	1.0127E-05	185.22	370.43	0.00E+00	1.88E-03	3.75E-03	
Sn-126	4.3902E-05	185.22	370.43	0.00E+00	8.13E-03	1.63E-02	
Sr-90	5.0088E-01	185.22	370.43	0.00E+00	9.28E+01	1.86E+02	
Tc-99	3.9412E-04	185.22	370.43	0.00E+00	7.30E-02	1.46E-01	
Th-229	2.7219E-12	185.22	370.43	0.00E+00	5.04E-10	1.01E-09	
Th-230	1.0441E-09	185.22	370.43	0.00E+00	1.93E-07	3.87E-07	
Th-232	3.1689E-16	185.22	370.43	0.00E+00	5.87E-14	1.17E-13	
Th-238	4.6636E-07	185.22	370.43	0.00E+00	8.64E-05	1.73E-04	
U-232	1.2638E-06	185.22	370.43	0.00E+00	2.34E-04	4.68E-04	
U-233	5.7451E-10	185.22	370.43	0.00E+00	1.06E-07	2.13E-07	
U-234	4.3044E-06	185.22	370.43	0.00E+00	7.97E-04	1.59E-03	
U-235	-7.7765E-09	185.22	0.00	8.92E-06	7.48E-06	8.92E-06	
U-236	1.8050E-07	185.22	370.43	0.00E+00	3.34E-05	6.69E-05	
U-238	-1.7914E-07	185.22	0.00	6.49E-04	6.16E-04	6.49E-04	
Y-90	5.0088E-01	185.22	370.43	0.00E+00	9.28E+01	1.86E+02	
Other Radionuclides					2.62E+02	5.25E+02	

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		185.22	Nominal burnup taken from SFD and converted to MWd using BOL=2.744kg Bounding burnup assumed to be twice nominal burnup.
Bounding:		370.43	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-ACO-2, 4 THRU 16
SNF ID #: 329
Fuel Units & Descr: 14 - HEX ARRAY 169 ROD
Heavy Metal Mass: BOL= : EOL=605.982kg
ROD Storage Site: HANFORD

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

Estimated
Canister usage:
18"x15"
2.80

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	3.587E+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	1.58E+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+08
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-128	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		
Th-208	4.6636E-07	96,319.97	140,074.70	0.00E+00	4.49E-02	6.53E-02		
U-232	1.2638E-06	96,319.97	140,074.70	0.00E+00	1.22E-01	1.77E-01		
U-233	5.7451E-10	96,319.97	140,074.70	0.00E+00	5.53E-05	8.05E-05		
U-234	4.3044E-06	96,319.97	140,074.70	0.00E+00	4.15E-01	6.03E-01		
U-235	-7.7765E-09	96,319.97	0.00	2.28E-03	1.53E-03	2.28E-03		
U-236	1.8050E-07	96,319.97	140,074.70	0.00E+00	1.74E-02	2.53E-02		
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: 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 Claddings:	SST	SST	
BOL HM Constituents:	Pu and U	Pu and U	
BOL Enrichment %:		10 to 30	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=702.481kg Bounding burnup taken from SFD and converted to MWd using BOL=702.481kg
	From SFD	Estimated	
Nominal:		96,319.97	
Bounding:		140,074.70	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.90		
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	C/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	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	1.821E+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
Co-243	4.0629E-04	5,116.34	5,738.65	0.00E+00	2.08E+00	2.33E+00	0.1250	1.462E+13
Co-244	1.6024E-03	5,116.34	5,738.65	0.00E+00	8.20E+00	9.20E+00	0.2250	1.876E+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+14
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	7.05E+02	7.18E+02		
Pu-241	-1.4799E+00	5,116.34	0.00	2.69E+04	1.93E+04	2.69E+04		
Pu-242	1.1252E-05	5,116.34	5,738.65	1.60E-01	2.17E-01	2.24E-01		
Ra-226	7.8524E-12	5,116.34	5,738.65	0.00E+00	4.02E-08	4.51E-08		
Ra-228	2.4086E-16	5,116.34	5,738.65	0.00E+00	1.23E-12	1.38E-12		
Ru-106	1.5066E-05	5,116.34	5,738.65	0.00E+00	7.71E-02	8.65E-02		
Se-79	1.0127E-05	5,116.34	5,738.65	0.00E+00	5.18E-02	5.81E-02		
Sn-126	4.3902E-05	5,116.34	5,738.65	0.00E+00	2.25E-01	2.52E-01		
Sr-90	5.0088E-01	5,116.34	5,738.65	0.00E+00	2.56E+03	2.87E+03		
Tc-99	3.9412E-04	5,116.34	5,738.65	0.00E+00	2.02E+00	2.26E+00		
Th-229	2.7219E-12	5,116.34	5,738.65	0.00E+00	1.39E-08	1.56E-08		
Th-230	1.0441E-09	5,116.34	5,738.65	0.00E+00	5.34E-06	5.99E-06		
Th-232	3.1689E-16	5,116.34	5,738.65	0.00E+00	1.62E-12	1.82E-12		
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		
U-233	5.7451E-10	5,116.34	5,738.65	0.00E+00	2.94E-06	3.30E-06		
U-234	4.3044E-06	5,116.34	5,738.65	0.00E+00	2.20E-02	2.47E-02		
U-235	-7.7765E-09	5,116.34	0.00	2.42E-04	2.02E-04	2.42E-04		
U-236	1.8050E-07	5,116.34	5,738.65	0.00E+00	9.23E-04	1.04E-03		
U-238	-1.7914E-07	5,116.34	0.00	1.78E-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: 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) ³			Basis for burnup used in estimate: 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
Nominal:	From SFD	Estimated	
Bounding:		5,116.34	
		5,738.65	

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

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"
0.20

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	6.1822E-12	3.46	6.92	0.00E+00	2.14E-11	4.28E-11	0.0150 3.822E+12
Am-241	1.1066E-01	3.46	6.92	8.67E+01	6.71E+01	6.75E+01	0.0250 1.074E+11
Am-242m	1.9247E-03	3.46	6.92	0.00E+00	6.66E-03	1.33E-02	0.0375 5.867E+10
Am-243	1.0740E-04	3.46	6.92	0.00E+00	3.72E-04	7.43E-04	0.0675 9.775E+11
C-14	2.6042E-05	3.46	6.92	0.00E+00	9.01E-05	1.80E-04	0.0850 2.608E+10
Ci-36	3.4243E-10	3.46	6.92	0.00E+00	1.19E-09	2.37E-09	0.1250 2.051E+10
Cm-243	4.0629E-04	3.46	6.92	0.00E+00	1.41E-03	2.81E-03	0.2250 2.053E+10
Cm-244	1.6024E-03	3.46	6.92	0.00E+00	5.55E-03	1.11E-02	0.3750 1.009E+10
Co-60	3.4275E-03	3.46	6.92	0.00E+00	1.19E-02	2.37E-02	0.5750 3.551E+11
Cs-134	1.5566E-03	3.46	6.92	0.00E+00	5.39E-03	1.08E-02	0.8500 3.721E+09
Cs-135	4.7693E-05	3.46	6.92	0.00E+00	1.65E-04	3.30E-04	1.2500 4.441E+09
Cs-137	1.4007E+00	3.46	6.92	0.00E+00	4.85E+00	9.70E+00	1.7500 1.010E+08
Eu-154	1.6184E-02	3.46	6.92	0.00E+00	5.60E-02	1.12E-01	2.2500 3.234E+05
Eu-155	1.3774E-02	3.46	6.92	0.00E+00	4.77E-02	9.53E-02	2.7500 2.897E+05
Fe-55	3.8028E-04	3.46	6.92	0.00E+00	1.32E-03	2.63E-03	3.5000 1.561E+05
H-3	3.8454E-03	3.46	6.92	0.00E+00	1.33E-02	2.66E-02	5.0000 6.823E+04
I-129	1.2891E-06	3.46	6.92	0.00E+00	4.46E-06	8.92E-06	7.0000 7.538E+03
Kr-85	2.7848E-02	3.46	6.92	0.00E+00	9.84E-02	1.93E-01	11.0000 8.815E+02
Np-237	3.7516E-06	3.46	6.92	0.00E+00	1.30E-05	2.60E-05	
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	1.5086E-05	3.46	6.92	0.00E+00	5.21E-05	1.04E-04	
Se-78	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	3.81E-09	7.23E-09	
Th-232	3.1689E-16	3.46	6.92	0.00E+00	1.10E-15	2.19E-15	
Ti-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
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	Pu and U	Pu and U
BOL Enrichment %:		10 to 30

Basic for Parameter Differences:

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

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		3.46
Bounding:		6.92

Basic for burnup used in estimates:

Nominal burnup taken from SFD and converted to MWd using BOL=34.61kg
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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-FC-1
SNF ID #: 325
Fuel Units & Descr: 1 - HEX ARRAY 91 ROD
Heavy Metal Mass: BOL = 42.584kg
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"
0.20

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	3.506E+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	0.0675	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	4.6793E-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+06
I-129	1.2891E-06	2,694.34	5,388.68	0.00E+00	3.47E-03	6.95E-03	5.0000	1.706E+06
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	3.84E+02	4.20E+02	4.76E+02		
Pu-241	-1.4799E+00	2,694.34	0.00	1.84E+04	1.24E+04	1.64E+04		
Pu-242	1.1252E-05	2,694.34	5,388.68	9.71E-02	1.27E-01	1.58E-01		
Ra-226	7.8524E-12	2,694.34	5,388.68	0.00E+00	2.12E-08	4.23E-08		
Ra-228	2.4086E-16	2,694.34	5,388.68	0.00E+00	6.49E-13	1.30E-12		
Ru-106	1.5066E-05	2,694.34	5,388.68	0.00E+00	4.06E-02	8.12E-02		
Se-79	1.0127E-05	2,694.34	5,388.68	0.00E+00	2.73E-02	5.46E-02		
Sn-126	4.3902E-05	2,694.34	5,388.68	0.00E+00	1.18E-01	2.37E-01		
Sr-90	5.0088E-01	2,694.34	5,388.68	0.00E+00	1.35E+03	2.70E+03		
Tc-99	3.9412E-04	2,694.34	5,388.68	0.00E+00	1.06E+00	2.12E+00		
Th-229	2.7219E-12	2,694.34	5,388.68	0.00E+00	7.33E-09	1.47E-08		
Th-230	1.0441E-09	2,694.34	5,388.68	0.00E+00	2.81E-06	5.63E-06		
Th-232	3.1689E-16	2,694.34	5,388.68	0.00E+00	8.54E-13	1.71E-12		
Th-208	4.6636E-07	2,694.34	5,388.68	0.00E+00	1.26E-03	2.51E-03		
U-232	1.2638E-06	2,694.34	5,388.68	0.00E+00	3.41E-03	6.81E-03		
U-233	6.7451E-10	2,694.34	5,388.68	0.00E+00	1.55E-06	3.10E-06		
U-234	4.3044E-06	2,694.34	5,388.68	0.00E+00	1.16E-02	2.32E-02		
U-235	-7.7785E-09	2,694.34	0.00	1.47E-04	1.26E-04	1.47E-04		
U-236	1.8050E-07	2,694.34	5,388.68	0.00E+00	4.86E-04	9.73E-04		
U-238	-1.7914E-07	2,694.34	0.00	1.07E-02	1.02E-02	1.07E-02		
Y-90	5.0088E-01	2,694.34	5,388.68	0.00E+00	1.35E+03	2.70E+03		
Other Radionuclides					3.82E+03	7.63E+03		

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)^a

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.30		1.00
Bounding:	0.78		

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

^aTotal burnup for all fuel associated with this worksheet must be 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

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): 0.0329161

Template Decay Time: 35 years

Estimated

Canister usage:

18"x15"

0.40

II. Estimates	a	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	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	8.42E-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-08	7.11E-08	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	2.829E+13
Cs-134	1.5566E-03	10,382.82	20,765.65	0.00E+00	1.62E+01	3.23E+01	0.5750	1.085E+16
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+06
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	6.886E+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-06	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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reason: 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) ^a			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.
	From SFD	Estimated	
Nominal:		10,382.82	
Bounding:		20,765.65	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.69		
Bounding:	1.38		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-PO-2.4 & 5
 SNF ID #: 333
 Fuel Units & Descr: 3 - HEX ARRAY 189 ROD
 Heavy Metal Mass: BOL = : EOL=131.25kg
 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"
 0.60

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	4.7893E-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	1.848E+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+04
Kr-85	2.7848E-02	10,725.31	11,359.60	0.00E+00	2.99E+02	3.16E+02	7.0000	5.113E+05
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

	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)^a

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.50		1.00
Bounding:	0.53		

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

^aTotal burnup for all fuel associated with this worksheet must be 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

Fuel decay start date: 1992
Estimate as of: 2000
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 _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 Avg. MeV Total Photons/sec (bounding)
Ac-227	6.1822E-12	3,631.59	3,953.60	0.00E+00	2.25E-08	2.44E-08	0.0150 1.363E+14
Am-241	1.1066E-01	3,631.59	3,953.60	1.72E+02	5.74E+02	6.10E+02	0.0250 2.584E+13
Am-242m	1.9247E-03	3,631.59	3,953.60	0.00E+00	6.99E+00	7.61E+00	0.0375 2.989E+13
Am-243	1.0740E-04	3,631.59	3,953.60	0.00E+00	3.90E-01	4.25E-01	0.0575 3.156E+13
C-14	2.6042E-05	3,631.59	3,953.60	0.00E+00	9.46E-02	1.03E-01	0.0850 1.431E+13
Cf-252	3.4243E-10	3,631.59	3,953.60	0.00E+00	1.24E-06	1.35E-06	0.1250 1.007E+13
Cm-243	4.0629E-04	3,631.59	3,953.60	0.00E+00	1.48E+00	1.61E+00	0.2250 1.155E+13
Cm-244	1.6024E-03	3,631.59	3,953.60	0.00E+00	5.82E+00	6.34E+00	0.3750 5.008E+12
Co-60	3.4275E-03	3,631.59	3,953.60	0.00E+00	1.24E+01	1.36E+01	0.5750 2.028E+14
Cs-134	1.5566E-03	3,631.59	3,953.60	0.00E+00	5.65E+00	6.15E+00	0.8500 2.119E+12
Cs-135	4.7693E-05	3,631.59	3,953.60	0.00E+00	1.73E-01	1.89E-01	1.2500 2.536E+12
Cs-137	1.4007E+00	3,631.59	3,953.60	0.00E+00	5.09E+03	5.54E+03	1.7500 5.737E+10
Eu-154	1.6184E-02	3,631.59	3,953.60	0.00E+00	5.88E+01	6.40E+01	2.2500 1.207E+07
Eu-155	1.3774E-02	3,631.59	3,953.60	0.00E+00	5.00E+01	5.45E+01	2.7500 6.585E+07
Fe-55	3.8028E-04	3,631.59	3,953.60	0.00E+00	1.38E+00	1.50E+00	3.5000 6.094E+05
H-3	3.8454E-03	3,631.59	3,953.60	0.00E+00	1.40E+01	1.52E+01	5.0000 2.329E+05
I-129	1.2891E-06	3,631.59	3,953.60	0.00E+00	4.68E-03	5.10E-03	7.0000 2.650E+04
Kr-85	2.7848E-02	3,631.59	3,953.60	0.00E+00	1.01E+02	1.10E+02	11.0000 3.030E+03
Np-237	3.7516E-06	3,631.59	3,953.60	0.00E+00	1.36E-02	1.48E-02	
Pa-231	1.2488E-11	3,631.59	3,953.60	0.00E+00	4.54E-08	4.94E-08	
Pb-210	2.4206E-12	3,631.59	3,953.60	0.00E+00	8.79E-09	9.57E-09	
Pm-147	1.5671E-02	3,631.59	3,953.60	0.00E+00	5.69E+01	6.20E+01	
Pu-238	1.4877E-02	3,631.59	3,953.60	0.00E+00	5.40E+01	5.88E+01	
Pu-239	-3.5520E-02	3,631.59	0.00	1.42E+03	1.29E+03	1.42E+03	
Pu-240	2.0690E-02	3,631.59	3,953.60	7.20E+02	7.95E+02	8.01E+02	
Pu-241	-1.4799E+00	3,631.59	0.00	3.23E+04	2.69E+04	3.23E+04	
Pu-242	1.1252E-05	3,631.59	3,953.60	1.92E-01	2.33E-01	2.36E-01	
Ra-226	7.8524E-12	3,631.59	3,953.60	0.00E+00	2.85E-08	3.10E-08	
Ra-228	2.4086E-16	3,631.59	3,953.60	0.00E+00	8.75E-13	9.52E-13	
Ru-106	1.5066E-05	3,631.59	3,953.60	0.00E+00	5.47E-02	5.96E-02	
Se-79	1.0127E-05	3,631.59	3,953.60	0.00E+00	3.68E-02	4.00E-02	
Sn-126	4.3902E-05	3,631.59	3,953.60	0.00E+00	1.59E-01	1.74E-01	
Sr-90	5.0088E-01	3,631.59	3,953.60	0.00E+00	1.82E+03	1.98E+03	
Tc-99	3.9412E-04	3,631.59	3,953.60	0.00E+00	1.43E+00	1.56E+00	
Th-229	2.7219E-12	3,631.59	3,953.60	0.00E+00	9.88E-09	1.08E-08	
Th-230	1.0441E-09	3,631.59	3,953.60	0.00E+00	3.79E-06	4.13E-06	
Th-232	3.1689E-16	3,631.59	3,953.60	0.00E+00	1.15E-12	1.25E-12	
Ti-206	4.6636E-07	3,631.59	3,953.60	0.00E+00	1.69E-03	1.84E-03	
U-232	1.2638E-06	3,631.59	3,953.60	0.00E+00	4.59E-03	5.00E-03	
U-233	5.7451E-10	3,631.59	3,953.60	0.00E+00	2.09E-08	2.27E-08	
U-234	4.3044E-06	3,631.59	3,953.60	0.00E+00	1.56E-02	1.70E-02	
U-235	-7.7765E-09	3,631.59	0.00	2.91E-04	2.62E-04	2.91E-04	
U-236	1.8050E-07	3,631.59	3,953.60	0.00E+00	6.55E-04	7.14E-04	
U-238	-1.7914E-07	3,631.59	0.00	2.12E-02	2.05E-02	2.12E-02	
Y-90	5.0088E-01	3,631.59	3,953.60	0.00E+00	1.82E+03	1.98E+03	
Other Radionuclides					5.15E+03	5.60E+03	

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.24E+02	1.33E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	Pu and U	Pu and U
BOL Enrichment %:		10 to 30

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

Burnup Summary (MWd)

	From SFD	Estimated
Nominal:		3,631.59
Bounding:		3,953.60

Basis for burnup used is estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=89.448kg
Bounding burnup taken from SFD and converted to MWd using BOL=89.448kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.27	
Bounding:	0.29	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: 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

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"
 0.20

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	835.27	1,229.60	0.00E+00	5.16E-09	7.60E-09	Avg. MeV	
Am-241	1.1066E-01	835.27	1,229.60	6.91E+01	1.62E+02	2.05E+02	0.0150	4.323E+13
Am-242m	1.9247E-03	835.27	1,229.60	0.00E+00	1.81E+00	2.37E+00	0.0250	8.050E+12
Am-243	1.0740E-04	835.27	1,229.60	0.00E+00	8.97E-02	1.32E-01	0.0375	9.296E+12
C-14	2.6042E-05	835.27	1,229.60	0.00E+00	2.18E-02	3.20E-02	0.0575	1.003E+13
Cl-36	3.4243E-10	835.27	1,229.60	0.00E+00	2.86E-07	4.21E-07	0.0850	4.451E+12
Cm-243	4.0629E-04	835.27	1,229.60	0.00E+00	3.39E-01	5.00E-01	0.1250	3.134E+12
Cm-244	1.6024E-03	835.27	1,229.60	0.00E+00	1.34E+00	1.97E+00	0.2250	3.562E+12
Co-60	3.4275E-03	835.27	1,229.60	0.00E+00	2.86E+00	4.21E+00	0.3750	1.558E+12
Cs-134	1.5566E-03	835.27	1,229.60	0.00E+00	1.30E+00	1.91E+00	0.6750	6.307E+13
Cs-135	4.7893E-05	835.27	1,229.60	0.00E+00	3.98E-02	5.86E-02	0.8500	6.590E+11
Cs-137	1.4007E+00	835.27	1,229.60	0.00E+00	1.17E+03	1.72E+03	1.2500	7.887E+11
Eu-154	1.6184E-02	835.27	1,229.60	0.00E+00	1.35E+01	1.99E+01	1.7500	1.784E+10
Eu-155	1.3774E-02	835.27	1,229.60	0.00E+00	1.15E+01	1.69E+01	2.2500	3.824E+06
Fe-55	3.8028E-04	835.27	1,229.60	0.00E+00	3.18E-01	4.68E-01	2.7500	2.052E+07
H-3	3.8454E-03	835.27	1,229.60	0.00E+00	3.21E+00	4.73E+00	3.5000	2.257E+05
I-129	1.2891E-06	835.27	1,229.60	0.00E+00	1.08E-03	1.59E-03	5.0000	8.786E+04
Kr-85	2.7848E-02	835.27	1,229.60	0.00E+00	2.33E+01	3.42E+01	7.0000	9.988E+03
Np-237	3.7516E-06	835.27	1,229.60	0.00E+00	3.13E-03	4.61E-03	11.0000	1.142E+03
Pa-231	1.2488E-11	835.27	1,229.60	0.00E+00	1.04E-08	1.54E-08		
Pb-210	2.4206E-12	835.27	1,229.60	0.00E+00	2.02E-09	2.98E-09		
Pm-147	1.5671E-02	835.27	1,229.60	0.00E+00	1.31E+01	1.93E+01		
Pu-238	1.4877E-02	835.27	1,229.60	0.00E+00	1.24E+01	1.83E+01		
Pu-239	-3.5520E-02	835.27	0.00	5.67E+02	5.38E+02	5.67E+02		
Pu-240	2.0690E-02	835.27	1,229.60	2.88E+02	3.06E+02	3.14E+02		
Pu-241	-1.4799E+00	835.27	0.00	1.29E+04	1.17E+04	1.29E+04		
Pu-242	1.1252E-05	835.27	1,229.60	7.69E-02	8.63E-02	9.07E-02		
Ra-226	7.8524E-12	835.27	1,229.60	0.00E+00	6.56E-09	9.66E-09		
Ra-228	2.4086E-16	835.27	1,229.60	0.00E+00	2.01E-13	2.96E-13		
Ru-106	1.5066E-05	835.27	1,229.60	0.00E+00	1.26E-02	1.85E-02		
Se-79	1.0127E-05	835.27	1,229.60	0.00E+00	8.46E-03	1.25E-02		
Sn-126	4.3902E-05	835.27	1,229.60	0.00E+00	3.67E-02	5.40E-02		
Sr-90	5.0088E-01	835.27	1,229.60	0.00E+00	4.18E+02	6.16E+02		
Tc-99	3.9412E-04	835.27	1,229.60	0.00E+00	3.29E-01	4.85E-01		
Th-229	2.7219E-12	835.27	1,229.60	0.00E+00	2.27E-09	3.35E-09		
Th-230	1.0441E-09	835.27	1,229.60	0.00E+00	8.72E-07	1.28E-06		
Th-232	3.1689E-16	835.27	1,229.60	0.00E+00	2.65E-13	3.90E-13		
Ti-206	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: 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)			Basis for burnup used in estimate: Nominal burnup taken from SFD and converted to MWd using BOL=35.848kg Bounding burnup taken from SFD and converted to MWd using BOL=35.848kg
	From SFD	Estimated	
Nominal:		835.27	
Bounding:		1,229.60	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.15		
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: FTR-TFA-WBO18 & WBO42
 SNF ID #: 336
 Fuel Units & Dates: 2 - HEX ARRAY 61 ROD
 Heavy Metal Mass: BOL = : EOL=94.984kg
 ROD Storage Site: HANFORD

Fuel decay start date: 1992
 Estimate as of: 2030
 Template: FERM (Fuel, Zirc, 10 to 40%, U)
 Template Burnup(MWD): 58.6725048
 Heavy Metal Mass (MTR): 0.018774
 Template Decay Time: 35 years

Estimated
 Canister Usage:
 18"x15"
 0.40

Radionuclide	CLAWD From Template	Nominal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Gamma Sources
Ac-227	9.6110E-08	1.204.37	1.348.90	0.00E+00	1.16E-04	1.30E-04	0.0150	8.225E+13
Am-241	6.5601E-07	1.204.37	1.348.90	0.00E+00	7.90E-04	8.85E-04	0.0250	1.55E+13
Am-242m	0.0000E+00	1.204.37	1.348.90	0.00E+00	0.00E+00	0.00E+00	0.0250	1.55E+13
Am-243	8.370E-15	1.204.37	1.348.90	0.00E+00	1.01E-11	1.13E-11	0.0375	1.729E+13
C-14	2.1714E-05	1.204.37	1.348.90	0.00E+00	2.62E-02	2.83E-02	0.0575	1.045E+13
Cl-38	5.5188E-08	1.204.37	1.348.90	0.00E+00	6.65E-06	7.44E-06	0.0850	6.705E+12
Co-54	1.5496E-14	1.204.37	1.348.90	0.00E+00	1.87E-11	2.09E-11	0.1250	8.170E+12
Co-244	5.2375E-16	1.204.37	1.348.90	0.00E+00	6.31E-13	7.06E-13	0.2250	3.900E+12
Co-60	2.0947E-03	1.204.37	1.348.90	0.00E+00	2.52E+00	2.83E+00	0.3750	3.900E+12
Co-134	8.2448E-07	1.204.37	1.348.90	0.00E+00	7.52E-04	8.42E-04	0.5750	6.904E+11
Co-135	4.4896E-05	1.204.37	1.348.90	0.00E+00	5.40E-02	6.07E-02	0.8500	4.225E+11
Co-137	1.3775E+00	1.204.37	1.348.90	0.00E+00	1.66E+03	1.88E+03	1.2500	4.225E+11
Eu-154	1.8510E-04	1.204.37	1.348.90	0.00E+00	2.22E-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+08
Fe-55	1.4173E-05	1.204.37	1.348.90	0.00E+00	1.71E-02	1.91E-02	2.7500	2.795E+05
H-3	3.5383E-03	1.204.37	1.348.90	0.00E+00	4.26E+00	4.77E+00	3.5000	3.575E+02
I-129	1.1429E-06	1.204.37	1.348.90	0.00E+00	1.38E-03	1.54E-03	6.0000	1.300E+02
K-85	3.3099E-02	1.204.37	1.348.90	0.00E+00	4.65E+01	5.21E+01	7.0000	1.244E+01
Nb-237	3.8604E-02	1.204.37	1.348.90	0.00E+00	3.99E+00	4.46E+00	11.0000	1.257E+00
Pu-231	1.8655E-07	1.204.37	1.348.90	0.00E+00	2.28E-04	2.56E-04		
Pu-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	9.18E-02		
Pu-241	4.174E-06	1.204.37	1.348.90	0.00E+00	5.03E-03	5.63E-03		
Pu-242	4.9751E-13	1.204.37	1.348.90	0.00E+00	5.27E-10	5.95E-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	3.19E-08		
Rn-108	3.0951E-10	1.204.37	1.348.90	0.00E+00	3.73E-07	4.15E-07		
Sa-79	1.6488E-05	1.204.37	1.348.90	0.00E+00	1.99E-02	2.22E-02		
Se-126	3.7544E-05	1.204.37	1.348.90	0.00E+00	4.52E-02	5.07E-02		
Se-90	1.2032E+00	1.204.37	1.348.90	0.00E+00	1.45E+03	1.63E+03		
Tc-98	4.4825E-04	1.204.37	1.348.90	0.00E+00	5.40E-01	6.05E-01		
Tl-203	4.6479E-11	1.204.37	1.348.90	0.00E+00	5.60E-08	6.27E-08		
Tl-204	2.2259E-09	1.204.37	1.348.90	0.00E+00	2.68E-06	3.00E-06		
Tl-232	2.3691E-11	1.204.37	1.348.90	0.00E+00	2.85E-08	3.20E-08		
Tl-206	5.8256E-09	1.204.37	1.348.90	0.00E+00	7.02E-06	7.89E-06		
U-232	1.5759E-08	1.204.37	1.348.90	0.00E+00	1.90E-06	2.13E-06		
U-233	1.0110E-08	1.204.37	1.348.90	0.00E+00	1.22E-05	1.38E-05		
U-234	4.9001E-08	1.204.37	1.348.90	0.00E+00	5.90E-03	6.61E-03		
U-235	-2.3191E-08	1.204.37	0.00	5.33E-02	5.05E-02	5.33E-02		
U-236	1.2833E-05	1.204.37	1.348.90	0.00E+00	1.52E-02	1.70E-02		
U-238	-9.5407E-08	1.204.37	0.00	2.41E-02	2.40E-02	2.41E-02		
Y-90	1.2063E+00	1.204.37	1.348.90	0.00E+00	1.45E+03	1.65E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd/t)	From SFD	Estimated	Basic for Burnup used in estimate:
Nominal:	1.204.37		Nominal burnup taken from SFD and converted to MWd using BOL=68.35kg
Bounding:	1.348.90		Bounding burnup taken from SFD and converted to MWd using BOL=68.35kg

Checks	Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated BOL HMI/Given BOL HMI
Bounding:	4.00	4.00		1.00

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

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

Fuel decay start date: 1972
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: 50 years

Estimated
Canister usage:
HRC
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) 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	9.4369E-12	45,119.38	45,119.38	0.00E+00	4.26E-07	4.26E-07	Avg. MeV	
Am-241	1.1078E-01	45,119.38	45,119.38	1.74E+02	5.17E+03	5.17E+03	0.0150	9.732E+14
Am-242m	1.7940E-03	45,119.38	45,119.38	0.00E+00	8.09E+01	8.09E+01	0.0250	1.917E+14
Am-243	1.0724E-04	45,119.38	45,119.38	0.00E+00	4.84E+00	4.84E+00	0.0375	2.185E+14
C-14	2.5942E-05	45,119.38	45,119.38	0.00E+00	1.17E+00	1.17E+00	0.0675	2.428E+14
Cl-36	3.4243E-10	45,119.38	45,119.38	0.00E+00	1.55E-05	1.55E-05	0.0650	1.026E+14
Cm-243	2.8217E-04	45,119.38	45,119.38	0.00E+00	1.27E+01	1.27E+01	0.1250	6.757E+13
Cm-244	7.7027E-04	45,119.38	45,119.38	0.00E+00	3.48E+01	3.48E+01	0.2250	8.525E+13
Co-60	1.3011E-04	45,119.38	45,119.38	0.00E+00	5.87E+00	5.87E+00	0.3750	3.629E+13
Cs-134	1.2951E-07	45,119.38	45,119.38	0.00E+00	5.84E-03	5.84E-03	0.5750	1.536E+15
Cs-135	4.7693E-05	45,119.38	45,119.38	0.00E+00	2.15E+00	2.15E+00	0.8500	8.034E+12
Cs-137	9.3351E-01	45,119.38	45,119.38	0.00E+00	4.21E+04	4.21E+04	1.2500	4.766E+12
Eu-154	2.6341E-03	45,119.38	45,119.38	0.00E+00	1.19E+02	1.19E+02	1.7500	2.190E+11
Eu-155	4.0968E-04	45,119.38	45,119.38	0.00E+00	1.85E+01	1.85E+01	2.2500	2.164E+07
Fe-55	2.5543E-07	45,119.38	45,119.38	0.00E+00	1.15E-02	1.15E-02	2.7500	6.416E+08
H-3	1.2053E-03	45,119.38	45,119.38	0.00E+00	5.44E+01	5.44E+01	3.5000	1.517E+06
I-129	1.2891E-06	45,119.38	45,119.38	0.00E+00	5.82E-02	5.82E-02	5.0000	6.435E+05
K-85	7.0043E-03	45,119.38	45,119.38	0.00E+00	3.16E+02	3.16E+02	7.0000	7.329E+04
Np-237	4.3622E-06	45,119.38	45,119.38	0.00E+00	1.97E-01	1.97E-01	11.0000	8.374E+03
Pa-231	1.6733E-11	45,119.38	45,119.38	0.00E+00	7.55E-07	7.55E-07		
Pb-210	6.0684E-12	45,119.38	45,119.38	0.00E+00	2.74E-07	2.74E-07		
Pm-147	1.1315E-05	45,119.38	45,119.38	0.00E+00	5.11E-01	5.11E-01		
Pu-238	6.1482E-03	45,119.38	45,119.38	0.00E+00	2.77E+02	2.77E+02		
Pu-239	-3.5520E-02	45,119.38	0.00	1.43E+03	0.00E+00	1.43E+03		
Pu-240	2.0590E-02	45,119.38	45,119.38	7.27E+02	1.66E+03	1.66E+03		
Pu-241	-2.0307E+00	45,119.38	0.00	3.26E+04	0.00E+00	3.26E+04		
Pu-242	1.1252E-05	45,119.38	45,119.38	1.94E-01	7.02E-01	7.02E-01		
Ra-226	1.6601E-11	45,119.38	45,119.38	0.00E+00	7.49E-07	7.49E-07		
Ra-228	3.7077E-16	45,119.38	45,119.38	0.00E+00	1.67E-11	1.67E-11		
Ru-106	3.3126E-14	45,119.38	45,119.38	0.00E+00	1.49E-09	1.49E-09		
Se-79	1.0117E-05	45,119.38	45,119.38	0.00E+00	4.56E-01	4.56E-01		
Sn-126	4.3902E-05	45,119.38	45,119.38	0.00E+00	1.98E+00	1.98E+00		
Sr-90	3.2926E-01	45,119.38	45,119.38	0.00E+00	1.49E+04	1.49E+04		
Tc-99	3.9412E-04	45,119.38	45,119.38	0.00E+00	1.78E+01	1.78E+01		
Th-229	3.6957E-12	45,119.38	45,119.38	0.00E+00	1.67E-07	1.67E-07		
Th-230	1.6942E-09	45,119.38	45,119.38	0.00E+00	7.64E-05	7.64E-05		
Th-232	4.6236E-16	45,119.38	45,119.38	0.00E+00	2.09E-11	2.09E-11		
Ti-206	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)¹

	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		

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

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

Fuel decay start date: 1982
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: 35 years

Estimated
Canister usage:
HIC
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) ^a	Bounding Fuel Burnup (MWd) ^a	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	2.058E+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		
Th-208	1.7474E-07	60,759.03	60,759.03	0.00E+00	1.06E-02	1.06E-02		
U-232	4.7368E-07	60,759.03	60,759.03	0.00E+00	2.88E-02	2.88E-02		
U-233	2.5097E-08	60,759.03	60,759.03	0.00E+00	1.52E-03	1.52E-03		
U-234	5.0000E-05	60,759.03	60,759.03	0.00E+00	3.04E+00	3.04E+00		
U-235	-1.4489E-06	60,759.03	0.00	8.84E-03	0.00E+00	8.84E-03		
U-236	7.5824E-06	60,759.03	60,759.03	0.00E+00	4.61E-01	4.61E-01		
U-238	-2.6129E-07	60,759.03	0.00	4.16E-02	2.57E-02	4.16E-02		
Y-90	9.1699E-01	60,759.03	60,759.03	0.00E+00	5.57E+04	5.57E+04		
Other Radionuclides					8.16E+04	8.16E+04		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		60,759.03	Nominal burnup set equal to bounding burnup.
		60,759.03	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:	13.58	13.58	1.58

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

^aTotal burnup for all fuel associated with this worksheet must be 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
RAD Storage Site: HANFORD

*Fuel decay start date: 1963
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: 65 years

Estimated
Canister usage:
HIC
1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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+08
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	9.83E+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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	2,143.51	1,182.79
Bounding:	2,449.72	2,365.58

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

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

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: 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

*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
383.97

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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+10
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+10
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+10
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+10
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+10
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+10
Co-60	8.8563E-08	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+08	4.83E+08	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-08	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-206	8.4885E-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-05	5,060,015.91	0.00	5.22E+01	4.57E+01	5.22E+01		
U-236	1.1961E-08	5,060,015.91	5,718,007.18	0.00E+00	6.05E+01	6.84E+01		
U-238	-3.0619E-07	5,060,015.91	0.00	6.98E+02	6.97E+02	6.98E+02		
Y-90	5.9425E-01	5,060,015.91	5,718,007.18	0.00E+00	3.01E+06	3.40E+06		
Other Radionuclides					4.12E+06	4.65E+06		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
6.88E+04	7.77E+04	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
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) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	5,060,015.91	2,515,522.81	
Bounding:	5,718,007.18	5,031,045.62	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:	0.40	0.50	
Bounding:	0.45	0.53	1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 1981
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
Template Burnup (MWD): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated
Canister usage:
18"x15"
1.50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/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	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
Cl-36	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	9.78E+01	9.78E+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	2.845E+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		
Ti-208	1.7474E-07	38,160.90	38,160.90	0.00E+00	6.67E-03	6.67E-03		
U-232	4.7368E-07	38,160.90	38,160.90	0.00E+00	1.81E-02	1.81E-02		
U-233	2.5097E-08	38,160.90	38,160.90	0.00E+00	9.58E-04	9.58E-04		
U-234	5.0000E-05	38,160.90	38,160.90	0.00E+00	1.91E+00	1.91E+00		
U-235	-1.4489E-06	38,160.90	0.00	6.30E-02	7.76E-03	6.30E-02		
U-236	7.5824E-06	38,160.90	38,160.90	0.00E+00	2.89E-01	2.89E-01		
U-238	-2.6129E-07	38,160.90	0.00	3.82E-01	3.72E-01	3.82E-01		
Y-90	9.1899E-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
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.5	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	38,160.90	5,230.14
Bounding:	38,160.90	10,460.29

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.93	0.14
Bounding:	0.93	0.27

Estimated EOL HM/Given EOL HM
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=16226kg; EOL=15780.002kg
ROD Storage Site: HANFORD

Fuel decay start date: 1989
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:
MCO
18.00

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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)		
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+18
Am-242m	2.6809E-04	433,632.15	867,264.30	0.00E+00	1.16E+02	2.33E+02	0.0250	6.813E+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
Ci-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+18
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	1.986E+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	1.758E+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+08
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		

Thermal Power		
Nominal Heat	Bounding	
Output (Watts)	Heat Output (Watts)	
7.84E+03	1.57E+04	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	263,023.20	433,632.15	
Bounding:	399,406.60	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

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

^aTotal burnup for all fuel associated with this worksheet must be 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

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
0.86

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7399E-10	6,078.13	12,156.27	0.00E+00	5.31E-06	1.06E-05	Avg. MeV	
Am-241	9.9095E-02	6,078.13	12,156.27	0.00E+00	6.02E+02	1.20E+03	0.0150	4.170E+14
Am-242m	5.4598E-05	6,078.13	12,156.27	0.00E+00	3.32E-01	6.64E-01	0.0250	8.476E+13
Am-243	4.6221E-05	6,078.13	12,156.27	0.00E+00	2.81E-01	5.62E-01	0.0375	7.807E+13
C-14	9.1853E-05	6,078.13	12,156.27	0.00E+00	5.58E-01	1.12E+00	0.0575	9.436E+13
Cl-36	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00	0.0850	4.685E+13
Cm-243	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00	0.1250	3.064E+13
Cm-244	2.5589E-04	6,078.13	12,156.27	0.00E+00	1.56E+00	3.11E+00	0.2250	4.012E+13
Co-60	8.8563E-06	6,078.13	12,156.27	0.00E+00	5.38E-02	1.08E-01	0.3750	1.739E+13
Cs-134	9.0661E-08	6,078.13	12,156.27	0.00E+00	5.51E-04	1.10E-03	0.5750	3.793E+14
Cs-135	1.0066E-05	6,078.13	12,156.27	0.00E+00	6.12E-02	1.22E-01	0.8500	3.239E+12
Cs-137	8.4454E-01	6,078.13	12,156.27	0.00E+00	5.13E+03	1.03E+04	1.2500	1.414E+12
Eu-154	1.9842E-03	6,078.13	12,156.27	0.00E+00	1.21E+01	2.41E+01	1.7500	8.660E+10
Eu-155	3.5690E-05	6,078.13	12,156.27	0.00E+00	2.17E-01	4.34E-01	2.2500	8.444E+06
Fe-55	5.2802E-08	6,078.13	12,156.27	0.00E+00	3.21E-04	6.42E-04	2.7500	2.507E+05
H-3	9.0776E-04	6,078.13	12,156.27	0.00E+00	5.52E+00	1.10E+01	3.5000	2.218E+05
I-129	8.6006E-07	6,078.13	12,156.27	0.00E+00	5.23E-03	1.05E-02	5.0000	9.346E+04
Kr-85	1.0138E-02	6,078.13	12,156.27	0.00E+00	6.16E+01	1.23E+02	7.0000	1.056E+04
Np-237	9.0345E-06	6,078.13	12,156.27	0.00E+00	5.49E-02	1.10E-01	11.0000	1.202E+03
Pa-231	1.9210E-09	6,078.13	12,156.27	0.00E+00	1.17E-05	2.34E-05		
Pb-210	7.5862E-11	6,078.13	12,156.27	0.00E+00	4.61E-07	9.22E-07		
Pm-147	1.1372E-05	6,078.13	12,156.27	0.00E+00	6.91E-02	1.38E-01		
Pu-238	1.7802E-02	6,078.13	12,156.27	0.00E+00	1.08E+02	2.16E+02		
Pu-239	2.8822E-02	6,078.13	12,156.27	0.00E+00	1.75E+02	3.50E+02		
Pu-240	2.2759E-02	6,078.13	12,156.27	0.00E+00	1.38E+02	2.77E+02		
Pu-241	2.9641E-01	6,078.13	12,156.27	0.00E+00	1.80E+03	3.60E+03		
Pu-242	1.4526E-05	6,078.13	12,156.27	0.00E+00	8.83E-02	1.77E-01		
Ra-226	2.3132E-10	6,078.13	12,156.27	0.00E+00	1.41E-06	2.81E-06		
Ra-228	1.9655E-14	6,078.13	12,156.27	0.00E+00	1.19E-10	2.39E-10		
Ru-106	1.9612E-14	6,078.13	12,156.27	0.00E+00	1.19E-10	2.38E-10		
Se-79	1.0897E-05	6,078.13	12,156.27	0.00E+00	6.62E-02	1.32E-01		
Sn-126	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00		
Sr-90	5.9411E-01	6,078.13	12,156.27	0.00E+00	3.61E+03	7.22E+03		
Tc-99	3.6494E-04	6,078.13	12,156.27	0.00E+00	2.22E+00	4.44E+00		
Th-229	3.1063E-12	6,078.13	12,156.27	0.00E+00	1.89E-08	3.78E-08		
Th-230	2.5187E-08	6,078.13	12,156.27	0.00E+00	1.53E-04	3.06E-04		
Th-232	2.5287E-14	6,078.13	12,156.27	0.00E+00	1.54E-10	3.07E-10		
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	Thermal Power	
U-233	1.5704E-09	6,078.13	12,156.27	0.00E+00	9.55E-06	1.91E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	6.6293E-05	6,078.13	12,156.27	0.00E+00	4.03E-01	8.06E-01	6.38E+01	1.85E+02
U-235	-1.2930E-06	6,078.13	0.00	5.37E-03	0.00E+00	5.37E-03	Total	Total
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	9.89E-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

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except cladding.
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	ALUM	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	0.086	0 to 5	

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:	2,891.61	6,078.13	
Bounding:		12,156.27	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
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, Zinc, 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	sa	xb	xb	b	ya	yb	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	9.0681E-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+08
Eu-155	3.5690E-05	454.58	909.16	0.00E+00	1.62E-02	3.24E-02	2.2500	8.322E+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	8.6006E-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-08	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		
Th-208	6.4885E-15	454.58	909.16	0.00E+00	2.95E-12	5.90E-12		
U-232	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00		
U-233	1.5704E-09	454.58	909.16	0.00E+00	7.14E-07	1.43E-06		
U-234	8.6293E-05	454.58	909.16	0.00E+00	3.01E-02	6.03E-02		
U-235	-1.2930E-06	454.58	0.00	1.10E-02	1.04E-02	1.10E-02		
U-238	1.1961E-05	454.58	909.16	0.00E+00	5.44E-03	1.09E-02		
U-238	-3.0619E-07	454.58	0.00	1.35E-01	1.35E-01	1.35E-01		
Y-90	5.9425E-01	454.58	909.16	0.00E+00	2.70E+02	5.40E+02		
Other Radionuclides					3.70E+02	7.40E+02		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD 407.44	Estimated 454.58	
Bounding:		909.16	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 0.19	Estimated Burnup/ Given Burnup 1.12	
Bounding:	0.37		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SP-100 FUEL
SNF ID #: 777
Fuel Units & Descr: 2 - SCRAP
Heavy Metal Mass: BOL=2.711kg; EOL=2.628kg
ROO 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	x_1	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	73.37	146.73	0.00E+00	7.05E-06	1.41E-05	Avg. MeV	
Am-241	6.5801E-07	73.37	146.73	0.00E+00	4.81E-05	9.63E-05	0.0150	9.709E+12
Am-242m	0.0000E+00	73.37	146.73	0.00E+00	0.00E+00	0.00E+00	0.0250	2.017E+12
Am-243	8.3770E-15	73.37	146.73	0.00E+00	6.15E-13	1.23E-12	0.0375	1.774E+12
C-14	2.1714E-05	73.37	146.73	0.00E+00	1.59E-03	3.19E-03	0.0575	1.879E+12
Cl-36	5.5188E-08	73.37	146.73	0.00E+00	4.05E-06	8.10E-06	0.0850	1.137E+12
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	4.801E+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	6.0000	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	4.8478E-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		
Ti-208	5.8256E-09	73.37	146.73	0.00E+00	4.27E-07	8.55E-07		
U-232	1.5759E-08	73.37	146.73	0.00E+00	1.16E-06	2.31E-06		
U-233	1.0110E-08	73.37	146.73	0.00E+00	7.42E-07	1.48E-06		
U-234	4.9001E-06	73.37	146.73	0.00E+00	3.59E-04	7.19E-04		
U-235	-2.3191E-06	73.37	0.00	1.05E-03	8.84E-04	1.05E-03		
U-236	1.2633E-05	73.37	146.73	0.00E+00	9.27E-04	1.85E-03		
U-238	-9.5407E-08	73.37	0.00	7.47E-04	7.40E-04	7.47E-04		
Y-90	1.2053E+00	73.37	146.73	0.00E+00	8.84E+01	1.77E+02		
Other Radionuclides					1.00E+02	2.01E+02		

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:	UNKNOWN	ZIRC	This template is a good approximation since it is a FAST, Uranium fuel
BOL HM Constituents:	U	U	
BOL Enrichment %:	18	10 to 40	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		73.37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		146.73	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	8.66		1.01
Bounding:	17.32		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 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

Fuel decay start date: 1989

Estimate as of: 2030

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

Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 35 years

Estimated

Canister usage:

18"x10"

0.03

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	0.0675	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-06	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	2.78E-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-06	3.74	7.48	0.00E+00	4.62E-06	9.25E-06		
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		
Th-208	1.3723E-08	3.74	7.48	0.00E+00	5.14E-08	1.03E-07		
U-232	3.6932E-06	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-08	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:
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 %:	19.792	10 to 20.1	

Burnup Summary (MWd) ^a			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

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

^aTotal burnup for all fuel associated with this worksheet must be divided 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

Fuel decay start date: 1967
 Estimates as of: 2030
 Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
 Template Burnup (MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 35 years

Estimated
 Canister usage:
 16"x10"
 0.59

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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-06	421.00	842.00	0.00E+00	1.82E-02	3.63E-02	0.0575	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	4.366E+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+08
Fe-55	2.9338E-06	421.00	842.00	0.00E+00	1.24E-03	2.47E-03	2.7500	4.883E+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	7.3806E-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-80	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

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.786	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	421.00	132.30
Bounding:		842.00

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.92	0.31
Bounding:	1.85	

Estimated EOL HM/Given EOL HM

0.98

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

^bTotal burnup for all fuel associated with this worksheet must be divided 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

Fuel decay start date: 1989

Estimates as of: 2030

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

Template 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 ₀	x ₀	b	y ₀	y ₀	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	343.66	687.32	0.00E+00	2.30E-06	4.61E-06	Avg. MeV	
Am-241	3.9068E-03	343.66	687.32	0.00E+00	1.34E+00	2.69E+00	0.0150	4.798E+13
Am-242m	1.2325E-06	343.66	687.32	0.00E+00	4.24E-04	8.47E-04	0.0250	9.969E+12
Am-243	1.4732E-07	343.66	687.32	0.00E+00	5.06E-05	1.01E-04	0.0375	8.680E+12
C-14	1.2824E-04	343.66	687.32	0.00E+00	4.41E-02	8.81E-02	0.0575	9.331E+12
Cl-36	2.8120E-06	343.66	687.32	0.00E+00	9.66E-04	1.93E-03	0.0850	5.615E+12
Cm-243	8.6556E-06	343.66	687.32	0.00E+00	2.97E-05	5.95E-05	0.1250	3.654E+12
Cm-244	5.3835E-07	343.66	687.32	0.00E+00	1.85E-04	3.70E-04	0.2250	4.836E+12
Co-60	2.4887E-02	343.66	687.32	0.00E+00	8.55E+00	1.71E+01	0.3750	2.109E+12
Cs-134	3.8030E-06	343.66	687.32	0.00E+00	1.31E-03	2.61E-03	0.5750	3.528E+13
Cs-135	3.2195E-05	343.66	687.32	0.00E+00	1.11E-02	2.21E-02	0.8500	3.610E+11
Cs-137	1.3788E+00	343.66	687.32	0.00E+00	4.74E+02	9.48E+02	1.2500	1.401E+12
Eu-154	1.3711E-03	343.66	687.32	0.00E+00	4.71E-01	9.42E-01	1.7500	9.369E+09
Eu-155	4.4361E-04	343.66	687.32	0.00E+00	1.52E-01	3.05E-01	2.2500	7.878E+08
Fe-55	2.6075E-04	343.66	687.32	0.00E+00	8.96E-02	1.79E-01	2.7500	3.529E+06
H-3	2.0647E-03	343.66	687.32	0.00E+00	7.10E-01	1.42E+00	3.5000	8.686E+02
I-129	7.3684E-07	343.66	687.32	0.00E+00	2.53E-04	5.06E-04	5.0000	3.658E+02
Kr-85	3.6346E-02	343.66	687.32	0.00E+00	1.25E+01	2.50E+01	7.0000	4.129E+01
Np-237	1.2844E-08	343.66	687.32	0.00E+00	4.41E-04	8.83E-04	11.0000	4.895E+00
Pa-231	1.2352E-06	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	1.2785E+00	343.66	687.32	0.00E+00	4.39E+02	8.77E+02		
Other Radionuclides					4.73E+02	9.45E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.53E+08	1.11E+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 %:	20.00000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	256.56	343.66
Bounding:		687.32

Basis for burnup used in estimates:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	1.34
Bounding:	1.15	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (HANFORD)
 SNF ID #: 316
 Fuel Units & Descr: 33 - ELEMENT
 Heavy Metal Mass: BOL=6.336kg; EOL=6.316kg
 ROD Storage Site: HANFORD

Fuel decay start date: 1989
 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: 35 years

Estimated
 Canister usage:
 16"x10"
 0.30

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	6.7038E-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
Cm-243	8.6556E-08	30.88	61.75	0.00E+00	2.67E-06	5.34E-06	0.1250	3.283E+11
Cm-244	5.3835E-07	30.88	61.75	0.00E+00	1.86E-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	6.896E+06
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	9.8481E-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		

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 %:	19.896	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	30.88	18.90
Bounding:		61.75

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:	0.14	0.61
Bounding:	0.29	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ACRR (PULSED CORE)
SNF ID #: 757
Fuel Units & Descr: 251 - ELEMENT
Heavy Metal Mass: BOL=120.831kg; EOL=120.831kg
RAD Storage Site: INEEL

¹Fuel decay start date: 2036
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 ₀	X _b	b	Y ₀	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-08	8.98E-08	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	9.8902E-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
Cf-252	1.2281E-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	8.688E+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	4.376E+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	7.5025E-03	2,282.86	4,565.72	0.00E+00	1.71E+01	3.43E+01	1.7500	4.378E+11
Eu-155	4.6123E-02	2,282.86	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		
Th-234	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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.42E+02	4.85E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	21.10367543	60 to 100

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		2,282.86
Bounding:		4,565.72

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.81	

Estimated EOL HM/Given EOL HM
0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ANP
SNF ID #: 451
Fuel Units & Descr: 9 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=1.118kg; EOL=1.102kg
ROD Storage Site: INEEL

Fuel decay start date: 1957
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"
0.69

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	4.5940E-08	15.30	30.61	0.00E+00	7.03E-07	1.41E-06	Avg. MeV	
Am-241	1.1471E-04	15.30	30.61	0.00E+00	1.76E-03	3.51E-03	0.0150	1.117E+12
Am-242m	7.4210E-09	15.30	30.61	0.00E+00	1.14E-07	2.27E-07	0.0250	2.321E+11
Am-243	9.8236E-10	15.30	30.61	0.00E+00	1.50E-08	3.01E-08	0.0375	2.017E+11
C-14	2.2928E-04	15.30	30.61	0.00E+00	3.51E-03	7.02E-03	0.0575	2.164E+11
Cl-36	1.2260E-06	15.30	30.61	0.00E+00	1.88E-05	3.75E-05	0.0850	1.307E+11
Cm-243	1.2000E-10	15.30	30.61	0.00E+00	1.84E-09	3.67E-09	0.1250	8.478E+10
Cm-244	7.3577E-10	15.30	30.61	0.00E+00	1.13E-08	2.25E-08	0.2250	1.127E+11
Co-60	1.3732E-03	15.30	30.61	0.00E+00	2.10E-02	4.20E-02	0.3750	4.915E+10
Cs-134	1.2709E-10	15.30	30.61	0.00E+00	1.94E-09	3.89E-09	0.5750	8.267E+11
Cs-135	3.0316E-05	15.30	30.61	0.00E+00	4.64E-04	9.28E-04	0.8500	8.029E+09
Cs-137	7.2579E-01	15.30	30.61	0.00E+00	1.11E+01	2.22E+01	1.2500	5.811E+09
Eu-154	5.9750E-05	15.30	30.61	0.00E+00	9.14E-04	1.83E-03	1.7500	2.065E+08
Eu-155	1.0577E-05	15.30	30.61	0.00E+00	1.62E-04	3.24E-04	2.2500	3.906E+04
Fe-55	4.1631E-07	15.30	30.61	0.00E+00	6.37E-06	1.27E-05	2.7500	1.749E+04
H-3	4.6722E-04	15.30	30.61	0.00E+00	7.15E-03	1.43E-02	3.5000	1.968E+00
I-129	7.3195E-07	15.30	30.61	0.00E+00	1.12E-05	2.24E-05	6.0000	8.142E-01
Kr-85	5.9418E-03	15.30	30.61	0.00E+00	9.09E-02	1.82E-01	7.0000	9.017E-02
Np-237	1.1499E-06	15.30	30.61	0.00E+00	1.76E-05	3.52E-05	11.0000	1.014E-02
Pa-231	7.0899E-08	15.30	30.61	0.00E+00	1.08E-06	2.17E-06		
Pb-210	2.2363E-12	15.30	30.61	0.00E+00	3.42E-11	6.84E-11		
Pm-147	4.2296E-07	15.30	30.61	0.00E+00	6.47E-06	1.29E-05		
Pu-238	2.3295E-04	15.30	30.61	0.00E+00	3.56E-03	7.13E-03		
Pu-239	6.6722E-04	15.30	30.61	0.00E+00	1.02E-02	2.04E-02		
Pu-240	8.6556E-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		
Th-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.25E-01	2.49E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD: LIGHT WATER	Used: LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	NICHROME	SST	This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.20218125	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		15.30	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		30.61	Bounding burnup assumed to be twice nominal burnup.

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

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"
0.06

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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-08	2.64E-08	Avg. MeV	
Am-241	1.1471E-04	28.72	57.43	0.00E+00	3.29E-03	6.59E-03	0.0150	2.098E+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	1.391E+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	7.88E-09	1.57E-08		
Th-232	8.3594E-12	28.72	57.43	0.00E+00	2.40E-10	4.80E-10		
Ti-206	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-238	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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Claddings:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	92.987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		28.72
Bounding:		57.43

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:	2.50	
Bounding:	5.00	

Estimated EOL HM/Given EOL HM

1.00

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

^a 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	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-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	4.7801E-05	670.42	1,340.84	0.00E+00	3.21E-02	6.42E-02	0.0575	1.803E+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	5.802E+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	9.88E-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	4.80E-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		
U-233	2.5097E-08	670.42	1,340.84	0.00E+00	1.68E-05	3.37E-05		
U-234	5.0000E-05	670.42	1,340.84	0.00E+00	3.35E-02	6.70E-02		
U-235	-1.4489E-06	670.42	0.00	7.90E-04	0.00E+00	7.90E-04		
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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E+01	3.88E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.9	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	592.20	670.42	
Bounding:		1,340.84	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.52	1.13	
Bounding:	3.04		

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: ARMF (PLATES)
SNF ID #: 8
Fuel Units & Descr: 15 - FLAT PLATES IN CAN
Heavy Metal Mass: BOL=0.198kg; EOL=0.198kg
ROD Storage Shtr: SRS

Fuel decay start date: 1987
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"
1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	3.9824E-07	0.02	0.05	0.00E+00	9.02E-09	1.80E-08	0.0250	6.965E+08
Am-243	1.4880E-08	0.02	0.05	0.00E+00	3.39E-08	6.78E-08	0.0375	6.064E+08
C-14	5.7053E-09	0.02	0.05	0.00E+00	1.30E-10	2.60E-10	0.0575	6.516E+08
Ci-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	2.618E+08
Cm-244	1.6522E-05	0.02	0.05	0.00E+00	3.76E-07	7.52E-07	0.2250	3.489E+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+08
Cs-135	3.4477E-08	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		
Ti-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.89393939	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	0.02	
Bounding:		0.05

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	0.00
Bounding:	0.00	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: NAAFCO-FRUE MARK 1
 SIF ID #: 9
 Fuel Units & Descr: 56 - 15 FLAT PLATES
 Heavy Metal Mass: BOL-11.25kg; EOL-11.25kg
 MOO Storage Site: SRS

Estimated
 Canister usage:
 18"x10"
 2.33

II. Estimates

III. Template Selection Summary, Burnup Summary, and Checks

Radionuclide	CHAWD From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources
Ac-227	2.008E-09	1.30	13.74	0.00E+00	2.61E-09	2.78E-08	Photon Energy Group (Bouding)
Am-241	2.5251E-03	1.30	13.74	0.00E+00	3.28E-03	3.47E-02	1.07E+12
Am-243m	3.9624E-07	1.30	13.74	0.00E+00	5.14E-07	5.44E-06	2.10E+11
Am-243	1.4689E-06	1.30	13.74	0.00E+00	1.83E-06	2.04E-05	1.82E+11
C-14	5.7053E-09	1.30	13.74	0.00E+00	7.41E-09	7.84E-08	1.26E+11
Ce-136	1.3124E-32	1.30	13.74	0.00E+00	1.70E-32	1.80E-31	1.18E+11
Co-243	1.1419E-07	1.30	13.74	0.00E+00	1.48E-07	1.57E-06	7.837E+10
Co-244	1.6522E-05	1.30	13.74	0.00E+00	2.15E-05	2.27E-04	1.027E+11
Co-60	7.4047E-07	1.30	13.74	0.00E+00	9.81E-07	1.02E-05	4.446E+10
Co-134	2.0455E-05	1.30	13.74	0.00E+00	2.66E-05	2.81E-04	7.352E+11
Co-135	3.4477E-06	1.30	13.74	0.00E+00	4.48E-06	4.74E-05	8.861E+09
Ce-137	1.4635E-00	1.30	13.74	0.00E+00	1.87E-00	1.97E-01	4.344E+08
Eu-154	7.3230E-03	1.30	13.74	0.00E+00	9.51E-03	1.01E-01	2.445E+08
Eu-155	5.9259E-04	1.30	13.74	0.00E+00	7.69E-04	8.14E-03	2.250E+04
Fe-55	2.2791E-06	1.30	13.74	0.00E+00	2.96E-06	3.13E-05	1.851E+04
H-3	1.9698E-03	1.30	13.74	0.00E+00	2.56E-03	2.71E-02	3.500E+00
I-129	7.5300E-07	1.30	13.74	0.00E+00	9.78E-07	1.03E-05	5.000E+00
K-40	4.1170E-02	1.30	13.74	0.00E+00	5.35E-02	5.68E-01	7.000E+00
Np-237	9.5752E-06	1.30	13.74	0.00E+00	1.24E-05	1.32E-04	11.000E+02
Pu-231	3.8379E-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	5.68E-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	4.89E-06	
Pu-236	9.0114E-10	1.30	13.74	0.00E+00	1.17E-09	1.24E-08	
Pa-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	2.78E-10	2.82E-09	
Se-79	1.2830E-05	1.30	13.74	0.00E+00	1.68E-05	1.78E-04	
Sn-126	1.5171E-05	1.30	13.74	0.00E+00	1.50E-05	1.58E-04	
St-90	1.3472E-00	1.30	13.74	0.00E+00	1.75E+00	1.85E+01	
Tc-99	4.2238E-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	3.6371E-14	1.30	13.74	0.00E+00	4.98E-14	5.27E-13	
Th-230a	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	4.89E-08	
U-234	1.8562E-04	1.30	13.74	0.00E+00	2.41E-04	2.55E-03	
U-235	2.7236E-06	1.30	0.00	2.25E-02	2.25E-02	2.25E-02	
U-236	1.5483E-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	

Thermal Power
 Nominal Heat Output (Watts)
 2.22E+02
 Bounding Heat Output (Watts)
 2.31E+01
 Total

Template Selection Summary				Basis for Parameter Differences:	
From SFD	Used	From SFD	Used		
Reactor Moderator: LIGHT WATER	ALUM	Reactor Moderator: LIGHT WATER	ALUM		
Fuel Cladding: BCL NH1 Constituents: U	U	Fuel Cladding: BCL NH1 Constituents: U	U		
BOL Enrichment %:	82.28270621	BOL Enrichment %:	80 to 100		
Burnup Summary (MWd/g)					
Nominal:	1.30	Estimated		Basis for Burnup used in estimate:	
Bounding:	13.74			Nominal burnup taken directly from SFD (converted to MWd/g).	
				Bounding burnup taken directly from SFD (converted to MWd/g).	
Checks					
Nominal:	Burnup Multiplier: 0.00	Estimated Burnup/ Given Burnup: 0.00		Estimated EOL MW/Given EOL NH1	
Bounding:	0.00	0.00		1.00	

Reactor shutdown, core removal, storage, shipping or other data confirming peak irradiation ceased for fuel.
 *Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/gNH1).

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

*Fuel decay start date:

1991

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"

0.08

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	8.85E-05	7.25E-04	0.0150	2.118E+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	1.84E-09	0.0675	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-06	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-208	4.0414E-08	0.03	0.29	0.00E+00	1.10E-09	1.16E-08		
U-232	1.0948E-07	0.03	0.29	0.00E+00	2.97E-09	3.14E-08		
U-233	3.6275E-09	0.03	0.29	0.00E+00	9.84E-11	1.04E-09		
U-234	1.8562E-04	0.03	0.29	0.00E+00	5.04E-06	5.33E-05		
U-235	-2.7235E-06	0.03	0.00	4.75E-04	4.75E-04	4.75E-04		
U-236	1.5493E-05	0.03	0.29	0.00E+00	4.20E-07	4.45E-06		
U-238	-4.2851E-09	0.03	0.00	5.38E-06	5.38E-06	5.38E-06		
Y-90	1.3475E+00	0.03	0.29	0.00E+00	3.66E-02	3.87E-01		
Other Radionuclides					3.71E-02	3.93E-01		

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 %:	93.22	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	0.03		
Bounding:	0.29		

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:	0.00	0.00	1.00
Bounding:	0.00	0.00	

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

^aTotal burnup for all fuel associated with this worksheet must be 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 II
SNF ID #: 11

Fuel Units & Descr: 8 - 15 FLAT PLATES
Heavy Metal Mass: BOL=1.164kg; EOL=1.164kg
ROD Storage Site: SRS

Fuel decay start date: 1991
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"
0.33

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	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	0.0650	1.222E+10
Cm-243	1.1419E-07	0.13	1.42	0.00E+00	1.53E-08	1.62E-07	0.1250	8.080E-09
Cm-244	1.6522E-05	0.13	1.42	0.00E+00	2.21E-06	2.34E-05	0.2250	1.059E+10
Co-60	7.4047E-07	0.13	1.42	0.00E+00	9.91E-08	1.05E-06	0.3750	4.587E+09
Cs-134	2.0455E-05	0.13	1.42	0.00E+00	2.74E-06	2.90E-05	0.5750	7.581E+10
Cs-135	3.4477E-06	0.13	1.42	0.00E+00	4.62E-07	4.88E-06	0.8500	9.260E+08
Cs-137	1.4365E+00	0.13	1.42	0.00E+00	1.92E-01	2.03E+00	1.2500	4.479E+08
Eu-154	7.3230E-03	0.13	1.42	0.00E+00	9.80E-04	1.04E-02	1.7500	2.521E+07
Eu-155	5.9259E-04	0.13	1.42	0.00E+00	7.93E-05	8.39E-04	2.2500	2.108E+03
Fe-55	2.2791E-06	0.13	1.42	0.00E+00	3.05E-07	3.23E-06	2.7500	2.012E+03
H-3	1.9698E-03	0.13	1.42	0.00E+00	2.64E-04	2.79E-03	3.5000	1.387E+00
I-129	7.5300E-07	0.13	1.42	0.00E+00	1.01E-07	1.07E-06	5.0000	5.695E-01
Kr-85	4.1176E-02	0.13	1.42	0.00E+00	5.51E-03	5.83E-02	7.0000	6.262E-02
Np-237	9.5752E-06	0.13	1.42	0.00E+00	1.28E-06	1.36E-05	11.0000	7.004E-03
Pa-231	3.9379E-09	0.13	1.42	0.00E+00	5.27E-10	5.58E-09		
Pb-210	3.3115E-10	0.13	1.42	0.00E+00	4.43E-11	4.69E-10		
Pm-147	9.2402E-04	0.13	1.42	0.00E+00	1.24E-04	1.31E-03		
Pu-238	1.6217E-02	0.13	1.42	0.00E+00	2.17E-03	2.30E-02		
Pu-239	4.2810E-04	0.13	1.42	0.00E+00	5.73E-05	6.06E-04		
Pu-240	2.4333E-04	0.13	1.42	0.00E+00	3.26E-05	3.45E-04		
Pu-241	1.6242E-02	0.13	1.42	0.00E+00	2.17E-03	2.30E-02		
Pu-242	3.6329E-07	0.13	1.42	0.00E+00	4.86E-08	5.15E-07		
Ra-226	9.0114E-10	0.13	1.42	0.00E+00	1.21E-10	1.28E-09		
Ra-228	3.1019E-14	0.13	1.42	0.00E+00	4.15E-15	4.39E-14		
Ru-106	2.1225E-10	0.13	1.42	0.00E+00	2.84E-11	3.01E-10		
Se-79	1.2930E-05	0.13	1.42	0.00E+00	1.73E-06	1.83E-05		
Sn-126	1.1571E-05	0.13	1.42	0.00E+00	1.55E-06	1.64E-05		
Sr-90	1.3472E+00	0.13	1.42	0.00E+00	1.80E-01	1.91E+00		
Tc-99	4.2239E-04	0.13	1.42	0.00E+00	5.65E-05	5.98E-04		
Th-229	1.2407E-11	0.13	1.42	0.00E+00	1.66E-12	1.76E-11		
Th-230	8.3497E-08	0.13	1.42	0.00E+00	1.12E-08	1.18E-07		
Th-232	3.6371E-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
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.12714777	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	0.13	
Bounding:	1.42	

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	0.00
Bounding:	0.00	0.00

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ARMF/CFRMF MARK III
SNF ID #: 12

Fuel Units & Descr: 4 - 15 FLAT PLATES
Heavy Metal Mass: BOL=0.098kg; EOL=0.098kg
ROD Storage Site: SRS

Fuel decay start date: 1991
Estimates as of: 2030
Template: ATR (Light Water, Alum., 80 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"
0.17

II. Estimates	m	Z ₀	Z ₁	b	Y ₁	Y ₂	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+08
Cs-135	3.4477E-06	0.01	0.12	0.00E+00	3.81E-08	4.03E-07	0.8500	7.637E+07
Cs-137	1.4365E+00	0.01	0.12	0.00E+00	1.59E-02	1.68E-01	1.2500	3.694E+07
Eu-154	7.3230E-03	0.01	0.12	0.00E+00	8.08E-05	8.56E-04	1.7500	2.079E+06
Eu-155	5.9259E-04	0.01	0.12	0.00E+00	6.54E-06	6.92E-05	2.2500	1.739E+02
Fe-55	2.2791E-06	0.01	0.12	0.00E+00	2.52E-08	2.66E-07	2.7500	1.659E+02
H-3	1.9698E-03	0.01	0.12	0.00E+00	2.17E-05	2.30E-04	3.5000	1.168E-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		
Ti-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	Thermal Power	
U-233	3.6275E-09	0.01	0.12	0.00E+00	4.00E-11	4.24E-10	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8562E-04	0.01	0.12	0.00E+00	2.05E-06	2.17E-05	1.90E-04	1.96E-03
U-235	-2.7235E-06	0.01	0.00	1.90E-04	1.90E-04	1.90E-04	Total	Total
U-236	1.5493E-05	0.01	0.12	0.00E+00	1.71E-07	1.81E-06		
U-238	-4.2851E-09	0.01	0.00	2.69E-06	2.69E-06	2.69E-06		
Y-90	1.3475E+00	0.01	0.12	0.00E+00	1.49E-02	1.57E-01		
Other Radionuclides					1.51E-02	1.60E-01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	91.6666667	80 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimates:
Nominal:	From SFD	Estimated	
	0.01		
Bounding:	0.12		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:	Burnup Multiplier	Estimated Burnup/Given Burnup	
	0.00	0.00	
Bounding:	0.00	0.00	1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATR
SNF ID #: 15
Fuel Units & Descr: 1576 - 19 CURVED PLATES
Heavy Metal Mass: BOL=1818.704kg; EOL=1313.754kg
ROO 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	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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
Ci-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	1.86E+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	5.8259E-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	3.8379E-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		
To-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		
Ti-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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.154	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
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

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

Fuel decay start date: 2035
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: 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) ^a	Bounding Fuel Burnup (MWd) ^b	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	3.928E+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
Cf-252	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-136	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	1.208E+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		
Th-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+02	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		

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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.154	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD 1,017,446.76	Estimated 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
Nominal:	Burnup Multiplier 0.68	Estimated Burnup/ Given Burnup 0.99	
Bounding:	1.36		1.01

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

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

Fuel Radionuclide Inventory Worksheet

Fuel and Template Information

Fuel Name: ATR
SUF ID #: 843
Fuel Units & Descr: 128 - 19 CURVED PLATES
Heavy Metal Mass: BOL-147.712kg; EOL-99.392kg
ROO Storage Site: SRS

*Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water, Alum. 60 to 100%, U)
*Template Burnup (MWd/g): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
Canister Usage:
18"x10"
6.40

IL Estimates										Gamma Sources	
Radionuclide	C/NR/d From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Y ₁	Y ₂	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	2.0058E-09	45,921.00	91,842.00	0.00E+00	9.22E-05	1.84E-04	2.32E+02	1.84E-04	0.0150	6.764E+15	
Am-241	2.5251E-03	45,921.00	91,842.00	0.00E+00	1.16E+02	3.32E+02	3.32E+02	0.0250	1.405E+15		
Am-242m	3.9624E-07	45,921.00	91,842.00	0.00E+00	1.82E-02	1.37E-01	1.37E-01	0.0375	1.221E+15		
Am-243	1.4880E-06	45,921.00	91,842.00	0.00E+00	6.83E-02	5.24E-04	5.24E-04	0.0575	1.314E+15		
C-14	5.7053E-09	45,921.00	91,842.00	0.00E+00	2.62E-04	6.03E-28	1.21E-27	0.0650	7.918E+14		
C-36	1.3124E-32	45,921.00	91,842.00	0.00E+00	5.24E-03	1.05E-02	1.05E-02	0.1250	5.200E+14		
Cm-243	1.1419E-07	45,921.00	91,842.00	0.00E+00	7.59E-01	1.52E+00	1.52E+00	0.2250	6.836E+14		
Cm-244	1.8522E-05	45,921.00	91,842.00	0.00E+00	3.40E-02	6.80E-02	6.80E-02	0.3750	2.974E+14		
Ce-60	7.0477E-07	45,921.00	91,842.00	0.00E+00	9.39E-01	1.88E+00	1.88E+00	0.5750	4.915E+15		
Cs-134	2.0455E-05	45,921.00	91,842.00	0.00E+00	1.58E-01	3.17E-01	3.17E-01	0.8500	6.003E+13		
Cs-135	3.4477E-06	45,921.00	91,842.00	0.00E+00	6.60E+04	1.32E+05	1.32E+05	1.2500	2.904E+13		
Cs-137	1.4365E+00	45,921.00	91,842.00	0.00E+00	3.36E+02	6.73E+02	6.73E+02	1.7500	1.624E+12		
Eu-154	7.3230E-03	45,921.00	91,842.00	0.00E+00	2.72E+01	5.44E+01	5.44E+01	2.2500	1.506E+08		
Eu-155	5.9259E-04	45,921.00	91,842.00	0.00E+00	1.05E-01	2.09E-01	2.09E-01	2.7500	1.504E+08		
Fe-55	2.2791E-06	45,921.00	91,842.00	0.00E+00	9.05E+01	1.81E+02	1.81E+02	3.5000	7.556E+04		
H-3	1.9698E+03	45,921.00	91,842.00	0.00E+00	3.46E-02	6.92E-02	6.92E-02	5.0000	3.097E+04		
I-129	7.5300E-07	45,921.00	91,842.00	0.00E+00	1.89E+03	3.78E+03	3.78E+03	7.0000	3.378E+03		
K-85	4.1176E-02	45,921.00	91,842.00	0.00E+00	4.40E-01	8.79E-01	8.79E-01	11.0000	3.767E+02		
Na-237	9.5752E-06	45,921.00	91,842.00	0.00E+00	1.81E-04	3.62E-04	3.62E-04				
Pu-231	3.9378E-09	45,921.00	91,842.00	0.00E+00	1.52E-05	3.04E-05	3.04E-05				
Pu-210	3.3115E-10	45,921.00	91,842.00	0.00E+00	4.24E-01	8.49E+01	8.49E+01				
Pu-147	9.2402E-04	45,921.00	91,842.00	0.00E+00	7.45E-02	1.49E+03	1.49E+03				
Pu-238	1.8217E-02	45,921.00	91,842.00	0.00E+00	1.97E+01	3.93E+01	3.93E+01				
Pu-239	4.2810E-04	45,921.00	91,842.00	0.00E+00	1.12E+01	2.23E+01	2.23E+01				
Pu-240	2.4353E-04	45,921.00	91,842.00	0.00E+00	7.46E+02	1.49E+03	1.49E+03				
Pu-241	1.8242E-02	45,921.00	91,842.00	0.00E+00	1.87E-02	3.34E-02	3.34E-02				
Ra-226	3.6329E-07	45,921.00	91,842.00	0.00E+00	4.14E-05	8.28E-05	8.28E-05				
Ra-228	9.0144E-10	45,921.00	91,842.00	0.00E+00	1.42E-09	2.85E-09	2.85E-09				
Ru-106	3.1019E-14	45,921.00	91,842.00	0.00E+00	9.75E-06	1.95E-05	1.95E-05				
Se-79	1.2930E-05	45,921.00	91,842.00	0.00E+00	5.94E-01	1.19E+00	1.19E+00				
Sn-126	1.1571E-05	45,921.00	91,842.00	0.00E+00	5.31E-01	1.06E+00	1.06E+00				
Sr-90	1.9472E+00	45,921.00	91,842.00	0.00E+00	6.19E+04	1.24E+05	1.24E+05				
Tc-99	4.2239E-04	45,921.00	91,842.00	0.00E+00	1.94E+01	3.88E+01	3.88E+01				
Th-230	1.2407E-11	45,921.00	91,842.00	0.00E+00	5.70E-07	1.14E-06	1.14E-06				
Th-232	8.3497E-06	45,921.00	91,842.00	0.00E+00	3.83E-03	7.67E-03	7.67E-03				
Th-232	3.8371E-14	45,921.00	91,842.00	0.00E+00	1.76E-09	3.52E-09	3.52E-09				
Th-230	4.0414E-06	45,921.00	91,842.00	0.00E+00	1.86E+03	3.71E+03	3.71E+03				
U-232	1.0948E-07	45,921.00	91,842.00	0.00E+00	5.03E-03	1.01E-02	1.01E-02				
U-233	3.8275E-09	45,921.00	91,842.00	0.00E+00	1.87E-04	3.33E-04	3.33E-04				
U-234	1.8568E-04	45,921.00	91,842.00	0.00E+00	8.52E+00	1.70E+01	1.70E+01				
U-235	-2.7235E-06	45,921.00	0.00	2.97E-01	7.72E-01	2.97E-01	2.97E-01				
U-236	1.5493E-06	45,921.00	91,842.00	0.00E+00	7.11E-01	1.42E+00	1.42E+00				
U-238	-4.2851E-09	45,921.00	0.00	3.40E-03	3.20E-03	3.40E-03	3.40E-03				
Y-90	1.3475E+00	45,921.00	91,842.00	0.00E+00	6.19E+04	1.24E+05	1.24E+05				
Other Radionuclides					6.28E+04	1.28E+05	1.28E+05				
							Thermal Power				
							Nominal Heat Output (MWt)				
							Bounding Heat Output (MWt)				
							Total				

Other Radionuclides

Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Basis for Parameter Differences:	
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	From SFD	Used	
BOL H ₂ O Constituents:	From SFD	Used	
BOL Enrichment %:	From SFD	Used	

Burnup Summary (MWd/g)		Basis for burnup used in estimate:	
Nominal:	From SFD	Estimated	
Bounding:	From SFD	Estimated	

Checks		Estimated Burnup/ Given Burnup	
Nominal:	Burnup Multiplier	Estimated BOL H ₂ O Given BOL H ₂ O	
Bounding:	Burnup Multiplier	Estimated BOL H ₂ O Given BOL H ₂ O	

*Reactor shutdown, core removal, storage, shipping or other data 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: 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=411.800kg
ROD Storage Site: INEEL

Fuel decay start date: 1975
Estimate 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	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	8.446E+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+08
Np-237	1.1927E-05	44,857.39	89,714.78	0.00E+00	5.35E-01	1.07E+00	11.0000	2.089E+08
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-08	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	8.4163E-01	44,857.39	89,714.78	0.00E+00	2.68E+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		
Ti-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	8.4180E-01	44,857.39	89,714.78	0.00E+00	2.88E+04	5.76E+04		
Other Radionuclides					4.27E+04	8.55E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.11E+03	1.52E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.56002814	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	11,779.72	44,857.39
Bounding:		89,714.78

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.79	3.61
Bounding:	5.58	

Estimated EOL HM/ Given EOL HM
1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: NEEEL

Fuel decay start date: 1982
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
*Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
2.63

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	6.7038E-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-206	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: This fuel matches on all parameters except enrichment.
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	44.026	10 to 20.1	

Burnup Summary (MWd)¹

	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: BM (CP-24)
SNF ID #: 774
Fuel Units & Descr: 2 - CANISTER OF SCRAP
Heavy Metal Mass: BOL = : EOL=0.559kg
ROD Storage Shc: INEEL

Fuel decay start date: 1961
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"
0.15

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	0.0378	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
Ci-36	1.2260E-06	528.25	528.25	0.00E+00	6.48E-04	6.48E-04	0.0850	2.258E+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+06
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		
Ti-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	-2.7781E-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

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		528.25
Bounding:		528.25

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.12	
Bounding:	10.12	

Estimated EOL HM/Given EOL HM

1.02

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

^aTotal burnup for all fuel associated with this worksheet must be 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 (CP1-38)
SNF ID #: 20
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=1.286kg
ROD Storage Site: INEEL

*Fuel decay start date: 1961
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
*Template Burnup (MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012862
Template Decay Time: 65 years

Estimated
Canister usage:
18"x10"
0.06

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-08	1,215.10	1,215.10	0.00E+00	5.58E-05	5.58E-05	Avg. MeV	
Am-241	1.1471E-04	1,215.10	1,215.10	0.00E+00	1.39E-01	1.39E-01	0.0150	4.435E+13
Am-242m	7.4210E-09	1,215.10	1,215.10	0.00E+00	9.02E-06	9.02E-06	0.0250	9.215E+12
Am-243	9.8236E-10	1,215.10	1,215.10	0.00E+00	1.19E-06	1.19E-06	0.0375	8.008E+12
C-14	2.2928E-04	1,215.10	1,215.10	0.00E+00	2.79E-01	2.79E-01	0.0675	8.593E+12
Ci-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	8.196E+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	1.06E-01	1.06E-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-70	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		
Ti-208	1.6228E-08	1,215.10	1,215.10	0.00E+00	1.97E-05	1.97E-05		
U-232	4.3960E-08	1,215.10	1,215.10	0.00E+00	5.34E-05	5.34E-05		
U-233	3.3344E-09	1,215.10	1,215.10	0.00E+00	4.05E-06	4.05E-06		
U-234	4.0749E-07	1,215.10	1,215.10	0.00E+00	4.95E-04	4.95E-04		
U-235	2.7761E-06	1,215.10	0.00	5.20E-03	1.82E-03	5.20E-03		
U-236	1.6190E-05	1,215.10	1,215.10	0.00E+00	1.97E-02	1.97E-02		
U-238	2.8547E-09	1,215.10	0.00	5.82E-05	5.27E-05	5.82E-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:	HASTELOY	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)^a

	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		

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

^aTotal burnup for all fuel associated with this worksheet must be 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 _m	x _b	b	y _m	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	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	1.506E+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	5.46E+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-06	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	8.6722E-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		
Th-208	1.6228E-08	1,115.44	2,230.88	0.00E+00	1.81E-05	3.62E-05		
U-232	4.3960E-06	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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00081766	60 to 100

Basic for Parameter Differences:

Burnup Summary (MWd)⁴

	From SFD	Estimated
Nominal:		1,115.44
Bounding:		2,230.88

Basic for burnup used in estimates:

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:	1.09	
Bounding:	2.17	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: BR-3
 SNF ID #: 927
 Fuel Units & Descr: 16 - ROD
 Heavy Metal Mass: BOL=5.6kg; EOL=5.11kg
 ROD Storage Site: NEEL

Fuel decay start date: 1961
 Estimates as of: 2030
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
 Template Burnup(MWd): 61.92
 Template BOL Heavy Metal Mass (MT): 0.00176911
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 1.00

II. Estimates	m	x _n	x ₀	b	y _n	y ₀	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	465.59	931.17	0.00E+00	4.09E-07	8.17E-07	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	9.836E+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	5.806E+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
Pu-231	1.3036E-09	465.59	931.17	0.00E+00	6.07E-07	1.21E-06		
Pu-210	8.5078E-11	465.59	931.17	0.00E+00	3.96E-08	7.92E-08		
Pu-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	8.4260E-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	6.1180E-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	3.8357E-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		
Th-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			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:	U	U	
BOL Enrichment %:	28.57142857	0 to 5	

Burnup Summary (MWd) ^a			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:		465.59	
Bounding:		931.17	

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

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

^aTotal burnup for all fuel associated with this worksheet must be 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: NEEL

¹Fuel decay start date: 1994
Estimates as of: 2030
Template: PWR (Light Water, Zirc. 0 to 5%, U)
²Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.12

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cl/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	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-38	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	1.990E+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+08
Fe-55	4.3136E-05	448.85	897.70	0.00E+00	1.94E-02	3.87E-02	2.7500	6.223E+08
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	3.62E-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-206	1.7474E-07	448.85	897.70	0.00E+00	7.84E-05	1.57E-04		
U-232	4.7368E-07	448.85	897.70	0.00E+00	2.13E-04	4.25E-04		
U-233	2.5097E-08	448.85	897.70	0.00E+00	1.13E-05	2.25E-05		
U-234	5.0000E-05	448.85	897.70	0.00E+00	2.24E-02	4.49E-02		
U-235	-1.4489E-06	448.85	0.00	1.35E-03	6.98E-04	1.35E-03		
U-238	7.5824E-06	448.85	897.70	0.00E+00	3.40E-03	6.81E-03		
U-238	-2.6129E-07	448.85	0.00	2.32E-03	2.21E-03	2.32E-03		
Y-90	9.1699E-01	448.85	897.70	0.00E+00	4.12E+02	8.23E+02		
Other Radionuclides					6.03E+02	1.21E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches PWR Template on all but one parameter (enrichment) making PWR a reasonable match.
Fuel Claddings:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	8.280254777	0 to 5	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.70	1.53	1.00
Bounding:	3.40	2.84	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-B
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

Fuel decay start date: 1972
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 _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	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	8.703E+13
Cm-244	2.7616E-02	11,990.37	23,980.74	0.00E+00	3.31E+02	6.62E+02	0.2250	8.801E+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	1.1827E-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	4.3768E-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		
Th-208	1.5136E-07	11,990.37	23,980.74	0.00E+00	1.81E-03	3.63E-03		
U-232	4.1005E-07	11,990.37	23,980.74	0.00E+00	4.92E-03	9.83E-03		
U-233	2.5856E-08	11,990.37	23,980.74	0.00E+00	3.10E-04	6.20E-04		
U-234	5.2665E-05	11,990.37	23,980.74	0.00E+00	6.31E-01	1.26E+00		
U-235	-1.4487E-06	11,990.37	0.00	1.69E-02	0.00E+00	1.69E-02		
U-236	7.5888E-06	11,990.37	23,980.74	0.00E+00	9.10E-02	1.82E-01		
U-238	-2.6129E-07	11,990.37	0.00	8.57E-02	8.25E-02	8.57E-02		
Y-90	6.4180E-01	11,990.37	23,980.74	0.00E+00	7.70E+03	1.54E+04		
Other Radionuclides					1.14E+04	2.29E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:			
	ZIRC	ZIRC	
BOL HM Constituents:			
	U	U	
BOL Enrichment %:	2.952	0 to 5	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	5,310.89	11,990.37	
Bounding:	5,318.51	23,980.74	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.30	2.26	
Bounding:	2.61	4.51	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

*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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-08	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	3.5810E-04	11,298.83	11,722.29	0.00E+00	4.02E+00	4.17E+00	0.3750	1.816E+13
Co-134	2.6260E-07	11,298.83	11,722.29	0.00E+00	2.97E-03	3.08E-03	0.5750	4.276E+14
Co-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	8.9466E-03	11,298.83	11,722.29	0.00E+00	1.01E+02	1.05E+02	3.5000	4.829E+08
I-129	9.8288E-07	11,298.83	11,722.29	0.00E+00	1.11E-02	1.15E-02	5.0000	2.064E+08
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-08	1.97E-08		
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-08	4.51E-08		
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	3.8357E-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-08	1.83E-08		
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-06	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-08	11,298.83	0.00	3.67E-02	2.04E-02	3.67E-02		
U-236	7.5888E-08	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 %:	3.628	0 to 5	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	11,298.83	8,657.09	
Bounding:	11,722.29	17,314.19	

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:	0.69	0.77	
Bounding:	0.71	1.48	

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

^aTotal burnup for all fuel associated with this worksheet must be 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: NEEL

Fuel decay start date: 1968
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
Template Burnup(MWd): 61.82
Template BOL Heavy Metal Mass (MT): 0.00178911
Template Decay Time: 60 years

Estimated
Canister usage:
Bare Fuel Transfer

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	37,986.38	75,972.75	0.00E+00	4.08E-05	8.15E-05	Avg. MeV	
Am-241	1.4751E-01	37,986.38	75,972.75	0.00E+00	5.60E+03	1.12E+04	0.0150	2.891E+15
Am-242m	2.6809E-04	37,986.38	75,972.75	0.00E+00	1.02E+01	2.04E+01	0.0250	5.793E+14
Am-243	6.2484E-04	37,986.38	75,972.75	0.00E+00	2.37E+01	4.75E+01	0.0375	5.459E+14
C-14	4.7820E-05	37,986.38	75,972.75	0.00E+00	1.82E+00	3.63E+00	0.0575	6.831E+14
Cl-36	8.0297E-07	37,986.38	75,972.75	0.00E+00	3.05E-02	6.10E-02	0.0850	3.182E+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	9.88E-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	9.8570E-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	8.4163E-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	5.84E-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		
Th-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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.873	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.98	42.17	1.02
Bounding:	3.96	81.99	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-D2
SNF ID #: 28
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: 1988
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated
Canister usage:
Bare Fuel Transfer

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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
Cl-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+08
Kr-85	1.0707E-02	15,685.20	31,370.41	0.00E+00	1.68E+02	3.36E+02	7.0000	6.361E+06
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-08	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-08	5.28E-08		
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	8.4260E-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-08	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-08	4.91E-08		
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		
Th-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-08	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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.811	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	1,061.91	15,685.20
Bounding:	1,841.46	31,370.41

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:	1.92	14.77
Bounding:	3.84	19.11

Estimated EOL HM/Given EOL HM

1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: BRP-E
 SIF ID #: 27
 Fuel Unit: 6 Descr: 18 - 9 X 9 ROD ARRAY
 Heavy Metal Mass: BOL-2443.466kg; EOL-2430.568kg
 ROD Storage Slat: NEEL
 Fuel decay start date: 1972
 Estimates as of: 2030
 Template: PWR Light Water, Zirc. 0 to 5%, U
 Template BOL Heavy Metal Mass (MT): 61.92
 Template Decay Time: 50 years

Estimated
 Container usage:
 Bare Fuel Transfer

II. Estimates	m	n	x _n	x ₂	B	Y _n	Y ₂	Gamma Sources
Radionuclide	CLWVD From Template	Nominal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photon/sec (bounding)
Ac-227	1.0733E-09	29.160.32	33,700.28	0.00E+00	3.13E-05	3.62E-05	Avg. MeV	1.282E+15
Am-241	1.4751E-01	29.160.32	33,700.28	0.00E+00	4.30E+03	4.97E+03	0.0150	2.570E+14
Am-242m	2.6809E-04	29.160.32	33,700.28	0.00E+00	7.82E+00	9.03E+00	0.0250	2.420E+14
Am-243	6.2494E-04	29.160.32	33,700.28	0.00E+00	1.82E+01	2.11E+01	0.0975	2.420E+14
C-14	4.7820E-05	29.160.32	33,700.28	0.00E+00	1.28E+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	0.0650	1.416E+14
Cm-243	1.7405E-04	29.160.32	33,700.28	0.00E+00	5.08E+00	5.87E+00	0.1250	9.419E+13
Cm-244	2.7818E-02	29.160.32	33,700.28	0.00E+00	8.05E+02	9.31E+02	0.2250	1.200E+14
Co-60	3.5610E-04	29.160.32	33,700.28	0.00E+00	1.04E+01	1.20E+01	0.5750	5.220E+13
Co-134	2.8260E-07	29.160.32	33,700.28	0.00E+00	7.66E-03	8.85E-03	0.5750	1.229E+15
Cr-136	1.4433E-05	29.160.32	33,700.28	0.00E+00	4.21E-01	4.86E-01	1.2500	1.200E+13
Cr-137	9.8870E-01	29.160.32	33,700.28	0.00E+00	2.88E+04	3.33E+04	1.7500	7.269E+12
Eu-154	6.0320E-03	29.160.32	33,700.28	0.00E+00	1.79E+02	2.03E+02	2.2500	3.393E+11
Eu-155	2.1770E-04	29.160.32	33,700.28	0.00E+00	6.36E+00	7.34E+00	2.7500	6.520E+07
Fe-55	7.9296E-07	29.160.32	33,700.28	0.00E+00	2.31E-02	2.67E-02	3.5000	1.389E+07
I-129	8.8488E-03	29.160.32	33,700.28	0.00E+00	2.61E+02	3.02E+02	6.0000	6.303E+06
I-128	9.8288E-07	29.160.32	33,700.28	0.00E+00	2.87E-02	3.31E-02	7.0000	6.835E+05
K-40	1.0707E-02	29.160.32	33,700.28	0.00E+00	3.12E+02	3.61E+02	11.0000	7.846E+04
Nb-237	1.1827E-05	29.160.32	33,700.28	0.00E+00	3.48E-01	4.02E-01		
Pb-210	1.4703E-09	29.160.32	33,700.28	0.00E+00	4.29E-05	4.95E-05		
Pb-210	1.8829E-10	29.160.32	33,700.28	0.00E+00	4.91E-06	5.67E-06		
Pm-147	6.8606E-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	1.6181E-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	1.29E+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	5.2956E-12	29.160.32	33,700.28	0.00E+00	1.54E-07	1.78E-07		
Ru-106	2.0419E-14	29.160.32	33,700.28	0.00E+00	6.65E-10	7.68E-10		
Se-79	1.2376E-05	29.160.32	33,700.28	0.00E+00	3.61E-01	4.17E-01		
Sm-146	2.5210E-05	29.160.32	33,700.28	0.00E+00	7.35E-01	8.50E-01		
Si-40	6.4163E-01	29.160.32	33,700.28	0.00E+00	1.87E+04	2.16E+04		
Tc-99	3.8357E-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	1.78E-07		
U-238	1.5138E-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	5.2865E-05	29.160.32	33,700.28	0.00E+00	1.54E+00	1.77E+00		
U-235	-1.4487E-06	29.160.32	33,700.28	0.00E+00	1.18E-01	1.58E-01		
U-236	7.5888E-06	29.160.32	33,700.28	0.00E+00	2.27E-01	2.56E-01		
U-238	-2.6129E-07	29.160.32	33,700.28	0.00E+00	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LIGHT WATER	
Fuel Cladding: ZIRC	
BOL HMI Constituents: U	
BOL Enrichment %: 2.95	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd/t)

From SFD	Estimated
Nominal: 29,160.32	21,755.30
Bounding: 33,700.28	43,511.79

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

Checks

Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal: 0.34	0.75
Bounding: 0.39	1.29

Estimated BOL HMI/Given BOL HMI
 1.00

Reactor shutdown, core removal storage, shipping or other data 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/HM).

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: NEEL

¹Fuel decay start date: 1973
Estimates as of: 2030
Template: PWR (Light Water, Zirc. 0 to 5%, U)
²Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00178911
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 Avg. MeV Total Photons/sec (bounding)
Ac-227	1.0733E-09	140,435.08	280,870.16	0.00E+00	1.51E-04	3.01E-04	0.0150
Am-241	1.4751E-01	140,435.08	280,870.16	0.00E+00	2.07E+04	4.14E+04	0.0250
Am-242m	2.6809E-04	140,435.08	280,870.16	0.00E+00	3.76E+01	7.53E+01	0.0375
Am-243	6.2484E-04	140,435.08	280,870.16	0.00E+00	8.77E+01	1.75E+02	0.0575
C-14	4.7820E-05	140,435.08	280,870.16	0.00E+00	6.72E+00	1.34E+01	0.0850
Cl-36	8.0297E-07	140,435.08	280,870.16	0.00E+00	1.13E-01	2.26E-01	0.1250
Cm-243	1.7426E-04	140,435.08	280,870.16	0.00E+00	2.45E+01	4.89E+01	0.2250
Cm-244	2.7616E-02	140,435.08	280,870.16	0.00E+00	3.88E+03	7.76E+03	0.3750
Co-60	3.5610E-04	140,435.08	280,870.16	0.00E+00	5.00E+01	1.00E+02	0.5750
Cs-134	2.6260E-07	140,435.08	280,870.16	0.00E+00	3.69E-02	7.38E-02	0.8500
Cs-135	1.4433E-05	140,435.08	280,870.16	0.00E+00	2.03E+00	4.05E+00	1.2500
Cs-137	9.8870E-01	140,435.08	280,870.16	0.00E+00	1.39E+05	2.78E+05	1.7500
Eu-154	6.0320E-03	140,435.08	280,870.16	0.00E+00	8.47E+02	1.69E+03	2.2500
Eu-155	2.1770E-04	140,435.08	280,870.16	0.00E+00	3.06E+01	6.11E+01	2.7500
Fe-55	7.9296E-07	140,435.08	280,870.16	0.00E+00	1.11E-01	2.23E-01	3.5000
H-3	8.9486E-03	140,435.08	280,870.16	0.00E+00	1.26E+03	2.51E+03	5.0000
I-129	9.8288E-07	140,435.08	280,870.16	0.00E+00	1.38E-01	2.76E-01	7.0000
Kr-85	1.0707E-02	140,435.08	280,870.16	0.00E+00	1.50E+03	3.01E+03	11.0000
Np-237	1.1927E-05	140,435.08	280,870.16	0.00E+00	1.67E+00	3.35E+00	
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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3.513	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	60,840.99	140,435.08
Bounding:	83,858.44	280,870.16

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:	0.88	2.31
Bounding:	1.76	3.35

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-EGF
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) ^a	Bounding Fuel Burnup (MWd) ^a	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	0.0650	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	6.887E+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	2.80E+00	5.21E+00	2.2500	3.918E+07
Fe-55	7.9296E-07	11,962.22	23,924.45	0.00E+00	9.49E-03	1.90E-02	2.7500	1.381E+08
H-3	8.9486E-03	11,962.22	23,924.45	0.00E+00	1.07E+02	2.14E+02	3.5000	9.854E+06
I-129	9.8288E-07	11,962.22	23,924.45	0.00E+00	1.18E-02	2.35E-02	6.0000	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	7.89E-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	1.2378E-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		
Th-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	5.2685E-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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	3.478	0 to 5	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	8,552.79	11,962.22	
Bounding:	8,583.24	23,924.45	

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

Checks

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

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

^aTotal burnup for all fuel associated with this worksheet must be 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

Fuel decay start date: 1974
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:
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) ^a	Bounding Fuel Burnup (MWD) ^a	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	9.210E+15
Cl-36	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	1.919E+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	4.04E-02	8.09E-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	1.6669E-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		
Th-208	7.5796E-05	17,236.64	34,473.28	0.00E+00	1.31E+00	2.61E+00		
U-232	2.0521E-04	17,236.64	34,473.28	0.00E+00	3.54E+00	7.07E+00		
U-233	3.6128E-04	17,236.64	34,473.28	0.00E+00	6.23E+00	1.25E+01		
U-234	1.2788E-02	17,236.64	34,473.28	0.00E+00	2.20E+02	4.41E+02		
U-235	5.7486E-04	17,236.64	34,473.28	1.59E-01	1.01E+01	2.00E+01		
U-236	2.3485E-04	17,236.64	34,473.28	0.00E+00	4.05E+00	8.10E+00		
U-238	1.1581E-04	17,236.64	34,473.28	1.98E-02	2.02E+00	4.01E+00		
Y-90	1.3861E+01	17,236.64	34,473.28	0.00E+00	2.39E+05	4.78E+05		
Other Radionuclides					8.86E+05	1.77E+06		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWD)			Basis for burnup used in estimates:
	From SFD	Estimated	
Nominal:	6,807.65	17,236.64	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	7,131.56	34,473.28	

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

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

^bTotal burnup for all fuel associated with this worksheet must be 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=1756.756kg
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:
Bare Fuel Transfer

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	40,268.00	80,535.99	0.00E+00	4.32E-05	8.64E-05	Avg. MeV	
Am-241	1.4751E-01	40,268.00	80,535.99	0.00E+00	5.94E+03	1.19E+04	0.0150	3.064E+15
Am-242m	2.6809E-04	40,268.00	80,535.99	0.00E+00	1.08E+01	2.16E+01	0.0250	6.141E+14
Am-243	6.2484E-04	40,268.00	80,535.99	0.00E+00	2.52E+01	5.03E+01	0.0375	6.787E+14
C-14	4.7820E-05	40,268.00	80,535.99	0.00E+00	1.93E+00	3.85E+00	0.0575	7.241E+14
Cl-36	8.0297E-07	40,268.00	80,535.99	0.00E+00	3.23E-02	6.47E-02	0.0850	3.383E+14
Cm-243	1.7426E-04	40,268.00	80,535.99	0.00E+00	7.02E+00	1.40E+01	0.1250	2.251E+14
Cm-244	2.7616E-02	40,268.00	80,535.99	0.00E+00	1.11E+03	2.22E+03	0.2250	2.889E+14
Co-60	3.5610E-04	40,268.00	80,535.99	0.00E+00	1.43E+01	2.87E+01	0.3750	1.246E+14
Cs-134	2.6260E-07	40,268.00	80,535.99	0.00E+00	1.06E-02	2.11E-02	0.5750	2.938E+15
Cs-135	1.4433E-05	40,268.00	80,535.99	0.00E+00	5.81E-01	1.16E+00	0.8500	2.869E+13
Cs-137	9.8870E-01	40,268.00	80,535.99	0.00E+00	3.98E+04	7.96E+04	1.2500	1.825E+13
Eu-154	6.0320E-03	40,268.00	80,535.99	0.00E+00	2.43E+02	4.86E+02	1.7500	8.025E+11
Eu-155	2.1770E-04	40,268.00	80,535.99	0.00E+00	8.77E+00	1.75E+01	2.2500	1.319E+08
Fe-55	7.9296E-07	40,268.00	80,535.99	0.00E+00	3.19E-02	6.39E-02	2.7500	4.649E+08
H-3	8.9486E-03	40,268.00	80,535.99	0.00E+00	3.60E+02	7.21E+02	3.5000	3.317E+07
I-129	9.8288E-07	40,268.00	80,535.99	0.00E+00	3.96E-02	7.92E-02	5.0000	1.418E+07
Kr-85	1.0707E-02	40,268.00	80,535.99	0.00E+00	4.31E+02	8.62E+02	7.0000	1.833E+06
Np-237	1.1927E-05	40,268.00	80,535.99	0.00E+00	4.80E-01	9.61E-01	11.0000	1.875E+05
Pa-231	1.4703E-09	40,268.00	80,535.99	0.00E+00	5.92E-05	1.18E-04		
Pb-210	1.6828E-10	40,268.00	80,535.99	0.00E+00	6.78E-06	1.36E-05		
Pm-147	6.9606E-06	40,268.00	80,535.99	0.00E+00	2.80E-01	5.61E-01		
Pu-238	6.6263E-02	40,268.00	80,535.99	0.00E+00	2.67E+03	5.34E+03		
Pu-239	1.1618E-02	40,268.00	80,535.99	0.00E+00	4.68E+02	9.36E+02		
Pu-240	1.5142E-02	40,268.00	80,535.99	0.00E+00	6.10E+02	1.22E+03		
Pu-241	4.3766E-01	40,268.00	80,535.99	0.00E+00	1.78E+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	6.4183E-01	40,268.00	80,535.99	0.00E+00	2.58E+04	5.17E+04		
Tc-99	3.9357E-04	40,268.00	80,535.99	0.00E+00	1.58E+01	3.17E+01		
Th-229	1.5644E-10	40,268.00	80,535.99	0.00E+00	6.30E-06	1.26E-05		
Th-230	2.7972E-08	40,268.00	80,535.99	0.00E+00	1.13E-03	2.25E-03		
Th-232	5.3036E-12	40,268.00	80,535.99	0.00E+00	2.14E-07	4.27E-07		
Tl-208	1.5136E-07	40,268.00	80,535.99	0.00E+00	6.09E-03	1.22E-02		
U-232	4.1005E-07	40,268.00	80,535.99	0.00E+00	1.65E-02	3.30E-02		
U-233	2.5856E-08	40,268.00	80,535.99	0.00E+00	1.04E-03	2.08E-03		
U-234	5.2665E-05	40,268.00	80,535.99	0.00E+00	2.12E+00	4.24E+00		
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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	3.515	0 to 5	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	18,908.58	40,268.00	
Bounding:	25,797.35	80,535.99	

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

Checks

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

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

^bTotal burnup for all fuel associated with this worksheet must be 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-PJ
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, 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) ^a	Bounding Fuel Burnup (MWd) ^a	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-08	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-38	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
Co-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	8.0320E-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+08
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	5.3038E-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-08	5,489.09	0.00	2.05E-02	1.26E-02	2.05E-02		
U-238	7.5888E-08	5,489.09	10,978.18	0.00E+00	4.17E-02	8.33E-02		
U-238	-2.6129E-07	5,489.09	0.00	8.74E-02	8.60E-02	8.74E-02		
Y-90	6.4180E-01	5,489.09	10,978.18	0.00E+00	3.52E+03	7.05E+03		
Other Radionuclides					5.23E+03	1.05E+04		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
9.93E+01	1.99E+02	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %:	From SPD	Used	
	LIGHT WATER	LIGHT WATER	
	ZIRC	ZIRC	
	U	U	
	3.525	0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	4,154.89	5,489.09	
Bounding:	4,193.24	10,978.18	
	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.		

Checks			Estimated EOL HM/Given EOL HM
Nominal: Bounding:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.58	1.32	
	1.16	2.62	
	1.00		

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

^aTotal burnup for all fuel associated with this worksheet must be 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

Fuel decay start date: 1979
Estimate as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
*Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 50 years

Estimated
Canister usage:
H/C
1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.2320E-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-08	24.54	49.08	0.00E+00	8.11E-05	1.62E-04	0.0250	4.964E+11
Am-243	2.0560E-08	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
Ci-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-08	1.72E-06	0.1250	1.817E+11
Cm-244	5.8860E-08	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
Ca-134	5.1180E-08	24.54	49.08	0.00E+00	1.26E-06	2.51E-06	0.5750	1.846E+12
Ca-135	7.9140E-08	24.54	49.08	0.00E+00	1.94E-04	3.88E-04	0.8500	1.876E+10
Ca-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-06	24.54	49.08	0.00E+00	1.89E-03	3.79E-03	2.2500	2.207E+06
Fe-55	1.0538E-08	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-08	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-06	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-08	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-206	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			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal:		24.54	
Bounding:		49.08	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.37		
Bounding:	2.73		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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): 0.00178911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 Bare Fuel Transfer

II. Estimates							Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	1,489.19	2,978.38	0.00E+00	1.60E-06	3.20E-06	Avg. MeV	
Am-241	1.4751E-01	1,489.19	2,978.38	0.00E+00	2.20E+02	4.39E+02	0.0150	1.133E+14
Am-242m	2.6809E-04	1,489.19	2,978.38	0.00E+00	3.99E-01	7.98E-01	0.0250	2.271E+13
Am-243	8.2484E-04	1,489.19	2,978.38	0.00E+00	9.31E-01	1.86E+00	0.0375	2.140E+13
C-14	4.7820E-05	1,489.19	2,978.38	0.00E+00	7.12E-02	1.42E-01	0.0575	2.678E+13
Ci-36	8.0297E-07	1,489.19	2,978.38	0.00E+00	1.20E-03	2.39E-03	0.0850	1.251E+13
Cm-243	1.7426E-04	1,489.19	2,978.38	0.00E+00	2.60E-01	5.19E-01	0.1250	8.325E+12
Cm-244	2.7616E-02	1,489.19	2,978.38	0.00E+00	4.11E+01	8.23E+01	0.2250	1.068E+13
Co-60	3.5610E-04	1,489.19	2,978.38	0.00E+00	5.30E-01	1.06E+00	0.3750	4.614E+12
Cs-134	2.6260E-07	1,489.19	2,978.38	0.00E+00	3.91E-04	7.82E-04	0.5750	1.066E+14
Cs-135	1.4433E-05	1,489.19	2,978.38	0.00E+00	2.15E-02	4.30E-02	0.8500	1.061E+12
Cs-137	9.8870E-01	1,489.19	2,978.38	0.00E+00	1.47E+03	2.94E+03	1.2500	6.751E+11
Eu-154	8.0320E-03	1,489.19	2,978.38	0.00E+00	8.98E+00	1.80E+01	1.7500	2.968E+10
Eu-155	2.1770E-04	1,489.19	2,978.38	0.00E+00	3.24E-01	6.48E-01	2.2500	4.878E+06
Fe-55	7.9296E-07	1,489.19	2,978.38	0.00E+00	1.18E-03	2.36E-03	2.7500	1.719E+07
H-3	8.9486E-03	1,489.19	2,978.38	0.00E+00	1.33E+01	2.67E+01	3.5000	1.227E+06
I-129	9.8288E-07	1,489.19	2,978.38	0.00E+00	1.46E-03	2.93E-03	5.0000	5.243E+05
Kr-85	1.0707E-02	1,489.19	2,978.38	0.00E+00	1.59E+01	3.19E+01	7.0000	6.040E+04
Np-237	1.1927E-05	1,489.19	2,978.38	0.00E+00	1.78E-02	3.55E-02	11.0000	6.935E+03
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	8.9606E-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.69E+01	5.39E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	1.5005013	0 to 5	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	823.86	1,489.19	
Bounding:		2,978.38	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.72	1.81	
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: DRESIL, HBR, BR-3, BRP, TM
 SNF ID #: 50
 Fuel Unit: a Drum: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL: : EOL: 18.608g
 ROD Storage Site: MUEL

Fuel decay start date: 1979
 Estimate as of: 2030
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
 Template Burnup (MWd): 61.82
 Heavy Metal Mass (MT): 0.00178911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18 x 10"
 0.01

II. Radionuclides

Radionuclide	CHANGE From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Photon/Sec (Bouding)
Ac-227	1.0733E-09	18.646.28	18.646.28	0.00E+00	2.00E-06	2.00E-05	0.0150	7.095E+14
Am-241	1.4751E-01	18.646.28	18.646.28	0.00E+00	2.75E+03	2.75E+03	0.0250	1.422E+14
Am-242m	2.6909E-04	18.646.28	18.646.28	0.00E+00	5.00E+00	5.00E+00	0.0375	1.406E+14
Am-243	6.2484E-04	18.646.28	18.646.28	0.00E+00	1.17E+01	1.17E+01	0.0575	1.677E+14
C-14	4.7820E-05	18.646.28	18.646.28	0.00E+00	8.92E-01	8.92E-01	0.0860	7.834E+13
Cm-243	8.0297E-07	18.646.28	18.646.28	0.00E+00	1.50E-02	1.50E-02	0.1250	5.212E+13
Cm-244	1.7428E-04	18.646.28	18.646.28	0.00E+00	3.25E+00	3.25E+00	0.2250	6.688E+13
Co-60	2.7616E-02	18.646.28	18.646.28	0.00E+00	5.15E+02	5.15E+02	0.3750	2.888E+13
Co-134	3.5810E-04	18.646.28	18.646.28	0.00E+00	6.64E+00	6.64E+00	0.8500	8.640E+12
Co-136	2.6280E-07	18.646.28	18.646.28	0.00E+00	4.90E-03	4.90E-03	1.2500	4.229E+12
Co-137	1.4330E-05	18.646.28	18.646.28	0.00E+00	2.69E-01	2.69E-01	1.7500	1.889E+11
Eu-154	6.0320E-03	18.646.28	18.646.28	0.00E+00	1.12E+02	1.12E+02	2.2500	3.054E+07
Eu-155	2.1770E-04	18.646.28	18.646.28	0.00E+00	4.06E+00	4.06E+00	2.7500	1.076E+08
Fa-253	7.8296E-07	18.646.28	18.646.28	0.00E+00	1.48E-02	1.48E-02	3.5000	7.678E+08
H-3	8.9488E-03	18.646.28	18.646.28	0.00E+00	1.83E-02	1.83E-02	5.0000	3.791E+06
I-129	9.8288E-07	18.646.28	18.646.28	0.00E+00	1.83E-02	1.83E-02	7.0000	3.791E+06
Kc-86	1.0707E-02	18.646.28	18.646.28	0.00E+00	2.20E+02	2.20E+02	11.0000	4.341E+04
Nb-237	1.1827E-05	18.646.28	18.646.28	0.00E+00	2.22E-01	2.22E-01		
Pa-231	1.4703E-09	18.646.28	18.646.28	0.00E+00	2.74E-06	2.74E-06		
Pa-210	1.6828E-10	18.646.28	18.646.28	0.00E+00	3.14E-08	3.14E-08		
Pm-147	6.9806E-06	18.646.28	18.646.28	0.00E+00	1.30E-01	1.30E-01		
Pu-238	6.6233E-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		
Pa-226	3.8501E-10	18.646.28	18.646.28	0.00E+00	7.18E-08	7.18E-08		
Pa-228	5.2855E-12	18.646.28	18.646.28	0.00E+00	9.87E-08	9.87E-08		
Pa-106	2.0413E-14	18.646.28	18.646.28	0.00E+00	3.81E-10	3.81E-10		
Se-78	1.2378E-05	18.646.28	18.646.28	0.00E+00	2.31E-01	2.31E-01		
Sm-126	2.5210E-05	18.646.28	18.646.28	0.00E+00	4.70E-01	4.70E-01		
Te-90	6.4163E-01	18.646.28	18.646.28	0.00E+00	1.20E+04	1.20E+04		
Th-229	3.8357E-04	18.646.28	18.646.28	0.00E+00	7.34E+00	7.34E+00		
Th-230	1.5644E-10	18.646.28	18.646.28	0.00E+00	2.92E-08	2.92E-08		
Th-232	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-238	1.5138E-07	18.646.28	18.646.28	0.00E+00	2.82E-03	2.82E-03		
U-232	4.1005E-07	18.646.28	18.646.28	0.00E+00	7.65E-03	7.65E-03		
U-233	2.5856E-08	18.646.28	18.646.28	0.00E+00	4.82E-04	4.82E-04		
U-234	5.2865E-05	18.646.28	18.646.28	0.00E+00	9.82E-01	9.82E-01		
U-235	1.4487E-06	18.646.28	18.646.28	0.00E+00	2.71E-03	2.71E-03		
U-236	7.5888E-06	18.646.28	18.646.28	0.00E+00	1.42E-01	1.42E-01		
U-238	2.8129E-07	18.646.28	18.646.28	0.00E+00	7.88E-03	7.88E-03		
U-238	6.4180E-01	18.646.28	18.646.28	0.00E+00	1.20E+04	1.20E+04		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ³				Basis for burnup used in estimate:	
From SFD		Estimated			
Nominal:		18.646.28		Nominal burnup set equal to bounding burnup.	
Bounding:		18.646.28		Bounding burnup estimated by assuming BOL heavy metal mass was 18.646.28.	

Checks				Estimated EOL HMI/Given EOL HMI	
Nominal:	Burnup Multiplier	13.59		1.59	
Bounding:		13.59			

*Reactor shutdown, core removal, storage, shipping or other data containing that radiation 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/GMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBR-II NITRIDE FUEL EXPER
SNF ID #: 363
Fuel Units & Descr: 64 - ROD
Heavy Metal Mass: BOL= ; EOL=9.587kg
ROD Storage Site: INEL

Fuel decay start date: 1994
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329181
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.32

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	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	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	2.8042E-05	833.80	1,563.38	0.00E+00	2.17E-02	4.07E-02	0.0675	1.181E+13
Cl-36	3.4243E-10	833.80	1,563.38	0.00E+00	2.88E-07	5.35E-07	0.0650	5.858E+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	4.586E+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	6.0000	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	1.0411E-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	2.84E-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		
U-233	5.7451E-10	833.80	1,563.38	0.00E+00	4.79E-07	8.98E-07		
U-234	4.3044E-06	833.80	1,563.38	0.00E+00	3.59E-03	6.73E-03		
U-235	-7.7765E-09	833.80	0.00	3.39E-05	2.74E-05	3.39E-05		
U-236	1.8050E-07	833.80	1,563.38	0.00E+00	1.50E-04	2.82E-04		
U-238	-1.7914E-07	833.80	0.00	2.47E-03	2.32E-03	2.47E-03		
Y-90	5.0088E-01	833.80	1,563.38	0.00E+00	4.18E+02	7.83E+02		
Other Radionuclides					1.18E+03	2.22E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.93E+01	3.24E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		833.80	
		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/Given EOL HM
Burnup Multiplier	Estimated Burnup/Given Burnup		
Nominal: 0.53			
Bounding: 0.99			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBR-II OXIDE FUEL EXPER
SNF ID #: 364
Fuel Units & Descr: 992 - ROD
Heavy Metal Mass: BOL= ; EOL=92.454g
ROD Storage Site: INEEL

Fuel decay start date: 1994
Estimate 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 ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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-38	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	6.800E+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	1.5871E-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-08	2.10E-05		
Th-232	3.1689E-16	8,040.82	20,102.04	0.00E+00	2.55E-12	6.37E-12		
Ti-206	4.6836E-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
Reactor Moderator:	FAST	FAST
Fuel Claddings:	SST	SST
BOL HM Constituents:	Pu and U	Pu and U
BOL Enrichment %:		10 to 30

Basic for Parameter Differences:

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

Burnup Summary (MWd)

	From SFD	Estimated
Nominal:		8,040.82
Bounding:		20,102.04

Basic for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=100.51kg
Bounding burnup taken from SFD and converted to MWd using BOL=100.51kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.53	
Bounding:	1.31	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBR-II OXIDE FUEL EXPER
SNF ID #: 345
Fuel Units & Descr: 571 - ROD
Heavy Metal Mass: BOL = ; EOL=56.986kg
ROD Storage Site: NEEL

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"
2.86

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	4,956.09	12,390.22	0.00E+00	3.06E-08	7.66E-08	Avg. MeV	
Am-241	1.1066E-01	4,956.09	12,390.22	1.19E+02	6.68E+02	1.49E+03	0.0150	4.045E+14
Am-242m	1.9247E-03	4,956.09	12,390.22	0.00E+00	9.54E+00	2.38E+01	0.0250	8.058E+13
Am-243	1.0740E-04	4,956.09	12,390.22	0.00E+00	5.32E-01	1.33E+00	0.0375	9.362E+13
C-14	2.8042E-05	4,956.09	12,390.22	0.00E+00	1.29E-01	3.23E-01	0.0575	9.306E+13
Cl-36	3.4243E-10	4,956.09	12,390.22	0.00E+00	1.70E-06	4.24E-06	0.0850	4.484E+13
Cm-243	4.0629E-04	4,956.09	12,390.22	0.00E+00	2.01E+00	5.03E+00	0.1250	3.155E+13
Cm-244	1.6024E-03	4,956.09	12,390.22	0.00E+00	7.94E+00	1.99E+01	0.2250	3.819E+13
Co-60	3.4275E-03	4,956.09	12,390.22	0.00E+00	1.70E+01	4.25E+01	0.3750	1.569E+13
Cs-134	1.5566E-03	4,956.09	12,390.22	0.00E+00	7.71E+00	1.93E+01	0.5750	6.355E+14
Cs-135	4.7693E-05	4,956.09	12,390.22	0.00E+00	2.36E-01	5.91E-01	0.8500	8.640E+12
Cs-137	1.4007E+00	4,956.09	12,390.22	0.00E+00	6.94E+03	1.74E+04	1.2500	7.948E+12
Eu-154	1.6184E-02	4,956.09	12,390.22	0.00E+00	8.02E+01	2.01E+02	1.7500	1.798E+11
Eu-155	1.3774E-02	4,956.09	12,390.22	0.00E+00	6.83E+01	1.71E+02	2.2500	3.591E+07
Fe-55	3.8028E-04	4,956.09	12,390.22	0.00E+00	1.88E+00	4.71E+00	2.7500	2.053E+08
H-3	3.8454E-03	4,956.09	12,390.22	0.00E+00	1.91E+01	4.76E+01	3.5000	9.275E+05
I-129	1.2891E-06	4,956.09	12,390.22	0.00E+00	6.39E-03	1.60E-02	5.0000	3.116E+05
Kr-85	2.7848E-02	4,956.09	12,390.22	0.00E+00	1.38E+02	3.45E+02	7.0000	3.557E+04
Np-237	3.7516E-06	4,956.09	12,390.22	0.00E+00	1.86E-02	4.65E-02	11.0000	4.068E+03
Pa-231	1.2488E-11	4,956.09	12,390.22	0.00E+00	6.19E-08	1.55E-07		
Pb-210	2.4206E-12	4,956.09	12,390.22	0.00E+00	1.20E-08	3.00E-08		
Pm-147	1.5671E-02	4,956.09	12,390.22	0.00E+00	7.77E+01	1.94E+02		
Pu-238	1.4877E-02	4,956.09	12,390.22	0.00E+00	7.37E+01	1.84E+02		
Pu-239	3.5520E-02	4,956.09	0.00	9.81E+02	8.04E+02	9.81E+02		
Pu-240	2.0690E-02	4,956.09	12,390.22	4.98E+02	6.01E+02	7.55E+02		
Pu-241	1.4799E+00	4,956.09	0.00	2.24E+04	1.50E+04	2.24E+04		
Pu-242	1.1252E-05	4,956.09	12,390.22	1.33E-01	1.89E-01	2.72E-01		
Ra-226	7.8524E-12	4,956.09	12,390.22	0.00E+00	3.89E-08	9.73E-08		
Ra-228	2.4086E-16	4,956.09	12,390.22	0.00E+00	1.19E-12	2.98E-12		
Ru-106	1.5066E-05	4,956.09	12,390.22	0.00E+00	7.47E-02	1.87E-01		
Se-79	1.0127E-05	4,956.09	12,390.22	0.00E+00	5.02E-02	1.25E-01		
Sn-126	4.3902E-05	4,956.09	12,390.22	0.00E+00	2.18E-01	5.44E-01		
Sr-90	5.0088E-01	4,956.09	12,390.22	0.00E+00	2.48E+03	6.21E+03		
Tc-99	3.9412E-04	4,956.09	12,390.22	0.00E+00	1.95E+00	4.88E+00		
Th-229	2.7219E-12	4,956.09	12,390.22	0.00E+00	1.35E-08	3.37E-08		
Th-230	1.0441E-09	4,956.09	12,390.22	0.00E+00	5.17E-06	1.29E-05		
Th-232	3.1689E-16	4,956.09	12,390.22	0.00E+00	1.57E-12	3.93E-12		
Ti-208	4.8636E-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		

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:		4,956.09	
Bounding:		12,390.22	Nominal burnup taken from SFD and converted to MWd using BOL=61.951kg Bounding burnup taken from SFD and converted to MWd using BOL=61.951kg

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FAST REACTOR FUEL
SNF ID #: 908
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
Estimate as of: 2030
Template: (Worst Case)
²Template Burnup (MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186385
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.08

II. Estimates	m	X ₀	X ₁	b	Y ₀	Y ₁	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
Cl-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-08	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-08	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-238	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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.40E+03	6.81E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	(Worst Case)
Fuel Cladding:	SST	SST/Inconel
BOL HM Constituents:	Th and U	U, Th, & Pu
BOL Enrichment %:	7.592	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)

	From SFD	Estimated
Nominal:	904.40	3,071.54
Bounding:		6,143.08

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:	10.15	3.40
Bounding:	20.31	

Estimated EOL HM/Given EOL HM
331.43

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: 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 SRe: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	3,998.94	7,997.88	0.00E+00	2.47E-08	4.94E-08	Avg. MeV	
Am-241	1.1066E-01	3,998.94	7,997.88	2.57E+01	4.68E+02	9.11E+02	0.0150	2.583E+14
Am-242m	1.8247E-03	3,998.94	7,997.88	0.00E+00	7.70E+00	1.54E+01	0.0250	5.197E+13
Am-243	1.0740E-04	3,998.94	7,997.88	0.00E+00	4.29E-01	8.59E-01	0.0375	6.043E+13
C-14	2.8042E-05	3,998.94	7,997.88	0.00E+00	1.04E-01	2.08E-01	0.0575	5.936E+13
Cl-36	3.4243E-10	3,998.94	7,997.88	0.00E+00	1.37E-06	2.74E-06	0.0850	2.895E+13
Cm-243	4.0629E-04	3,998.94	7,997.88	0.00E+00	1.82E+00	3.25E+00	0.1250	2.037E+13
Cm-244	1.6024E-03	3,998.94	7,997.88	0.00E+00	8.41E+00	1.28E+01	0.2250	2.336E+13
Co-60	3.4275E-03	3,998.94	7,997.88	0.00E+00	1.37E+01	2.74E+01	0.3750	1.012E+13
Cs-134	1.5566E-03	3,998.94	7,997.88	0.00E+00	6.22E+00	1.24E+01	0.5750	4.102E+14
Cs-135	4.7693E-05	3,998.94	7,997.88	0.00E+00	1.91E-01	3.81E-01	0.8500	4.286E+12
Cs-137	1.4007E+00	3,998.94	7,997.88	0.00E+00	5.60E+03	1.12E+04	1.2500	5.130E+12
Eu-154	1.6184E-02	3,998.94	7,997.88	0.00E+00	8.47E+01	1.29E+02	1.7500	1.161E+11
Eu-155	1.3774E-02	3,998.94	7,997.88	0.00E+00	5.51E+01	1.10E+02	2.2500	2.294E+07
Fe-55	3.8028E-04	3,998.94	7,997.88	0.00E+00	1.52E+00	3.04E+00	2.7500	1.324E+08
H-3	3.8454E-03	3,998.94	7,997.88	0.00E+00	1.54E+01	3.08E+01	3.5000	4.788E+05
I-129	1.2891E-06	3,998.94	7,997.88	0.00E+00	5.16E-03	1.03E-02	5.0000	1.502E+05
Kr-85	2.7848E-02	3,998.94	7,997.88	0.00E+00	1.11E+02	2.23E+02	7.0000	1.716E+04
Np-237	3.7516E-06	3,998.94	7,997.88	0.00E+00	1.50E-02	3.00E-02	11.0000	1.963E+03
Pa-231	1.2488E-11	3,998.94	7,997.88	0.00E+00	4.99E-08	9.99E-08		
Pb-210	2.4206E-12	3,998.94	7,997.88	0.00E+00	9.88E-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	2.4066E-16	3,998.94	7,997.88	0.00E+00	9.83E-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	4.3902E-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		
U-233	5.7451E-10	3,998.94	7,997.88	0.00E+00	2.30E-06	4.59E-06		
U-234	4.3044E-06	3,998.94	7,997.88	0.00E+00	1.72E-02	3.44E-02		
U-235	-7.7765E-09	3,998.94	0.00	4.33E-05	1.22E-05	4.33E-05		
U-236	1.8050E-07	3,998.94	7,997.88	0.00E+00	7.22E-04	1.44E-03		
U-238	-1.7914E-07	3,998.94	0.00	3.15E-03	2.44E-03	3.15E-03		
Y-90	5.0088E-01	3,998.94	7,997.88	0.00E+00	2.00E+03	4.01E+03		
Other Radionuclides					5.67E+03	1.13E+04		

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 (very close to 30%).
BOL HM Constituents:	Pu and U	Pu and U	
BOL Enrichment %:	31.101	10 to 30	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3,998.94	2,231.06	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		

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

^aTotal burnup for all fuel associated with this worksheet must be 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 & Desor: 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, Zirc, 10 to 40% U)
²Template Burnup(MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.04

II. Estimates	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	1.4291E-07	419.74	839.48	0.00E+00	6.00E-06	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
Cl-38	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-136	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+06
Fe-55	2.5992E-07	419.74	839.48	0.00E+00	1.09E-04	2.18E-04	2.7500	1.492E+06
H-3	1.5242E-03	419.74	839.48	0.00E+00	6.40E-01	1.28E+00	3.5000	1.853E+02
I-129	1.1426E-08	419.74	839.48	0.00E+00	4.80E-04	9.59E-04	5.0000	5.883E+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	6.17E+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-238	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		

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:	29.14	419.74
Bounding:	50.35	839.48

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	7.39	14.41
Bounding:	14.75	16.67

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: FERMI CORE 1 & 2 (CORE SHM)
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: FERMI (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	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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
Cl-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	6.56E-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	
	FAST	FAST	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	13.55265123	10 to 40	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	59.99	592.57	
Bounding:	103.67	1,185.14	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	5.06	9.88	
Bounding:	10.11	11.43	1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FERMI CORE 1 & 2 (DECLAD)
 SNF ID #: 453
 Fuel Units & Descr: 976 - ROD
 Heavy Metal Mass: BOL=130.686kg; EOL=110.971kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup (MWd): 58.6725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.25

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	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	1.809E+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	1.0780E-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	1.817E+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	3.833E+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-08	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	1.827E+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		
Sm-126	3.7564E-05	17,384.91	34,769.81	0.00E+00	6.53E-01	1.31E+00		
Sr-90	8.4333E-01	17,384.91	34,769.81	0.00E+00	1.47E+04	2.93E+04		
Tc-99	4.4825E-04	17,384.91	34,769.81	0.00E+00	7.79E+00	1.56E+01		
Th-229	6.0880E-11	17,384.91	34,769.81	0.00E+00	1.06E-06	2.12E-06		
Th-230	2.8889E-09	17,384.91	34,769.81	0.00E+00	5.02E-05	1.00E-04		
Th-232	2.3708E-11	17,384.91	34,769.81	0.00E+00	4.12E-07	8.24E-07		
Tl-208	5.0432E-09	17,384.91	34,769.81	0.00E+00	8.77E-05	1.75E-04		
U-232	1.3640E-08	17,384.91	34,769.81	0.00E+00	2.37E-04	4.74E-04	Thermal Power	
U-233	1.0327E-08	17,384.91	34,769.81	0.00E+00	1.80E-04	3.59E-04	Nominal Heat	Bounding
U-234	4.9103E-06	17,384.91	34,769.81	0.00E+00	8.54E-02	1.71E-01	Output	Heat Output
U-235	-2.3191E-06	17,384.91	0.00	7.26E-02	3.22E-02	7.26E-02	(Watts)	(Watts)
U-238	1.2633E-05	17,384.91	34,769.81	0.00E+00	2.20E-01	4.39E-01	1.91E+02	3.82E+02
U-238	-9.5407E-08	17,384.91	0.00	3.26E-02	3.10E-02	3.26E-02	Total	Total
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 FAST	Used FAST	
Fuel Cladding:	NONE	ZIRC	This Template was used for the following reasons: This fuel matches on all parameters except cladding.
BOL HM Constituents:	U	U	
BOL Enrichment %:	25.69061404	10 to 40	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	209.10	17,384.91	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	361.35	34,769.81	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	42.57	83.14	1.04
Bounding:	85.13	98.22	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FERMI CORE 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: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.6725048
Template BOL Heavy Metal Mass (MT): 0.018774
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.26

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	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	2.1880E-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	6.064E+13
Co-60	2.9128E-04	5,444.25	10,888.49	0.00E+00	1.59E+00	3.17E+00	0.3750	2.207E+13
Cs-134	4.0326E-09	5,444.25	10,888.49	0.00E+00	2.20E-05	4.39E-05	0.5750	3.939E+14
Cs-135	4.4996E-05	5,444.25	10,888.49	0.00E+00	2.45E-01	4.90E-01	0.8500	3.590E+12
Cs-137	9.7388E-01	5,444.25	10,888.49	0.00E+00	5.30E+03	1.06E+04	1.2500	1.427E+12
Eu-154	5.5290E-05	5,444.25	10,888.49	0.00E+00	3.01E-01	6.02E-01	1.7500	9.248E+10
Eu-155	1.7402E-04	5,444.25	10,888.49	0.00E+00	9.47E-01	1.89E+00	2.2500	1.138E+07
Fe-55	2.5992E-07	5,444.25	10,888.49	0.00E+00	1.42E-03	2.83E-03	2.7500	1.936E+06
H-3	1.5242E-03	5,444.25	10,888.49	0.00E+00	8.30E+00	1.66E+01	3.8000	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	5.897E+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	1.8485E-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		
Th-208	5.0432E-09	5,444.25	10,888.49	0.00E+00	2.75E-05	5.49E-05		
U-232	1.3640E-08	5,444.25	10,888.49	0.00E+00	7.43E-05	1.49E-04		
U-233	1.0327E-08	5,444.25	10,888.49	0.00E+00	5.62E-05	1.12E-04		
U-234	4.9103E-06	5,444.25	10,888.49	0.00E+00	2.67E-02	5.35E-02		
U-235	-2.3191E-06	5,444.25	0.00	7.29E-02	6.02E-02	7.29E-02		
U-236	1.2633E-05	5,444.25	10,888.49	0.00E+00	6.88E-02	1.38E-01		
U-238	-9.5407E-08	5,444.25	0.00	3.28E-02	3.23E-02	3.28E-02		
Y-90	8.4350E-01	5,444.25	10,888.49	0.00E+00	4.59E+03	9.18E+03		
Other Radionuclides					5.34E+03	1.07E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	
Reactor Moderator:	FAST
Fuel Cladding:	ZIRC
BOL HM Constituents:	U
BOL Enrichment %:	25.69081404

Basis for Parameter Differences:

Burnup Summary (MWd) ²	
Nominal:	209.96
Bounding:	362.83

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:	13.28
Bounding:	26.55

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: FERM CORE 1 & 2 (SODIUM WORTH)
SNF ID #: 455
Fuel Units & Descr: 420 - ROD
Heavy Metal Mass: BOL=56.238kg; EOL=55.398kg
ROD Storage Site: INEEL

Fuel decay start date: 1972
Estimate as of: 2030
Template: FERM (Fast, Zirc, 10 to 40%, U)
Template Burnup (MWd): 56.6725048
Template BOL Heavy Metal Mass (MT): 0.016774
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.11

II. Estimated	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	8.857E+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	5.369E+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-08	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	1.9484E-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-08	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		
Th-234	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-08	740.71	0.00	3.12E-02	2.95E-02	3.12E-02		
U-236	1.2633E-05	740.71	1,481.43	0.00E+00	9.36E-03	1.87E-02		
U-238	-9.5407E-08	740.71	0.00	1.40E-02	1.40E-02	1.40E-02		
Y-90	8.4350E-01	740.71	1,481.43	0.00E+00	6.25E+02	1.25E+03		
Other Radionuclides					7.26E+02	1.45E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	89.98	740.71	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	155.50	1,481.43	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	4.21	8.23	1.00
Bounding:	8.43	9.53	

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

^bTotal burnup for all fuel associated with this worksheet must be 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=3536.724kg; EOL=3566.108kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1972
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.8725048
 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	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	Avg. MeV
Ac-227	1.4291E-07	62,269.34	124,538.69	0.00E+00	8.90E-03	1.78E-02	0.0150	5.764E+15	0.0375
Am-241	6.7476E-07	62,269.34	124,538.69	0.00E+00	4.20E-02	8.40E-02	0.0250	1.197E+15	0.0575
Am-242m	0.0000E+00	62,269.34	124,538.69	0.00E+00	0.00E+00	0.00E+00	0.0375	1.055E+15	0.0675
Am-243	8.3651E-15	62,269.34	124,538.69	0.00E+00	5.21E-10	1.04E-09	0.0850	6.736E+14	0.1250
C-14	2.1680E-05	62,269.34	124,538.69	0.00E+00	1.35E+00	2.70E+00	0.2250	5.792E+14	0.3750
Cl-36	5.5188E-08	62,269.34	124,538.69	0.00E+00	3.44E-03	6.87E-03	0.5750	4.506E+15	0.8500
Cm-243	1.0760E-14	62,269.34	124,538.69	0.00E+00	6.70E-10	1.34E-09	1.2500	1.632E+13	1.7500
Cm-244	2.9486E-16	62,269.34	124,538.69	0.00E+00	1.84E-11	3.67E-11	2.2500	2.524E+14	2.2500
Co-60	2.9128E-04	62,269.34	124,538.69	0.00E+00	1.81E+01	3.63E+01	0.5750	4.506E+15	0.8500
Cs-134	4.0326E-09	62,269.34	124,538.69	0.00E+00	2.51E-04	5.02E-04	0.8500	4.106E+13	1.2500
Cs-135	4.4966E-05	62,269.34	124,538.69	0.00E+00	2.80E+00	5.60E+00	1.7500	1.058E+12	2.2500
Cs-137	9.7388E-01	62,269.34	124,538.69	0.00E+00	6.06E+04	1.21E+05	2.7500	2.213E+07	3.5000
Eu-154	5.5290E-05	62,269.34	124,538.69	0.00E+00	3.44E+00	6.89E+00	5.0000	8.991E+03	7.0000
Eu-155	1.7402E-04	62,269.34	124,538.69	0.00E+00	1.08E+01	2.17E+01	11.0000	7.534E+01	
Fe-55	2.5992E-07	62,269.34	124,538.69	0.00E+00	1.62E-02	3.24E-02			
H-3	1.5242E-03	62,269.34	124,538.69	0.00E+00	9.49E+01	1.90E+02			
I-129	1.1426E-06	62,269.34	124,538.69	0.00E+00	7.11E-02	1.42E-01			
Kr-85	1.4635E-02	62,269.34	124,538.69	0.00E+00	9.11E+02	1.82E+03			
Np-237	3.3099E-06	62,269.34	124,538.69	0.00E+00	2.06E-01	4.12E-01			
Pa-231	2.4492E-07	62,269.34	124,538.69	0.00E+00	1.53E-02	3.06E-02			
Pb-210	1.7794E-11	62,269.34	124,538.69	0.00E+00	1.11E-06	2.22E-06			
Pm-147	2.2021E-05	62,269.34	124,538.69	0.00E+00	1.37E+00	2.74E+00			
Pu-238	1.5235E-04	62,269.34	124,538.69	0.00E+00	9.49E+00	1.90E+01			
Pu-239	1.9464E-02	62,269.34	124,538.69	0.00E+00	1.21E+03	2.42E+03			
Pu-240	6.7817E-05	62,269.34	124,538.69	0.00E+00	4.22E+00	8.45E+00			
Pu-241	2.0282E-06	62,269.34	124,538.69	0.00E+00	1.26E-01	2.53E-01			
Pu-242	4.3751E-13	62,269.34	124,538.69	0.00E+00	2.72E-08	5.45E-08			
Ra-226	4.0632E-11	62,269.34	124,538.69	0.00E+00	2.53E-06	5.06E-06			
Ra-228	2.3674E-11	62,269.34	124,538.69	0.00E+00	1.47E-06	2.95E-06			
Ru-106	1.0255E-14	62,269.34	124,538.69	0.00E+00	6.39E-10	1.28E-09			
Se-79	1.6485E-05	62,269.34	124,538.69	0.00E+00	1.03E+00	2.05E+00			
Sn-126	3.7564E-05	62,269.34	124,538.69	0.00E+00	2.34E+00	4.68E+00			
Sr-90	8.4333E-01	62,269.34	124,538.69	0.00E+00	5.25E+04	1.05E+05			
Tc-99	4.4825E-04	62,269.34	124,538.69	0.00E+00	2.79E+01	5.58E+01			
Th-229	6.0880E-11	62,269.34	124,538.69	0.00E+00	3.79E-06	7.58E-06			
Th-230	2.8889E-09	62,269.34	124,538.69	0.00E+00	1.80E-04	3.60E-04			
Th-232	2.3708E-11	62,269.34	124,538.69	0.00E+00	1.48E-06	2.95E-06			
Ti-208	5.0432E-09	62,269.34	124,538.69	0.00E+00	3.14E-04	6.28E-04			
U-232	1.3640E-08	62,269.34	124,538.69	0.00E+00	8.49E-04	1.70E-03			
U-233	1.0327E-08	62,269.34	124,538.69	0.00E+00	6.43E-04	1.29E-03			
U-234	4.9103E-06	62,269.34	124,538.69	0.00E+00	3.06E-01	6.12E-01			
U-235	-2.3191E-06	62,269.34	0.00	2.02E+00	1.87E+00	2.02E+00			
U-236	1.2633E-05	62,269.34	124,538.69	0.00E+00	7.87E-01	1.57E+00			
U-238	-9.5407E-08	62,269.34	0.00	9.08E-01	9.02E-01	9.08E-01			
Y-90	8.4350E-01	62,269.34	124,538.69	0.00E+00	5.25E+04	1.05E+05			
Other Radionuclides					6.10E+04	1.22E+05			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 EXPER.

SNF ID #: 347

Fuel Units & Descr: 15 - ELEMENT

Heavy Metal Mass: BOL = 7.356kg

ROD Storage Site: NEEL

Fuel decay start date: 1993

Estimate as of: 2030

Template: FFTF (FAST, SST, 10 to 30%, Pu & U)

Template Burnup (MWd): 5011.2

Template BOL Heavy Metal Mass (MT): 0.0329161

Template Decay Time: 35 years

Estimated

Canister usage:

18"x10"

0.31

II. Estimates

Radionuclide	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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+08
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	6.984E+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	1.48E+01	1.82E+01	7.0000	2.878E+03
Np-237	3.7518E-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	1.08E+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-06	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-08	525.78	652.69	0.00E+00	2.26E-03	2.81E-03		
U-235	-7.7765E-09	525.78	0.00	2.56E-06	2.15E-05	2.56E-05		
U-236	1.8050E-07	525.78	652.69	0.00E+00	9.49E-06	1.18E-05		
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

	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=7.883kg Bounding burnup taken from SFD and converted to MWd using BOL=7.883kg
Nominal:		525.78	
Bounding:		652.69	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
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=0.248kg
 ROD Storage Site: NEEL

¹Fuel decay start date: 1993
 Estimates as of: 2030
 Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
²Template Burnup(MWd): 5011.2
 Template BOL Heavy Metal Mass (MT): 0.0329181
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 0.02

Radionuclide	m	X ₀	X ₀	b	Y ₀	Y ₀	Gamma Sources	
	CIMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	6.89E-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	1.8024E-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		
Sr-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		
U-233	5.7451E-10	33.98	62.29	0.00E+00	1.95E-08	3.58E-08		
U-234	4.3044E-06	33.98	62.29	0.00E+00	1.46E-04	2.68E-04		
U-235	-7.7765E-09	33.98	0.00	9.20E-07	6.56E-07	9.20E-07		
U-236	1.8050E-07	33.98	62.29	0.00E+00	6.13E-06	1.12E-05		
U-238	-1.7914E-07	33.98	0.00	6.70E-05	6.09E-05	6.70E-05		
Y-90	5.0088E-01	33.98	62.29	0.00E+00	1.70E+01	3.12E+01		
Other Radionuclides					4.81E+01	8.63E+01		

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) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		33.98	Nominal burnup taken from SFD and converted to MWd using BOL=0.263kg
Bounding:		62.29	Bounding burnup taken from SFD and converted to MWd using BOL=0.263kg

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FSVR
SNF ID #: 86
Fuel Units & Descr: 1464 - CARBON COATED PART
Heavy Metal Mass: BOL=15366.58kg; EOL=14725.937kg
ROD Storage Site: FSV

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: 35 years

Estimated
Canister usage:
18"x18"
292.80

II. Estimates	m	x ₀	x _b	b	y ₀	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	3.8818E-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-08	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-08	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	3.9086E-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	5.853E+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+08
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-08	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+08
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-08	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	1.5148E-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:
	From SFD	Used	
Reactor Moderator:	GRAPHITE	GRAPHITE	
Fuel Cladding:	GRAPHITE	GRAPHITE	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	93.15	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	605,875.77	605,875.77	
Bounding:	722,229.41	1,211,751.53	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:	0.39	1.68	
Bounding:	0.47		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 RERTH
 SNF ID #: 90
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=3.851kg; EOL=3.071kg
 ROD Storage Site: NEEI

Estimated
 Canister Usage:
 HNC
 0.50

Fuel decay start date: 2035
 Estimates as of: 2030
 Template: THICA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Template BOL Heavy Metal Mass (HTT): 6.65
 Template Decay Time: 0.000195 5 years

II. Estimates	m	kg	kg	B	Y _n	Y _p	Gamma Sources
Radionuclide	CAIWD From Template	Nominal Fuel Burnup (MWd/g) ²	Bounding Fuel Burnup (MWd/g) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	8.517E-10	744.21	1,488.42	0.00E+00	6.34E-07	1.27E-06	Avg. MW
Am-241	1.8331E-03	744.21	1,488.42	0.00E+00	1.36E-00	2.73E-00	0.0150
Am-242m	1.4129E-06	744.21	1,488.42	0.00E+00	1.05E-03	2.10E-03	0.0250
Am-243	1.4774E-07	744.21	1,488.42	0.00E+00	1.10E-04	2.20E-04	0.0075
C-14	1.2871E-04	744.21	1,488.42	0.00E+00	9.58E-02	1.92E-01	0.0575
Cm-243	2.8120E-06	744.21	1,488.42	0.00E+00	2.09E-03	4.19E-03	0.0850
Cm-244	1.7840E-07	744.21	1,488.42	0.00E+00	1.34E-04	2.67E-04	0.1250
Cm-246	1.6962E-06	744.21	1,488.42	0.00E+00	1.36E-03	2.52E-03	0.2250
Co-60	1.2839E-00	744.21	1,488.42	0.00E+00	9.56E-02	1.91E-01	0.5750
Co-134	9.0541E-02	744.21	1,488.42	0.00E+00	6.74E-01	1.35E-02	0.5750
Co-136	3.2195E-05	744.21	1,488.42	0.00E+00	2.40E-02	4.79E-02	0.8500
Co-137	2.7564E-00	744.21	1,488.42	0.00E+00	2.05E-03	4.10E-03	1.2500
Eu-154	1.5368E-02	744.21	1,488.42	0.00E+00	1.14E-01	2.23E-01	1.7500
Eu-155	2.8293E-02	744.21	1,488.42	0.00E+00	2.18E-01	4.36E-01	2.2500
Fe-55	1.1111E-02	744.21	1,488.42	0.00E+00	5.74E-02	1.15E-03	2.7500
H-3	7.3684E-07	744.21	1,488.42	0.00E+00	8.27E-00	1.65E-01	3.5000
K-45	2.6263E-01	744.21	1,488.42	0.00E+00	1.88E-02	3.78E-02	5.0000
Nd-237	1.2427E-06	744.21	1,488.42	0.00E+00	9.25E-04	1.85E-03	7.0000
Pa-231	3.6511E-09	744.21	1,488.42	0.00E+00	2.87E-06	5.73E-06	11.0000
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	1.58E-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	3.83E-11	7.66E-11	
Ra-228	1.8338E-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	
Sr-78	1.3078E-05	744.21	1,488.42	0.00E+00	8.69E-03	1.84E-02	
Sn-126	1.2167E-05	744.21	1,488.42	0.00E+00	9.05E-03	1.81E-02	
Tb-89	2.6045E-00	744.21	1,488.42	0.00E+00	1.94E-03	3.88E-03	
Tb-229	4.4241E-04	744.21	1,488.42	0.00E+00	3.29E-01	6.58E-01	
Ti-230	1.3713E-10	744.21	1,488.42	0.00E+00	1.02E-07	2.04E-07	
Ti-232	2.5278E-10	744.21	1,488.42	0.00E+00	1.35E-08	2.69E-08	
Ti-236	1.6947E-08	744.21	1,488.42	0.00E+00	1.88E-07	3.76E-07	
U-232	4.8737E-08	744.21	1,488.42	0.00E+00	1.26E-05	2.52E-05	
U-233	1.2203E-07	744.21	1,488.42	0.00E+00	3.63E-05	7.25E-05	
U-234	1.5825E-07	744.21	1,488.42	0.00E+00	9.08E-05	1.82E-04	
U-235	-2.6194E-06	744.21	1,488.42	0.00E+00	1.19E-04	2.37E-04	
U-236	1.2883E-05	744.21	1,488.42	0.00E+00	1.65E-03	1.65E-03	
U-238	-3.6331E-08	744.21	0.00	1.04E-03	9.45E-03	1.89E-02	
Y-90	2.6006E+00	744.21	1,488.42	0.00E+00	1.01E-03	1.94E-03	
					2.68E-03	5.37E-03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From EFD	Used	Basis for Parameter Differences:
Reactor Moderator: LW AND U ZIRC HYDROIDE			
Fuel Cladding: INCOLOY			
BOL HMI Constituents: U			
BOL Enrichment %: 19.767			

Burnup Summary (MWd/g) ²	From EFD	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	Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	5.67	11.53	
			Estimated EOL Inventory EOL HMI 1.05

Reactor shutdown, core removal, storage, shipping or other data confirming that radiation 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/gM).

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
ROO Storage S2r: 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"
6.11

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	1.4241E-09	22,675.71	45,351.43	0.00E+00	3.23E-05	6.46E-05	Avg. MeV	
Am-241	1.0407E-02	22,675.71	45,351.43	0.00E+00	2.36E+02	4.72E+02	0.0150	2.349E+15
Am-242m	1.1944E-06	22,675.71	45,351.43	0.00E+00	2.71E-02	5.42E-02	0.0250	4.813E+14
Am-243	3.6993E-05	22,675.71	45,351.43	0.00E+00	8.39E-01	1.68E+00	0.0375	4.202E+14
C-14	2.6367E-08	22,675.71	45,351.43	0.00E+00	5.98E-04	1.20E-03	0.0675	4.553E+14
Cl-36	4.4435E-31	22,675.71	45,351.43	0.00E+00	1.01E-26	2.02E-26	0.0850	2.711E+14
Cm-243	2.7503E-06	22,675.71	45,351.43	0.00E+00	6.24E-02	1.25E-01	0.1250	1.787E+14
Cm-244	1.4775E-03	22,675.71	45,351.43	0.00E+00	3.35E+01	6.70E+01	0.2250	2.340E+14
Co-60	9.4350E-07	22,675.71	45,351.43	0.00E+00	2.14E-02	4.28E-02	0.3750	1.018E+14
Cs-134	4.4666E-07	22,675.71	45,351.43	0.00E+00	1.01E-02	2.03E-02	0.5750	1.719E+15
Cs-135	4.2564E-06	22,675.71	45,351.43	0.00E+00	9.65E-02	1.93E-01	0.8500	2.018E+13
Cs-137	1.0182E+00	22,675.71	45,351.43	0.00E+00	2.31E+04	4.62E+04	1.2500	9.545E+12
Eu-154	4.6373E-03	22,675.71	45,351.43	0.00E+00	1.05E+02	2.10E+02	1.7500	5.479E+11
Eu-155	2.1646E-04	22,675.71	45,351.43	0.00E+00	4.91E+00	9.82E+00	2.2500	4.895E+07
Fe-55	4.5838E-07	22,675.71	45,351.43	0.00E+00	1.04E-02	2.08E-02	2.7500	6.084E+07
H-3	8.5966E-04	22,675.71	45,351.43	0.00E+00	1.95E+01	3.90E+01	3.5000	1.134E+06
I-129	6.6403E-07	22,675.71	45,351.43	0.00E+00	1.51E-02	3.01E-02	5.0000	4.805E+06
Kr-85	1.5553E-02	22,675.71	45,351.43	0.00E+00	3.53E+02	7.05E+02	7.0000	5.481E+04
Np-237	3.1685E-05	22,675.71	45,351.43	0.00E+00	7.18E-01	1.44E+00	11.0000	6.259E+03
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		
Th-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	-8.4194E-09	22,675.71	0.00	1.92E-03	1.71E-03	1.92E-03		
Y-90	9.3439E-01	22,675.71	45,351.43	0.00E+00	2.12E+04	4.24E+04		
Other Radionuclides					2.22E+04	4.44E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.0510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		22,675.71
Bounding:		45,351.43

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.63	
Bounding:	1.26	

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: 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 ₀	x ₁	b	y ₀	y ₁	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	1.4241E-09	2,061.43	4,122.86	0.00E+00	2.94E-08	5.87E-08	Avg. MeV	
Am-241	1.0407E-02	2,061.43	4,122.86	0.00E+00	2.15E+01	4.29E+01	0.0150	2.136E+14
Am-242m	1.1944E-06	2,061.43	4,122.86	0.00E+00	2.46E-03	4.92E-03	0.0250	4.376E+13
Am-243	3.6993E-05	2,061.43	4,122.86	0.00E+00	7.63E-02	1.53E-01	0.0375	3.820E+13
C-14	2.6367E-08	2,061.43	4,122.86	0.00E+00	5.44E-05	1.09E-04	0.0575	4.139E+13
Cl-36	4.4435E-31	2,061.43	4,122.86	0.00E+00	9.16E-28	1.83E-27	0.0850	2.464E+13
Cm-243	2.7503E-06	2,061.43	4,122.86	0.00E+00	5.67E-03	1.13E-02	0.1250	1.825E+13
Cm-244	1.4775E-03	2,061.43	4,122.86	0.00E+00	3.05E+00	6.09E+00	0.2250	2.127E+13
Co-60	9.4350E-07	2,061.43	4,122.86	0.00E+00	1.94E-03	3.89E-03	0.3750	9.255E+12
Cs-134	4.4666E-07	2,061.43	4,122.86	0.00E+00	9.21E-04	1.84E-03	0.5750	1.563E+14
Cs-135	4.2564E-06	2,061.43	4,122.86	0.00E+00	8.77E-03	1.75E-02	0.8500	1.835E+12
Cs-137	1.0182E+00	2,061.43	4,122.86	0.00E+00	2.10E+03	4.20E+03	1.2500	8.678E+11
Eu-154	4.6373E-03	2,061.43	4,122.86	0.00E+00	9.56E+00	1.91E+01	1.7500	4.981E+10
Eu-155	2.1646E-04	2,061.43	4,122.86	0.00E+00	4.46E-01	8.92E-01	2.2500	4.450E+06
Fe-55	4.5838E-07	2,061.43	4,122.86	0.00E+00	9.45E-04	1.89E-03	2.7500	5.531E+06
H-3	8.5966E-04	2,061.43	4,122.86	0.00E+00	1.77E+00	3.54E+00	3.5000	1.031E+05
I-129	6.6403E-07	2,061.43	4,122.86	0.00E+00	1.37E-03	2.74E-03	5.0000	4.368E+04
Kr-85	1.5553E-02	2,061.43	4,122.86	0.00E+00	3.21E+01	6.41E+01	7.0000	4.983E+03
Np-237	3.1665E-05	2,061.43	4,122.86	0.00E+00	6.53E-02	1.31E-01	11.0000	5.890E+02
Pa-231	2.4380E-09	2,061.43	4,122.86	0.00E+00	5.03E-06	1.01E-05		
Pb-210	1.7394E-10	2,061.43	4,122.86	0.00E+00	3.59E-07	7.17E-07		
Pm-147	8.8578E-06	2,061.43	4,122.86	0.00E+00	1.83E-02	3.65E-02		
Pu-238	1.2120E-01	2,061.43	4,122.86	0.00E+00	2.50E+02	5.00E+02		
Pu-239	6.9441E-04	2,061.43	4,122.86	0.00E+00	1.43E+00	2.86E+00		
Pu-240	3.8299E-04	2,061.43	4,122.86	0.00E+00	7.90E-01	1.58E+00		
Pu-241	3.1731E-02	2,061.43	4,122.86	0.00E+00	6.54E+01	1.31E+02		
Pu-242	3.0911E-08	2,061.43	4,122.86	0.00E+00	6.37E-03	1.27E-02		
Ra-226	4.1239E-10	2,061.43	4,122.86	0.00E+00	8.50E-07	1.70E-06		
Ra-228	4.5680E-14	2,061.43	4,122.86	0.00E+00	9.42E-11	1.88E-10		
Ru-106	8.1713E-15	2,061.43	4,122.86	0.00E+00	1.68E-11	3.37E-11		
Se-79	1.2333E-05	2,061.43	4,122.86	0.00E+00	2.54E-02	5.08E-02		
Sn-126	1.0194E-05	2,061.43	4,122.86	0.00E+00	2.10E-02	4.20E-02		
Sr-90	9.3378E-01	2,061.43	4,122.86	0.00E+00	1.92E+03	3.85E+03		
Tc-99	3.8050E-04	2,061.43	4,122.86	0.00E+00	7.84E-01	1.57E+00		
Th-229	2.9532E-11	2,061.43	4,122.86	0.00E+00	6.09E-08	1.22E-07		
Th-230	3.1981E-08	2,061.43	4,122.86	0.00E+00	6.59E-05	1.32E-04		
Th-232	5.3633E-14	2,061.43	4,122.86	0.00E+00	1.11E-10	2.21E-10		
Th-208	3.7406E-06	2,061.43	4,122.86	0.00E+00	7.71E-05	1.54E-04		
U-232	1.0134E-07	2,061.43	4,122.86	0.00E+00	2.09E-04	4.18E-04		
U-233	9.2892E-09	2,061.43	4,122.86	0.00E+00	1.91E-05	3.83E-05		
U-234	6.6403E-05	2,061.43	4,122.86	0.00E+00	1.37E-01	2.74E-01		
U-235	2.8661E-06	2,061.43	0.00	1.51E-02	9.22E-03	1.51E-02		
U-236	1.6701E-05	2,061.43	4,122.86	0.00E+00	3.44E-02	6.89E-02		
U-238	9.4194E-09	2,061.43	0.00	1.75E-04	1.55E-04	1.75E-04		
Y-90	9.3439E-01	2,061.43	4,122.86	0.00E+00	1.93E+03	3.85E+03		
Other Radionuclides					2.02E+03	4.04E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,061.43	
Bounding:		4,122.86	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	BT	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	0.0675	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	1.800E+06
H-3	9.8486E-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	5.837E+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	1.2378E-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	5.82E-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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	200.85	169.84
Bounding:	277.17	339.65

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	0.85
Bounding:	0.04	1.23

Estimated EOL HM/Given EOL HM

1.00

*Reactor shutdown, core removal, storage, shipping or other data 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

Fuel decay start date: 1975
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:
18"x10"
1.00

II. Estimates

	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	3.784E+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	7.108E+11
C-14	4.7820E-06	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	3.808E+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+06
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		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
8.96E-01	1.79E+00	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basic 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 %:	9.74	0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basic for burnup used in estimates:
Nominal:	47.48	49.45	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		98.90	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: LOFT CORNER FUEL MODULE
 SRF ID #: 128
 Fuel Units & Decay: 4 - 11 X 11 ROD ARRAY
 Heavy Metal Mass: BOL-279.864kg EOL-279.053kg
 ROD Storage Size: NIEEL

Fuel decay start date: 1975
Estimates as of: 2000
Template: PWR (Light Water, Zirc. 0 to 5% U)
Template BOL Heavy Metal Mass (MT): 61.82
Template Decay Time: 50 years

Estimated Center Usage:
 16 x 10⁶
 2.00

Radionuclide	Clad/Wd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(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	5.838E+13
Am-241	1.4751E-01	780.26	1.560.52	0.00E+00	1.15E+02	2.30E+02	0.0150	1.890E+13
Am-243m	2.5695E-04	780.26	1.560.52	0.00E+00	2.00E-01	4.18E-01	0.0250	1.190E+13
Am-243	6.2494E-04	780.26	1.560.52	0.00E+00	4.88E-01	9.75E-01	0.0375	1.127E+13
C-14	4.7820E-05	780.26	1.560.52	0.00E+00	3.73E-02	7.46E-02	0.0675	1.403E+13
Co-243	8.0297E-07	780.26	1.560.52	0.00E+00	8.27E-04	1.25E-03	0.0850	6.556E+12
Co-244	1.7426E-04	780.26	1.560.52	0.00E+00	1.38E-01	2.72E-01	0.1250	4.362E+12
Co-60	2.7618E-02	780.26	1.560.52	0.00E+00	2.15E+01	4.31E+01	0.2250	8.598E+12
Cs-134	3.5610E-04	780.26	1.560.52	0.00E+00	2.78E-01	5.56E-01	0.3750	2.417E+12
Cs-136	2.6260E-07	780.26	1.560.52	0.00E+00	2.05E-04	4.10E-04	0.5750	6.693E+13
Cs-137	9.8370E-01	780.26	1.560.52	0.00E+00	1.13E-02	2.25E-02	0.8500	5.558E+11
Eu-154	6.0302E-03	780.26	1.560.52	0.00E+00	4.71E+00	9.41E+00	1.7500	1.559E+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	7.8296E-07	780.26	1.560.52	0.00E+00	8.19E-04	1.24E-03	2.7500	9.000E+06
H-3	8.8486E-03	780.26	1.560.52	0.00E+00	6.98E+00	1.40E+01	3.5000	6.432E+06
H-3	8.8486E-03	780.26	1.560.52	0.00E+00	7.67E-04	1.53E-03	6.0000	2.746E+05
Ir-192	1.0707E-02	780.26	1.560.52	0.00E+00	8.35E+00	1.67E+01	7.0000	3.187E+04
Nb-237	1.1827E-05	780.26	1.560.52	0.00E+00	9.31E-03	1.65E-02	11.0000	3.68E+03
Pu-231	1.4703E-09	780.26	1.560.52	0.00E+00	1.15E-06	2.29E-06		
Pu-210	1.8628E-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	4.3786E-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	3.9501E-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		
Rn-106	2.0413E-14	780.26	1.560.52	0.00E+00	1.59E-11	3.18E-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	3.8367E-04	780.26	1.560.52	0.00E+00	3.07E-01	6.14E-01		
Ti-229	1.5684E-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	1.5133E-07	780.26	1.560.52	0.00E+00	1.19E-04	2.38E-04		
U-232	4.1005E-07	780.26	1.560.52	0.00E+00	3.20E-04	6.40E-04		
U-233	2.5866E-08	780.26	1.560.52	0.00E+00	2.02E-05	4.03E-05		
U-234	5.2655E-05	780.26	1.560.52	0.00E+00	4.11E-02	8.22E-02		
U-235	-1.4487E-06	780.26	0.00	2.42E-02	2.31E-02	2.42E-02		
U-236	7.5888E-05	780.26	1.560.52	0.00E+00	6.92E-03	1.38E-02		
U-238	-2.6129E-07	780.26	0.00	9.03E-02	5.01E-02	9.03E-02		
Y-90	6.4180E-01	780.26	1.560.52	0.00E+00	7.44E+02	1.49E+03		

III. Template Selection Summary, Burnup Summary, and Checks		Basis for Parameter Differences:	
Template Selection Summary			
Reactor Moderator	From SFD	Used	
Fuel Cladding	UO ₂ WATER	Zirc	
BOL HMI Constituents	U		
BOL Enrichment %	4.005614536	0 to 5	

Burnup Summary (MWd) ³		Basis for burnup used in estimate:	
Nominal	From SFD	Estimated	
Bounding	780.26	771.41	Nominal burnup taken directly from SFD (connected to HMI)
		1,560.52	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HMI/Given EOL HMI	
Nominal	Burnup Multiplier	Given Burnup	0.93
Bounding	0.08		
	0.16		

³Reactor shutdown, core removal, storage, shipping or other data confirming that radiation ceased for fuel.
⁴Total burnup for all fuel associated with this worksheet must be 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=815.8kg; EOL=813.025kg
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"
4.00

II. Estimates	m	X ₀	X ₁	b	Y ₀	Y ₁	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	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
Ci-36	8.0297E-07	2,447.37	4,894.74	0.00E+00	1.97E-03	3.93E-03	0.0650	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	2.18E+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	6.00E-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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
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

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LWR SNF SCRAP (ZVSST)
SNF ID #: 940
Fuel Units & Descr: 9 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=161.862kg; EOL=154.224kg
ROD Storage Site: INEEL

*Fuel decay start date: 1983
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"
0.69

II. Estimates	m	x ₀	x _b	b	y ₀	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Total Photons/sec (bounding)
Ac-227	8.7758E-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	6.2656E-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	3.58E+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	6.2713E-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	6.86E+03	1.33E+04	
Tc-99	3.8357E-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	
Ti-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

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ZIRC OR SST	ZIRC	This fuel matches on all parameters except possibly cladding.
BOL HM Constituents:	U	U	
BOL Enrichment %:	3.923	0 to 5	

Burnup Summary (MWd)¹

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

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MTR CANAL SCRAP
SNF ID #: 1062
Fuel Units & Descr: 105 - CANISTER OF SCRAP
Heavy Metal Mass: BOL = : EOL=265.975kg
RAD Storage Site: NEEL

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 _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CIMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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-136	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	6.4183E-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

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		266.26
Bounding:		532.51

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.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.06	

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: MURR (UALX) COLUMBIA

SNF ID #: 142

Fuel Units & Design: 32 - 24 CURVED PLATES

Heavy Metal Mass: BOL=25.12kg; EOL=21.725kg

ROD Storage Sites: SRS

*Fuel decay start date:

1985

2030

Estimates as of:

367.2

Template: ATR (Light Water, Alum. 60 to 100%, U)

*Template Burnup (MWd/g):

0.0016659

Template BOL Heavy Metal Mass (MT):

35 years

Template Decay Time:

Estimated
Canister usage:

18710*

1.33

Gamma Sources

Photon

Energy

Group

Avg. MeV

Photons/sec

(bounding)

Total

Ac-227

Am-241

Am-242m

Am-243

C-14

C-38

Cm-243

Cm-244

Co-60

Ce-134

Ce-135

Cs-137

Eu-154

Eu-155

Fe-55

H-3

I-129

K-36

Np-237

Pa-231

Pb-210

Pm-147

Pu-238

Pu-239

Pu-240

Pu-241

Pu-242

Re-228

Re-228

Ru-106

Se-79

Sm-128

Sr-90

Tc-99

Th-229

Th-230

Th-232

Th-232

U-232

U-233

U-234

U-235

U-236

U-238

U-238

Y-90

Other Radionuclides

Template Selection Summary

Template Selection Summary

From SFD

Used

Reactor Moderator:

Fuel Cladding:

BOL HLM Constituent:

BOL Enrichment %:

From SFD

Estimated

Nominal:

Bounding:

Estimated Burnup/
Given Burnup

Nominal:

Bounding:

Estimated BOL HLM/Given EOL HLM

Nominal:

Bounding:

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

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

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

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"
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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	3,391.20	6,782.40	0.00E+00	6.81E-06	1.36E-05	Avg. MeV	
Am-241	2.5251E-03	3,391.20	6,782.40	0.00E+00	8.56E+00	1.71E+01	0.0150	4.995E+14
Am-242m	3.9624E-07	3,391.20	6,782.40	0.00E+00	1.34E-03	2.69E-03	0.0250	1.037E+14
Am-243	1.4880E-06	3,391.20	6,782.40	0.00E+00	5.05E-03	1.01E-02	0.0375	9.016E+13
C-14	5.7053E-09	3,391.20	6,782.40	0.00E+00	1.83E-05	3.67E-05	0.0575	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	1.8522E-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	9.831E+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		
Ti-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	2.88E-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

	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

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	3,391.20	2,411.49
Bounding:		6,782.40

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	0.71
Bounding:	1.14	

Estimated EOL HM/Given EOL HM
0.95

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

^aTotal burnup for all fuel associated with this worksheet must be 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-30.24g EOL-31.963g
ROD Storage Site: INEL

Estimated
Canister usage:
18"x19"
0.78

Fuel decay start date: 1988
Estimate as of: 2030
Template: PWR (Light Water, Zirc. 0 to 5%, U)
Heavy Metal Mass (BTR): 0.00776911
Template Decay Time: 35 years

II. Estimates

Radionuclide	CLAWD From Template	Nominal Fuel Burnup (MWd/MTU)	Bounding Fuel Burnup (MWd/MTU)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7759E-10	6.863.03	13.728.05	0.00E+00	6.02E-06	1.20E-05	Avg. 144V	0.0150	7.385E+14
Am-241	1.4352E-01	6.863.03	13.728.05	0.00E+00	9.85E+02	1.97E+03		0.0250	1.489E+14
Am-242m	2.8698E-04	6.863.03	13.728.05	0.00E+00	1.97E+00	3.94E+00		0.0375	1.420E+14
Am-243	6.2665E-04	6.863.03	13.728.05	0.00E+00	4.29E+00	8.59E+00		0.0575	1.641E+14
C-14	4.7901E-05	6.863.03	13.728.05	0.00E+00	3.29E-01	6.57E-01		0.0650	8.284E+13
Cm-243	2.5081E-04	6.863.03	13.728.05	0.00E+00	5.51E-03	1.10E-02		0.1250	5.734E+13
Cm-244	4.9015E-02	6.863.03	13.728.05	0.00E+00	1.72E+00	3.44E+00		0.2250	7.098E+13
Cm-246	2.3581E-03	6.863.03	13.728.05	0.00E+00	3.98E+02	6.73E+02		0.3750	3.047E+13
Ce-134	4.0536E-05	6.863.03	13.728.05	0.00E+00	1.78E-01	3.51E+01		0.5750	7.087E+13
Ce-136	1.4433E-05	6.863.03	13.728.05	0.00E+00	9.91E-02	1.98E-01		0.8500	9.800E+12
Co-137	1.3973E+00	6.863.03	13.728.05	0.00E+00	9.59E+03	1.92E+04		1.2500	8.831E+12
Eu-154	2.0203E-02	6.863.03	13.728.05	0.00E+00	1.39E+02	2.77E+02		1.7500	2.884E+11
Eu-155	1.7684E-03	6.863.03	13.728.05	0.00E+00	1.21E+01	2.43E+01		2.2500	4.844E+07
F-65	4.3136E-05	6.863.03	13.728.05	0.00E+00	2.96E-01	5.92E-01		2.7500	9.514E+07
H-3	2.0769E-02	6.863.03	13.728.05	0.00E+00	1.43E+02	2.85E+02		3.5000	9.798E+08
I-129	6.8289E-07	6.863.03	13.728.05	0.00E+00	6.75E-03	1.35E-02		5.0000	4.189E+08
K-45	2.8214E-02	6.863.03	13.728.05	0.00E+00	1.94E+02	3.87E+02		7.0000	4.829E+06
Np-237	1.1218E-05	6.863.03	13.728.05	0.00E+00	7.70E-02	1.54E-01		11.0000	5.545E+04
Pu-231	1.3008E-09	6.863.03	13.728.05	0.00E+00	8.95E-06	1.79E-05			
Pu-238	8.5079E-11	6.863.03	13.728.05	0.00E+00	5.84E-07	1.17E-06			
Pu-239	3.6537E-04	6.863.03	13.728.05	0.00E+00	2.51E+00	5.01E+00			
Pu-240	7.4654E-02	6.863.03	13.728.05	0.00E+00	5.12E+02	1.02E+03			
Pu-242	1.1623E-02	6.863.03	13.728.05	0.00E+00	7.98E+01	1.60E+02			
Pu-243	1.5132E-02	6.863.03	13.728.05	0.00E+00	1.04E+02	2.08E+02			
Pu-244	9.0039E-01	6.863.03	13.728.05	0.00E+00	6.18E+03	1.24E+04			
Pu-246	6.4280E-05	6.863.03	13.728.05	0.00E+00	4.41E-01	8.82E-01			
Pu-248	2.2804E-10	6.863.03	13.728.05	0.00E+00	1.57E-06	3.10E-06			
Ra-226	5.2713E-12	6.863.03	13.728.05	0.00E+00	3.82E-08	7.24E-08			
Rn-106	8.1160E-05	6.863.03	13.728.05	0.00E+00	4.20E-06	8.39E-06			
Sr-79	1.2377E-05	6.863.03	13.728.05	0.00E+00	6.49E-02	1.70E-01			
Sr-126	2.5210E-05	6.863.03	13.728.05	0.00E+00	1.73E-01	3.46E-01			
Tc-99	3.8575E-04	6.863.03	13.728.05	0.00E+00	6.29E+03	1.26E+04			
Tc-228	1.2057E-10	6.863.03	13.728.05	0.00E+00	2.70E+00	5.40E+00			
Tc-229	2.1043E-08	6.863.03	13.728.05	0.00E+00	1.44E-04	2.88E-04			
Tc-230	5.2972E-12	6.863.03	13.728.05	0.00E+00	3.64E-08	7.27E-08			
Ti-208	1.7474E-07	6.863.03	13.728.05	0.00E+00	1.20E-03	2.40E-03			
Ti-222	4.7369E-07	6.863.03	13.728.05	0.00E+00	3.25E-03	6.50E-03			
U-232	2.5097E-08	6.863.03	13.728.05	0.00E+00	1.72E-04	3.44E-04			
U-233	5.0000E-05	6.863.03	13.728.05	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	13.728.05	0.00E+00	5.50E-02	1.04E-01			
U-238	-2.8129E-07	6.863.03	0.00	1.23E-02	1.11E-02	1.23E-02			
Y-90	9.1699E-01	6.863.03	13.728.05	0.00E+00	6.29E+03	1.26E+04			
Total									

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFR	Used
Reactor Moderator:	Light Water
Fuel Cladding:	Zirc
BOL H/M Constituents:	U
BOL Enrichment %:	0 to 5

Basic for Parameter Differences:

From SFR	Used
Reactor Moderator:	Light Water
Fuel Cladding:	Zirc
BOL H/M Constituents:	U
BOL Enrichment %:	0 to 5

Basic for Burnup used in estimate:

Nominal:	Estimated
Bounding:	13.728.05

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

Checks

Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	5.00	5.17
	10.00	7.00

Estimated EOL H/M/chem EOL HM

1.12

Reactor shutdown, core removal, storage, shipping or other data 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/MTU).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR
SNF D #: 461
Fuel Units & Descr: V - 19 CURVED PLATES
Heavy Metal Mass: BOL=581kg; EOL=325kg
ROO Storage Site: SRS

Fuel decay start date: 1985
Estimates as of: 2000
Template: ATR (Light Water, Ann., 60 to 100%, U)
Template BOL Heavy Metal Mass (HTI): 367.2
Template Decay Time: 0.00116889 55 years

Estimated
Canister usage:
16.710'
0.47

Radionuclide	CMAWD From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (pounds)
Ac-227	2.0068E-09	1.637.30	3.274.60	0.00E+00	3.29E-06	6.57E-06	Avg. MeV	2.412E+14
Am-241	2.6281E-03	1.637.30	3.274.60	0.00E+00	4.19E+00	8.27E+00	0.0150	6.008E+13
Am-243m	3.9624E-07	1.637.30	3.274.60	0.00E+00	6.49E-04	1.30E-03	0.0260	4.858E+13
Am-243	1.4880E-06	1.637.30	3.274.60	0.00E+00	2.44E-03	4.87E-03	0.0575	4.858E+13
C-14	5.7053E-09	1.637.30	3.274.60	0.00E+00	9.34E-08	1.87E-05	0.0850	2.823E+13
Co-56	1.3124E-32	1.637.30	3.274.60	0.00E+00	2.15E-29	4.30E-29	0.0850	1.863E+13
Co-243	1.1419E-07	1.637.30	3.274.60	0.00E+00	1.87E-04	3.74E-04	1.7500	2.437E+13
Co-244	1.8522E-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	0.5750	1.060E+13
Co-134	2.0455E-06	1.637.30	3.274.60	0.00E+00	3.36E-02	6.70E-02	0.5750	1.732E+14
Co-136	3.4477E-06	1.637.30	3.274.60	0.00E+00	6.64E-02	1.19E-02	0.8500	2.140E+12
Co-137	1.4365E+00	1.637.30	3.274.60	0.00E+00	2.36E+03	4.70E+03	1.2500	1.035E+12
Eu-154	7.8230E-03	1.637.30	3.274.60	0.00E+00	1.20E+01	2.40E+01	1.7500	5.827E+10
Eu-155	6.8259E-04	1.637.30	3.274.60	0.00E+00	9.70E-01	1.94E+00	2.2500	4.827E+06
Fe-55	2.2701E-06	1.637.30	3.274.60	0.00E+00	3.73E-03	7.46E-03	2.7500	4.860E+06
H-3	1.8698E-03	1.637.30	3.274.60	0.00E+00	3.23E+00	6.45E+00	3.5000	2.694E+03
H-129	7.5300E-07	1.637.30	3.274.60	0.00E+00	5.42E-07	1.08E-05	11.0000	1.343E+01
K-45	4.1178E-02	1.637.30	3.274.60	0.00E+00	6.74E+01	1.35E+02		
Nb-237	9.5782E-06	1.637.30	3.274.60	0.00E+00	1.57E-02	3.14E-02		
Pa-231	3.9378E-09	1.637.30	3.274.60	0.00E+00	6.45E-06	1.29E-05		
Pa-210	3.3115E-10	1.637.30	3.274.60	0.00E+00	5.42E-07	1.08E-05		
Pm-147	9.2402E-04	1.637.30	3.274.60	0.00E+00	1.51E+00	3.03E+00		
Pu-238	1.8217E-02	1.637.30	3.274.60	0.00E+00	2.86E+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	3.88E-01	7.97E-01		
Pu-241	1.6242E-02	1.637.30	3.274.60	0.00E+00	2.86E+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	6.08E-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		
Sm-126	1.1571E-05	1.637.30	3.274.60	0.00E+00	1.89E-02	3.78E-02		
Si-40	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	6.82E-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		
Th-238	4.0414E-06	1.637.30	3.274.60	0.00E+00	6.82E-06	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	1.8502E-04	1.637.30	3.274.60	0.00E+00	3.04E-01	6.08E-01		
U-235	2.7235E-06	1.637.30	3.274.60	1.00E-02	6.57E-03	1.00E-02		
U-236	1.5493E-05	1.637.30	3.274.60	0.00E+00	2.54E-02	6.07E-02		
U-238	4.2851E-09	1.637.30	3.274.60	0.00E+00	1.14E-04	1.14E-04		
U-240	1.3475E+00	1.637.30	3.274.60	0.00E+00	2.21E+03	4.41E+03		
Other Radionuclides								
Template Selection Summary, Burnup Summary, and Checks								
Template Selection Summary								
From SFD			Used	Basis for Parameter Differences:				
Reactor Moderator:			LIGHT WATER					
Fuel Cladding:			ALUMI					
BOL HMI Constituents:			U					
BOL Enrichment %:			60 to 100					
Burnup Summary (MWd) ²								
From SFD			Estimated	Basis for burnup used to estimate:				
Nominal:			1.637.30	Nominal burnup calculated from BOL heavy metal mass destroyed.				
Bounding:			3.274.60	Bounding burnup assumed to be twice nominal burnup.				
Checks								
Nominal:			1.04	Estimated BOL HMI/Chen EOL HMI				
Bounding:			2.08	1.03				
Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.								
Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MH).								

Thermal Power			
Nominal Heat	Bounding	Output	Heat Output
(Watts)	(Watts)	(Watts)	(Watts)
2.76E+01	5.48E+01		
Total	Total		

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: PATR-RIDEN (SUPERHEATER)
 SIF ID #: 106
 Fuel Units & Decay: 411 - ROD
 Heavy Metal Mass: BOL-54.54kg, EOL-52.608kg
 ROD Storage Site: NEEB

Estimated
 Canister usage:
 18 x 10' = 3.57

Fuel decay start date: 1987
Estimate as of: 2030
Template: Patridge (Light Water, SST, 60 to 100%, U)
Template BOL Heavy Metal Mass (MT): 0.00012582
Template Decay Time: 50 years

Radionuclide	CLAWID From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Photons/sec (bounding)
Ac-227	3.427E-08	1.824.78	3.649.55	0.00E+00	6.25E-05	1.29E-04	Avg. MW	
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-243m	7.9469E-09	1.824.78	3.649.55	0.00E+00	1.45E-05	2.90E-05	0.0250	3.955E+13
Am-243	9.8338E-10	1.824.78	3.649.55	0.00E+00	1.80E-08	3.59E-08	0.0078	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	3.689E+13
Cl-36	1.2281E-06	1.824.78	3.649.55	0.00E+00	2.24E-03	4.47E-03	0.0850	2.228E+13
Co-243	1.7271E-10	1.824.78	3.649.55	0.00E+00	3.15E-07	6.30E-07	0.1250	1.445E+13
Co-244	1.3068E-09	1.824.78	3.649.55	0.00E+00	2.39E-06	4.77E-06	0.2250	1.820E+13
Co-60	9.9839E-03	1.824.78	3.649.55	0.00E+00	1.80E+01	3.60E+01	0.5750	8.374E+12
Co-134	1.824.78	1.824.78	3.649.55	0.00E+00	3.59E-05	7.10E-05	0.5750	1.394E+14
Co-136	3.0318E-05	1.824.78	3.649.55	0.00E+00	5.53E-02	1.11E-01	0.8500	1.377E+12
Co-137	1.0263E-00	1.824.78	3.649.55	0.00E+00	1.67E+03	3.35E+03	1.2500	3.105E+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	1.799E+07
Eu-156	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	2.229E+02
H-39	7.3195E-07	1.824.78	3.649.55	0.00E+00	1.34E-03	2.67E-03	5.0000	9.208E-01
K-48	1.5681E-02	1.824.78	3.649.55	0.00E+00	2.88E+01	5.72E+01	7.0000	1.018E+01
Nb-237	1.1494E-08	1.824.78	3.649.55	0.00E+00	2.10E-03	4.19E-03	11.0000	1.143E+00
Pu-231	5.9070E-08	1.824.78	3.649.55	0.00E+00	1.06E-04	2.12E-04		
Pu-210	1.2885E-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	2.8223E-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	1.59E-01	3.16E-01		
Pu-241	3.4759E-04	1.824.78	3.649.55	0.00E+00	6.94E-01	1.27E+00		
Pu-242	1.9717E-09	1.824.78	3.649.55	0.00E+00	3.80E-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	6.1646E-15	1.824.78	3.649.55	0.00E+00	1.12E-11	2.24E-11		
Se-78	1.3221E-05	1.824.78	3.649.55	0.00E+00	2.41E-02	4.83E-02		
Sm-126	1.1491E-05	1.824.78	3.649.55	0.00E+00	2.10E-02	4.19E-02		
Sn-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		
Th-230a	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-08	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	-2.7781E-06	1.824.78	0.00	1.10E-01	1.05E-01	1.10E-01		
U-236	1.6190E-05	1.824.78	3.649.55	0.00E+00	2.95E-02	5.91E-02		
U-238	-2.8547E-09	1.824.78	0.00	1.26E-03	1.25E-03	1.26E-03		
Y-90	9.5557E-01	1.824.78	3.649.55	0.00E+00	1.74E+03	3.49E+03		
Other Radionuclides					2.22E+03	4.45E+03		

Thermal Power	Bounding Heat Output (Watts)
2.11E+01	4.26E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			
From SFD	Used	Basis for Parameter Differences:	
Reactor Moderator: LIGHT WATER	LIGHT WATER		
Fuel Cladding: SST	SST		
BOL H/M Constituents: U	U		
BOL Enrichment %: 83.1424353	60 to 100		

Burnup Summary (MWd/g)		Basis for Burnup used in estimate:
Nominal: 1.824.78	Estimated	
Bounding: 3.649.55	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.	

Checks		
Nominal: 0.72	Burnup Multiplier: 1.43	Estimated Burnup/ Given Burnup
Estimated EOL H/M Given EOL H/M 1.09		

Reactor shutdown, core removal, storage, shipping or other data confirming that radiation ceased for fuel.
 Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MH).

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	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 Avg. MeV Total Photons/sec (bounding)
Ac-227	3.4278E-08	15.04	30.09	0.00E+00	5.16E-07	1.03E-06	0.0150
Am-241	1.1458E-04	15.04	30.09	0.00E+00	1.72E-03	3.45E-03	0.0250
Am-242m	7.9468E-09	15.04	30.09	0.00E+00	1.20E-07	2.39E-07	0.0375
Am-243	9.8386E-10	15.04	30.09	0.00E+00	1.48E-08	2.96E-08	0.0575
C-14	2.2978E-04	15.04	30.09	0.00E+00	3.46E-03	6.91E-03	0.0850
Cl-36	1.2261E-06	15.04	30.09	0.00E+00	1.84E-05	3.69E-05	0.1250
Cm-243	1.7271E-10	15.04	30.09	0.00E+00	2.60E-09	5.20E-09	0.2250
Cm-244	1.3058E-09	15.04	30.09	0.00E+00	1.96E-08	3.93E-08	0.3750
Co-60	9.8636E-03	15.04	30.09	0.00E+00	1.48E-01	2.97E-01	0.5750
Cs-134	1.9617E-08	15.04	30.09	0.00E+00	2.95E-07	5.90E-07	0.8500
Cs-135	3.0318E-05	15.04	30.09	0.00E+00	4.56E-04	9.12E-04	1.2500
Cs-137	1.0263E+00	15.04	30.09	0.00E+00	1.54E+01	3.09E+01	1.7500
Eu-154	2.0017E-04	15.04	30.09	0.00E+00	3.01E-03	6.02E-03	2.2500
Eu-155	8.5957E-05	15.04	30.09	0.00E+00	1.29E-03	2.59E-03	2.7500
Fe-55	2.2646E-05	15.04	30.09	0.00E+00	3.41E-04	6.81E-04	3.5000
H-3	1.0835E-03	15.04	30.09	0.00E+00	1.63E-02	3.26E-02	5.0000
I-129	7.3195E-07	15.04	30.09	0.00E+00	1.10E-05	2.20E-05	7.0000
Kr-85	1.5661E-02	15.04	30.09	0.00E+00	2.36E-01	4.71E-01	8.0000
Np-237	1.1494E-06	15.04	30.09	0.00E+00	1.73E-05	3.46E-05	11.0000
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	
Th-238	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	

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 %:	93.14242815	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		15.04
Bounding:		30.09

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.81	

Estimated EOL HM/Given EOL HM
 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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-38	1.2261E-06	9.621.24	19,242.47	0.00E+00	1.18E-02	2.36E-02	0.0850	1.881E+14
Cm-243	2.4875E-10	9.621.24	19,242.47	0.00E+00	2.39E-08	4.79E-08	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	1.080E+01
Pa-231	4.5241E-08	9.621.24	19,242.47	0.00E+00	4.35E-04	8.71E-04		
Pb-210	6.4476E-13	9.621.24	19,242.47	0.00E+00	6.20E-09	1.24E-08		
Pm-147	1.1651E-03	9.621.24	19,242.47	0.00E+00	1.12E+01	2.24E+01		
Pu-238	2.9517E-04	9.621.24	19,242.47	0.00E+00	2.84E+00	5.68E+00		
Pu-239	6.6772E-04	9.621.24	19,242.47	0.00E+00	6.42E+00	1.28E+01		
Pu-240	8.6839E-05	9.621.24	19,242.47	0.00E+00	8.35E-01	1.67E+00		
Pu-241	7.1514E-04	9.621.24	19,242.47	0.00E+00	6.88E+00	1.38E+01		
Pu-242	1.9717E-09	9.621.24	19,242.47	0.00E+00	1.90E-05	3.79E-05		
Ra-226	1.7654E-12	9.621.24	19,242.47	0.00E+00	1.70E-08	3.40E-08		
Ra-228	8.2928E-12	9.621.24	19,242.47	0.00E+00	7.98E-08	1.60E-07		
Ru-106	1.8419E-10	9.621.24	19,242.47	0.00E+00	1.77E-06	3.54E-06		
Sa-79	1.3223E-05	9.621.24	19,242.47	0.00E+00	1.27E-01	2.54E-01		
Sn-126	1.1493E-05	9.621.24	19,242.47	0.00E+00	1.11E-01	2.21E-01		
Sr-90	1.3649E+00	9.621.24	19,242.47	0.00E+00	1.31E+04	2.63E+04		
Tc-99	4.6656E-04	9.621.24	19,242.47	0.00E+00	4.49E+00	8.98E+00		
Th-229	1.4547E-11	9.621.24	19,242.47	0.00E+00	1.40E-07	2.80E-07		
Th-230	1.6817E-10	9.621.24	19,242.47	0.00E+00	1.60E-08	3.20E-08		
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	3.38E+02
U-235	2.7781E-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:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches Pathfinder Template on all but one parameter (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:	623.28	19,242.47	Bounding burnup assumed to be twice nominal burnup.

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	

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

²Total burnup for all fuel associated with this worksheet must be 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=283.335kg; EOL=285.305kg
ROD Storage Site: INEEL

Fuel decay start date: 1976
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"
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) ^a	Bounding Fuel Burnup (MWd) ^a	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	0.0650	2.421E+13
Co-243	1.7426E-04	2,881.39	5,762.77	0.00E+00	5.02E-01	1.00E+00	0.1250	1.611E+13
Co-244	2.7618E-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	6.927E+12
Cs-134	2.6260E-07	2,881.39	5,762.77	0.00E+00	7.57E-04	1.51E-03	0.5750	2.102E+14
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	9.8570E-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	1.1827E-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	1.6828E-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	6.8263E-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-206	1.5136E-07	2,881.39	5,762.77	0.00E+00	4.36E-04	8.72E-04		
U-232	4.1005E-07	2,881.39	5,762.77	0.00E+00	1.18E-03	2.36E-03		
U-233	2.5856E-08	2,881.39	5,762.77	0.00E+00	7.45E-05	1.49E-04		
U-234	5.2665E-05	2,881.39	5,762.77	0.00E+00	1.52E-01	3.03E-01		
U-235	-1.4487E-06	2,881.39	0.00	1.51E-02	1.10E-02	1.51E-02		
U-236	7.5888E-06	2,881.39	5,762.77	0.00E+00	2.19E-02	4.37E-02		
U-238	-2.6129E-07	2,881.39	0.00	9.46E-02	9.38E-02	9.46E-02		
Y-90	6.4180E-01	2,881.39	5,762.77	0.00E+00	1.85E+03	3.70E+03		
Other Radionuclides					2.75E+03	5.49E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.21E+01	1.84E+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:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.429812544	0 to 5	

Burnup Summary (MWd)^a

	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

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

^aTotal burnup for all fuel associated with this worksheet must be 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 #: 398
Fuel Units & Descr: 20 - ROD
Heavy Metal Mass: BOL=79kg; EOL=71.12kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1978
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 _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	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
Ci-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	5.487E+14
Cs-135	1.4433E-06	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	8.852E+07
H-3	8.9486E-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
Pu-231	1.4703E-09	7,493.51	14,987.01	0.00E+00	1.10E-05	2.20E-05		
Pu-210	1.6828E-10	7,493.51	14,987.01	0.00E+00	1.26E-08	2.52E-08		
Pu-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-08	5.77E-08		
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		
Ti-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.43	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)

	From SFD	Estimated
Nominal:	809.75	7,493.51
Bounding:	943.28	14,987.01

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:	2.71	9.25
Bounding:	5.42	15.89

Estimated EOL HM/Given EOL HM
1.04

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1969
 Estimates as of: 2030
 Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
²Template Burnup(MWd): 1270.275
 Template BOL Heavy Metal Mass (MT): 0.012702752
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x15"
 0.15

II. Estimates	m	x _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	4.2062E-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	4.8006E-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	4.8887E-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	8.1851E-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	1.4961E-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	3.8666E-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		
Ti-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		

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	

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 1
SNF ID #: 170
Fuel Units & Descr: 814 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=1707.365kg; EOL=1660.153kg
ROD Storage Site: INEEL

Fuel decay start date: 1969
Estimate 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"
62.62

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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
Cf-252	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+08
I-129	1.0092E-06	44,649.60	52,578.31	0.00E+00	4.51E-02	5.31E-02	5.0000	1.336E+06
Kr-85	1.4981E-02	44,649.60	52,578.31	0.00E+00	6.69E+02	7.88E+02	7.0000	1.532E+05
Np-237	1.2556E-05	44,649.60	52,578.31	0.00E+00	5.61E-01	6.60E-01	11.0000	1.755E+04
Pa-231	4.7360E-06	44,649.60	52,578.31	0.00E+00	2.11E-01	2.49E-01		
Pb-210	2.1901E-09	44,649.60	52,578.31	0.00E+00	9.78E-05	1.15E-04		
Pm-147	2.8781E-06	44,649.60	52,578.31	0.00E+00	1.29E-01	1.51E-01		
Pu-238	1.4430E-01	44,649.60	52,578.31	0.00E+00	6.44E+03	7.59E+03		
Pu-239	1.3572E-04	44,649.60	52,578.31	0.00E+00	6.06E+00	7.14E+00		
Pu-240	2.7537E-04	44,649.60	52,578.31	0.00E+00	1.23E+01	1.45E+01		
Pu-241	9.3995E-03	44,649.60	52,578.31	0.00E+00	4.20E+02	4.94E+02		
Pu-242	3.8866E-06	44,649.60	52,578.31	0.00E+00	1.74E-01	2.04E-01		
Ra-226	4.1243E-09	44,649.60	52,578.31	0.00E+00	1.84E-04	2.17E-04		
Ra-228	9.1949E-07	44,649.60	52,578.31	0.00E+00	4.11E-02	4.83E-02		
Ru-106	1.1667E-15	44,649.60	52,578.31	0.00E+00	5.21E-11	6.13E-11		
Se-79	2.1074E-05	44,649.60	52,578.31	0.00E+00	9.41E-01	1.11E+00		
Sn-126	2.2192E-05	44,649.60	52,578.31	0.00E+00	9.91E-01	1.17E+00		
Sr-90	8.8642E-01	44,649.60	52,578.31	0.00E+00	3.96E+04	4.66E+04		
Tc-99	3.3323E-04	44,649.60	52,578.31	0.00E+00	1.49E+01	1.75E+01		
Th-229	1.3517E-05	44,649.60	52,578.31	0.00E+00	6.04E-01	7.11E-01		
Th-230	2.2822E-07	44,649.60	52,578.31	0.00E+00	1.02E-02	1.20E-02		
Th-232	-6.9673E-06	44,649.60	0.00	1.69E-01	1.66E-01	1.69E-01		
Ti-206	5.1524E-04	44,649.60	52,578.31	0.00E+00	2.30E+01	2.71E+01		
U-232	1.3950E-03	44,649.60	52,578.31	0.00E+00	6.23E+01	7.33E+01		
U-233	2.0602E-03	44,649.60	52,578.31	0.00E+00	9.20E+01	1.08E+02		
U-234	2.9513E-04	44,649.60	52,578.31	0.00E+00	1.32E+01	1.55E+01		
U-235	-1.7343E-06	44,649.60	0.00	3.38E-01	2.60E-01	3.38E-01		
U-236	8.6281E-06	44,649.60	52,578.31	0.00E+00	3.85E-01	4.54E-01		
U-238	-5.6065E-09	44,649.60	0.00	3.36E-03	3.11E-03	3.36E-03		
Y-90	8.8642E-01	44,649.60	52,578.31	0.00E+00	3.96E+04	4.66E+04		
Other Radionuclides					4.03E+04	4.75E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

Basic for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	44,649.60	44,649.60
Bounding:	52,578.31	89,298.20

Basic 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

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

^aTotal burnup for all fuel associated with this worksheet must be 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: INEL

Fuel decay start date: 1973
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"
60.54

II. Estimates							Gamma Sources	
	m	x _m	x _b	b	y _m	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal 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	94,003.34	101,007.91	0.00E+00	3.95E-01	4.25E-01	0.0150	4.972E+15
Am-241	3.2229E-03	94,003.34	101,007.91	0.00E+00	3.03E+02	3.26E+02	0.0250	1.015E+15
Am-242m	2.2381E-06	94,003.34	101,007.91	0.00E+00	2.10E-01	2.26E-01	0.0375	8.811E+14
Am-243	4.6006E-05	94,003.34	101,007.91	0.00E+00	4.32E+00	4.65E+00	0.0575	9.518E+14
C-14	2.3082E-05	94,003.34	101,007.91	0.00E+00	2.17E+00	2.33E+00	0.0850	5.743E+14
Cl-36	1.0667E-06	94,003.34	101,007.91	0.00E+00	1.00E-01	1.08E-01	0.1250	3.778E+14
Cm-243	1.7602E-05	94,003.34	101,007.91	0.00E+00	1.65E+00	1.78E+00	0.2250	4.973E+14
Cm-244	3.6307E-03	94,003.34	101,007.91	0.00E+00	3.41E+02	3.67E+02	0.3750	2.154E+14
Co-60	6.2585E-05	94,003.34	101,007.91	0.00E+00	5.88E+00	6.32E+00	0.5750	3.535E+15
Cs-134	2.4585E-07	94,003.34	101,007.91	0.00E+00	2.31E-02	2.48E-02	0.8500	4.419E+13
Cs-135	2.4711E-05	94,003.34	101,007.91	0.00E+00	2.32E+00	2.50E+00	1.2500	2.133E+13
Cs-137	9.3838E-01	94,003.34	101,007.91	0.00E+00	8.62E+04	9.48E+04	1.7500	1.356E+12
Eu-154	4.6887E-03	94,003.34	101,007.91	0.00E+00	4.41E+02	4.74E+02	2.2500	1.128E+08
Eu-155	1.2793E-04	94,003.34	101,007.91	0.00E+00	1.20E+01	1.29E+01	2.7500	1.827E+12
Fe-55	8.1951E-10	94,003.34	101,007.91	0.00E+00	7.70E-05	8.28E-05	3.5000	6.027E+06
H-3	1.6839E-03	94,003.34	101,007.91	0.00E+00	1.58E+02	1.70E+02	5.0000	2.566E+06
I-129	1.0092E-06	94,003.34	101,007.91	0.00E+00	9.49E-02	1.02E-01	7.0000	2.943E+05
Kr-85	1.4981E-02	94,003.34	101,007.91	0.00E+00	1.41E+03	1.51E+03	11.0000	3.572E+04
Np-237	1.2556E-05	94,003.34	101,007.91	0.00E+00	1.18E+00	1.27E+00		
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	8.9673E-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	
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	94,003.34	
Bounding:	101,007.91	188,006.68	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.68		
Bounding:	0.73	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: PEACH BOTTOM UNIT I CORE II (INTACT)

SNF ID #: 208

Fuel Units & Descr: 9 - CONCENTRIC TUBES

Heavy Metal Mass: BOL=11.925kg; EOL=11.977kg

ROD Storage Site: INEEL

Fuel decay start date: 1974

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"

0.69

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	3.2239E-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	7.583E+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	9.688E+05
Fe-55	8.1951E-10	674.97	867.05	0.00E+00	5.53E-07	7.11E-07	2.7500	1.589E+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-08	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	2.804E+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-08	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	-8.9673E-08	674.97	0.00	1.18E-03	1.13E-03	1.18E-03		
Th-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-08	674.97	867.05	0.00E+00	5.82E-03	7.48E-03		
U-238	-5.8065E-09	674.97	0.00	2.35E-05	1.97E-05	2.35E-05		
Y-90	8.8642E-01	674.97	867.05	0.00E+00	5.98E+02	7.69E+02		
Other Radionuclides					6.10E+02	7.84E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.08E+01	1.39E+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 %:	93.152	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	674.97	-49.37
Bounding:	867.05	-98.73

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	-0.07
Bounding:	0.73	-0.11

Estimated EOL HM/Given EOL HM
0.94

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MIXED MATERIAL EXP.DCC-1
 SNF ID #: 430
 Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
 Heavy Metal Mass: BOL = : EOL=23.628kg
 ROD Storage Site: INEEL

*Fuel decay start date: 1983
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 *Template Burnup(MWd): 6.01
 Template BOL Heavy Metal Mass (MT): 0.00012882
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x15"
 0.07

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	0.0650	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	1.268E+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	6.78E-02	6.78E-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	6.8955E-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	6.3361E-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	Thermal Power	
U-233	3.1847E-09	22,320.13	22,320.13	0.00E+00	7.11E-05	7.11E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.6769E-07	22,320.13	22,320.13	0.00E+00	8.65E-03	8.65E-03	3.90E+02	3.90E+02
U-235	-2.7761E-06	22,320.13	0.00	9.54E-02	3.35E-02	9.54E-02	Total	Total
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

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:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	NONE	SST	
BOL Enrichment %:	U	U	
		60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal:		22,320.13	
Bounding:		22,320.13	

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

1. Fuel and Template Information:
 Fuel Name: FUL MIXED MATERIAL EXP DCC-2
 SNF ID #: 431

Fuel decay start date:
 Estimate as of:

1984
 2000

Fuel Units & Power: 1 - EXPERIMENT CAPSULE

Heavy Metal Mass: BOL : EOL-20.031kg

ROD Storage Slic: INEEL

Template BOL Heavy Metal Mass (MT):
 Template Decay Time:
 0.00012882
 35 years

Estimated
 Center Usage:
 18 x 15
 0.07

Radionuclide	CLAWD From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Gamma Sources
Ac-227	2.3344E-06	19.489.03	19.489.03	0.00E+00	4.55E-04	4.55E-04	Avg. 18eV	Total 1.453E+15
Am-241	1.1135E-04	19.489.03	19.489.03	0.00E+00	2.17E+00	2.17E+00	0.0150	1.453E+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	2.815E+14
C-14	2.3012E-04	19.489.03	19.489.03	0.00E+00	4.48E+00	4.48E+00	0.0575	2.815E+14
Cm-243	1.2261E-06	19.489.03	19.489.03	0.00E+00	2.39E-02	2.39E-02	0.0850	1.703E+14
Cm-244	2.2487E-10	19.489.03	19.489.03	0.00E+00	4.85E-08	4.85E-08	0.1250	1.106E+14
Cm-244	2.3179E-08	19.489.03	19.489.03	0.00E+00	4.52E-06	4.52E-06	0.2250	1.446E+14
Cm-244	7.0849E-02	19.489.03	19.489.03	0.00E+00	1.38E+03	1.38E+03	0.3750	6.393E+13
Ce-134	3.0266E-06	19.489.03	19.489.03	0.00E+00	5.30E-02	5.30E-02	0.8750	1.053E+15
Ce-138	1.4511E+00	19.489.03	19.489.03	0.00E+00	5.91E-01	5.91E-01	1.2500	1.066E+16
Eu-154	6.8955E-04	19.489.03	19.489.03	0.00E+00	2.83E-04	2.83E-04	1.7500	2.795E+14
Eu-155	6.8955E-04	19.489.03	19.489.03	0.00E+00	1.36E+01	1.36E+01	2.2500	5.703E+16
Fe-56	1.2318E-03	19.489.03	19.489.03	0.00E+00	2.40E+01	2.40E+01	2.7500	1.652E+17
H-3	2.5141E-03	19.489.03	19.489.03	0.00E+00	4.90E+01	4.90E+01	3.5000	1.164E+18
H-3	7.3195E-07	19.489.03	19.489.03	0.00E+00	1.43E-02	1.43E-02	5.0000	4.785E+02
K-40	4.1281E-02	19.489.03	19.489.03	0.00E+00	8.05E+02	8.05E+02	7.0000	5.294E+01
Np-237	1.1489E-06	19.489.03	19.489.03	0.00E+00	2.24E-02	2.24E-02	11.0000	5.822E+00
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	2.9617E-04	19.489.03	19.489.03	0.00E+00	5.75E+00	5.75E+00		
Pu-239	8.6772E-04	19.489.03	19.489.03	0.00E+00	1.30E+01	1.30E+01		
Pu-240	8.6539E-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	3.84E-05	3.84E-05		
Pu-242	1.9717E-09	19.489.03	19.489.03	0.00E+00	3.84E-05	3.84E-05		
Pu-242	1.7654E-12	19.489.03	19.489.03	0.00E+00	3.44E-08	3.44E-08		
Pu-242	8.2828E-12	19.489.03	19.489.03	0.00E+00	1.62E-07	1.62E-07		
Ra-106	1.6419E-10	19.489.03	19.489.03	0.00E+00	3.59E-06	3.59E-06		
Se-79	1.2223E-05	19.489.03	19.489.03	0.00E+00	2.58E-01	2.58E-01		
Sn-128	1.1493E-05	19.489.03	19.489.03	0.00E+00	2.24E-01	2.24E-01		
Te-90	1.3649E-04	19.489.03	19.489.03	0.00E+00	2.66E+04	2.66E+04		
Th-229	1.4647E-11	19.489.03	19.489.03	0.00E+00	2.84E-07	2.84E-07		
Th-230	1.6817E-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-232	2.1664E-08	19.489.03	19.489.03	0.00E+00	4.22E-04	4.22E-04		
U-232	5.8656E-08	19.489.03	19.489.03	0.00E+00	1.14E-03	1.14E-03		
U-233	3.1847E-03	19.489.03	19.489.03	0.00E+00	6.21E-05	6.21E-05		
U-235	3.8769E-07	19.489.03	19.489.03	8.33E-02	7.56E-03	7.56E-03		
U-235	-2.7761E-06	19.489.03	19.489.03	0.00E+00	2.82E-02	2.82E-02		
U-238	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	19.489.03	9.01E-04	8.45E-04	8.45E-04		
Y-90	1.3652E+00	19.489.03	19.489.03	0.00E+00	3.22E+04	3.22E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary, Burnup Summary, and Checks

Radionuclide	From SRD	Used	Basic for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for its identifying reason:
Fuel Cladding:	NONE	SST	The fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).
BOL HMI Constituents:	U	U	
BOL Enrichment %:	60 to 100		

Burnup Summary (MWd/g)	From SRD	Estimated	Basic for Burnup used in estimate:
Nominal:	19.489.03	19.489.03	Nominal burnup set equal to bounding burnup.
Bounding:	19.489.03	19.489.03	Bounding burnup estimated by assuming BOL heavy metal mass was 100% EOL.

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

Reactor shutdown, core removal, storage, shipping or other data 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/gm).

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	m	x _m	x _b	b	y _m	y _b	Gamma Sources
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Total Photons/sec (bounding)
Ac-227	2.3344E-08	19,237.75	19,237.75	0.00E+00	4.49E-04	4.49E-04	Avg. MeV
Am-241	1.1135E-04	19,237.75	19,237.75	0.00E+00	2.14E+00	2.14E+00	0.0150 1.436E+15
Am-242m	8.5075E-09	19,237.75	19,237.75	0.00E+00	1.64E-04	1.64E-04	0.0250 2.984E+14
Am-243	9.8519E-10	19,237.75	19,237.75	0.00E+00	1.90E-05	1.90E-05	0.0375 2.581E+14
C-14	2.3012E-04	19,237.75	19,237.75	0.00E+00	4.43E+00	4.43E+00	0.0675 2.782E+14
Cl-36	1.2261E-06	19,237.75	19,237.75	0.00E+00	2.36E-02	2.36E-02	0.0850 1.681E+14
Cm-243	2.4875E-10	19,237.75	19,237.75	0.00E+00	4.79E-06	4.79E-06	0.1250 1.091E+14
Cm-244	2.3178E-09	19,237.75	19,237.75	0.00E+00	4.46E-05	4.46E-05	0.2250 1.447E+14
Co-60	7.0849E-02	19,237.75	19,237.75	0.00E+00	1.36E+03	1.36E+03	0.3750 6.311E+13
Cs-134	3.0266E-06	19,237.75	19,237.75	0.00E+00	5.82E-02	5.82E-02	0.5750 1.040E+15
Cs-135	3.0316E-06	19,237.75	19,237.75	0.00E+00	5.83E-01	5.83E-01	0.8500 1.052E+13
Cs-137	1.4511E+00	19,237.75	19,237.75	0.00E+00	2.79E+04	2.79E+04	1.2500 1.046E+14
Eu-154	6.8955E-04	19,237.75	19,237.75	0.00E+00	1.29E+01	1.29E+01	1.7500 2.714E+11
Eu-155	6.8850E-04	19,237.75	19,237.75	0.00E+00	1.34E+01	1.34E+01	2.2500 5.635E+08
Fe-55	1.2318E-03	19,237.75	19,237.75	0.00E+00	2.37E+01	2.37E+01	2.7500 1.629E+07
H-3	2.5141E-03	19,237.75	19,237.75	0.00E+00	4.84E+01	4.84E+01	3.5000 1.149E+03
I-129	7.3195E-07	19,237.75	19,237.75	0.00E+00	1.41E-02	1.41E-02	5.0000 4.724E+02
Kr-85	4.1261E-02	19,237.75	19,237.75	0.00E+00	7.94E+02	7.94E+02	7.0000 5.216E+01
Np-237	1.1489E-06	19,237.75	19,237.75	0.00E+00	2.21E-02	2.21E-02	11.0000 5.853E+00
Pa-231	4.5241E-08	19,237.75	19,237.75	0.00E+00	8.70E-04	8.70E-04	
Pb-210	6.4478E-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	4.6556E-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	
Th-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	Thermal Power
U-233	3.1847E-09	19,237.75	19,237.75	0.00E+00	6.13E-05	6.13E-05	Nominal Heat Bounding
U-234	3.8769E-07	19,237.75	19,237.75	0.00E+00	7.46E-03	7.46E-03	Output Heat Output
U-235	-2.7761E-06	19,237.75	0.00	8.23E-02	2.89E-02	8.23E-02	(Watts) (Watts)
U-236	1.6190E-05	19,237.75	19,237.75	0.00E+00	3.11E-01	3.11E-01	3.36E+02 3.36E+02
U-238	-2.8547E-09	19,237.75	0.00	8.89E-04	8.35E-04	8.89E-04	Total Total
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	

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)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		19,237.75	Nominal burnup set equal to bounding burnup.
Bounding:		19,237.75	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		

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

^aTotal burnup for all fuel associated with this worksheet must be 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

Fuel decay start date: 1988
Estimate as of: 2030
Template: (Worst Case)
*Template Burnup (MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186965
Template Decay Time: 35 years

Estimated
Canister usage:
18"x18"
0.36

II. Estimates

	m	X ₀	X ₁	b	Y ₀	Y ₁	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	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
Ci-38	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	4.803E+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	6.8966E-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+06
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	1.5688E-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-08	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		
Ti-206	8.7573E-05	218.58	218.58	0.00E+00	1.91E-02	1.91E-02		
U-232	2.3706E-04	218.58	218.58	0.00E+00	5.18E-02	5.18E-02		
U-233	3.6128E-04	218.58	218.58	0.00E+00	7.90E-02	7.90E-02		
U-234	1.2788E-02	218.58	218.58	0.00E+00	2.80E+00	2.80E+00		
U-235	5.7486E-04	218.58	218.58	1.98E-04	1.26E-01	1.26E-01		
U-236	2.3485E-04	218.58	218.58	0.00E+00	5.13E-02	5.13E-02		
U-238	1.1581E-04	218.58	218.58	2.46E-05	2.53E-02	2.53E-02		
Y-90	1.9804E+01	218.58	218.58	0.00E+00	4.33E+03	4.33E+03		
Other Radionuclides					1.35E+04	1.35E+04		

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:		218.58
Bounding:		218.58

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

*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 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	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	1.984E+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	1.066E+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	6.8966E-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	2.996E+07
H-3	2.4311E-01	9.31	9.31	0.00E+00	2.26E+00	2.26E+00	3.5000	2.318E+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	5.8882E-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-06	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	1.6799E+01	9.31	9.31	0.00E+00	1.64E+02	1.64E+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	5.6704E-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		
Ti-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

	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)¹

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal:		9.31	
Bounding:		9.31	

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 FUEL 7055
SNF ID #: 416
Fuel Units & Descr: 12 - SCRAP
Heavy Metal Mass: BOL = ; EOL=0.058kg
ROD Storage Shc: INEEL

Fuel decay start date: 1988
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"
0.88

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Gamma Sources
Ac-227	2.3072E-06	54.74	54.74	0.00E+00	1.26E-04	1.26E-04	Photon Energy Group
Am-241	8.4448E+00	54.74	54.74	0.00E+00	4.62E+02	4.62E+02	Avg. MeV
Am-242m	1.6848E-02	54.74	54.74	0.00E+00	9.22E-01	9.22E-01	Total Photons/sec (bounding)
Am-243	1.6320E-02	54.74	54.74	0.00E+00	8.93E-01	8.93E-01	
C-14	1.2090E-01	54.74	54.74	0.00E+00	6.62E+00	6.62E+00	
Cf-253	2.2849E-03	54.74	54.74	0.00E+00	1.25E-01	1.25E-01	
Cm-243	8.6624E-04	54.74	54.74	0.00E+00	4.74E-02	4.74E-02	
Cm-244	1.6848E-01	54.74	54.74	0.00E+00	9.22E+00	9.22E+00	
Co-60	2.8086E+01	54.74	54.74	0.00E+00	1.54E+03	1.54E+03	
Cs-134	3.4148E-04	54.74	54.74	0.00E+00	1.87E-02	1.87E-02	
Cs-135	4.3976E-04	54.74	54.74	0.00E+00	2.41E-02	2.41E-02	
Cs-137	2.1049E+01	54.74	54.74	0.00E+00	1.15E+03	1.15E+03	
Eu-154	1.2500E+00	54.74	54.74	0.00E+00	6.84E+01	6.84E+01	
Eu-155	6.8986E-02	54.74	54.74	0.00E+00	3.78E+00	3.78E+00	
Fe-55	2.9308E-01	54.74	54.74	0.00E+00	1.60E+01	1.60E+01	
H-3	2.4311E-01	54.74	54.74	0.00E+00	1.33E+01	1.33E+01	
I-129	1.0618E-05	54.74	54.74	0.00E+00	5.81E-04	5.81E-04	
Kr-85	5.9882E-01	54.74	54.74	0.00E+00	3.28E+01	3.28E+01	
Np-237	1.5668E-04	54.74	54.74	0.00E+00	8.58E-03	8.58E-03	
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-08	54.74	54.74	0.00E+00	9.57E-05	9.57E-05	
Th-230	5.8704E-08	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	

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ¹			Basis for burnup used in estimates:
Nominal:	From SFD	Estimated	
Bounding:		54.74	Nominal burnup set equal to bounding burnup.
		54.74	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 1988
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"
0.29

Radionuclide	m	X ₀	X ₁	b	Y ₁	Y ₂	Gamma Sources
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group
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
Am-242m	1.6848E-02	2,318.86	2,318.86	0.00E+00	3.91E+01	3.91E+01	0.0250
Am-243	1.6320E-02	2,318.86	2,318.86	0.00E+00	3.78E+01	3.78E+01	0.0375
C-14	1.2090E-01	2,318.86	2,318.86	0.00E+00	2.80E+02	2.80E+02	0.0575
Cf-252	2.2849E-03	2,318.86	2,318.86	0.00E+00	5.30E+00	5.30E+00	0.0850
Cm-243	8.6624E-04	2,318.86	2,318.86	0.00E+00	2.01E+00	2.01E+00	0.1250
Cm-244	1.6848E-01	2,318.86	2,318.86	0.00E+00	3.91E+02	3.91E+02	0.2250
Co-60	2.8086E+01	2,318.86	2,318.86	0.00E+00	6.51E+04	6.51E+04	0.3750
Cs-134	3.4148E-04	2,318.86	2,318.86	0.00E+00	7.92E-01	7.92E-01	0.5750
Cs-135	4.3976E-04	2,318.86	2,318.86	0.00E+00	1.02E+00	1.02E+00	0.8500
Cs-137	2.1049E+01	2,318.86	2,318.86	0.00E+00	4.88E+04	4.88E+04	1.2500
Eu-154	1.2500E+00	2,318.86	2,318.86	0.00E+00	2.90E+03	2.90E+03	1.7500
Eu-155	6.8986E-02	2,318.86	2,318.86	0.00E+00	1.60E+02	1.60E+02	2.2500
Fe-55	2.9308E-01	2,318.86	2,318.86	0.00E+00	6.80E+02	6.80E+02	2.7500
H-3	2.4311E-01	2,318.86	2,318.86	0.00E+00	5.64E+02	5.64E+02	3.5000
I-129	1.0618E-05	2,318.86	2,318.86	0.00E+00	2.46E-02	2.46E-02	5.0000
Kr-85	5.9882E-01	2,318.86	2,318.86	0.00E+00	1.39E+03	1.39E+03	7.0000
Np-237	1.5668E-04	2,318.86	2,318.86	0.00E+00	6.63E-01	6.63E-01	11.0000
Pa-231	2.8556E-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-06	5.55E-06	
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	6.9952E-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	1.88E-03	1.88E-03	
Se-79	1.9181E-04	2,318.86	2,318.86	0.00E+00	4.45E-01	4.45E-01	
Sr-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	
Ti-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	6.7486E-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	

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,318.86	Nominal burnup set equal to bounding burnup.
Bounding:		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	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	2.081E+14
Cf-252	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	5.28E-04	5.28E-04		
Sa-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-08	614.88	614.88	0.00E+00	1.08E-03	1.08E-03		
Th-230	5.8704E-08	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		
U-234	1.2788E-02	614.88	614.88	0.00E+00	7.86E+00	7.86E+00		
U-235	5.7486E-04	614.88	614.88	5.57E-04	3.54E-01	3.54E-01		
U-238	2.3485E-04	614.88	614.88	0.00E+00	1.44E-01	1.44E-01		
U-238	1.1581E-04	614.88	614.88	6.93E-05	7.13E-02	7.13E-02		
Y-90	1.9804E+01	614.88	614.88	0.00E+00	1.22E+04	1.22E+04		
Other Radionuclides					3.79E+04	3.79E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.06E+02	6.13E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ⁴			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	14.21	591.64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX PINS 7057
SNF ID #: 419
Fuel Units & Descr: 1 - SCRAP
Heavy Metal Mass: BOL = ; EOL=0.005kg
ROD Storage Site: INEEL

Fuel decay start date: 1988
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	CMMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	4.3978E-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-06	4.75	4.75	0.00E+00	5.05E-06	5.05E-06	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	8.80E-04	3.19E-04	8.80E-04		
Ra-226	6.4400E-06	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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	UNKNOWN	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:		4.75
Bounding:		4.75

Basis for burnup used in estimate:

4.75 Nominal burnup set equal to bounding burnup.
4.75 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 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	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 Avg. MeV Total Photons/sec (bounding)
Ac-227	2.3072E-06	52.27	52.27	0.00E+00	1.21E-04	1.21E-04	0.0150 6.405E+13
Am-241	8.4448E+00	52.27	52.27	0.00E+00	4.41E+02	4.41E+02	0.0250 1.275E+13
Am-242m	1.6848E-02	52.27	52.27	0.00E+00	8.81E-01	8.81E-01	0.0375 1.113E+13
Am-243	1.6320E-02	52.27	52.27	0.00E+00	8.53E-01	8.53E-01	0.0675 1.752E+13
C-14	1.2090E-01	52.27	52.27	0.00E+00	6.32E+00	6.32E+00	0.0850 6.838E+12
Cf-253	2.2849E-03	52.27	52.27	0.00E+00	1.19E-01	1.19E-01	0.1250 5.359E+12
Cm-243	8.6624E-04	52.27	52.27	0.00E+00	4.53E-02	4.53E-02	0.2250 5.924E+12
Cm-244	1.6848E-01	52.27	52.27	0.00E+00	8.81E+00	8.81E+00	0.3750 2.534E+12
Co-60	2.8086E+01	52.27	52.27	0.00E+00	1.47E+03	1.47E+03	0.5750 4.120E+13
Cs-134	3.4148E-04	52.27	52.27	0.00E+00	1.78E-02	1.78E-02	0.8500 1.575E+12
Cs-135	4.3976E-04	52.27	52.27	0.00E+00	2.30E-02	2.30E-02	1.2500 1.101E+14
Cs-137	2.1049E+01	52.27	52.27	0.00E+00	1.10E+03	1.10E+03	1.7500 4.969E+10
Eu-154	1.2500E+00	52.27	52.27	0.00E+00	6.53E+01	6.53E+01	2.2500 5.772E+08
Eu-155	6.8986E-02	52.27	52.27	0.00E+00	3.81E+00	3.81E+00	2.7500 1.827E+08
Fe-55	2.9308E-01	52.27	52.27	0.00E+00	1.53E+01	1.53E+01	3.5000 1.302E+06
H-3	2.4311E-01	52.27	52.27	0.00E+00	1.27E+01	1.27E+01	5.0000 5.529E+04
I-129	1.0618E-06	52.27	52.27	0.00E+00	5.55E-04	5.55E-04	7.0000 6.331E+03
Kr-85	5.9882E-01	52.27	52.27	0.00E+00	3.13E+01	3.13E+01	11.0000 7.244E+02
Np-237	1.5668E-04	52.27	52.27	0.00E+00	8.19E-03	8.19E-03	
Pa-231	2.8656E-08	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-08	1.25E-08	
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-08	52.27	52.27	0.00E+00	9.14E-05	9.14E-05	
Th-230	5.8704E-08	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	
Th-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-08	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)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	Pu and U	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

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

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 ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	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	1.8848E-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	0.0675	1.911E+13
Ci-36	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	1.8848E-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	2.784E+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	4.3978E-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	5.8882E-01	57.02	57.02	0.00E+00	3.41E+01	3.41E+01	7.0000	6.906E+03
Np-237	1.5688E-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	1.67E+00	0.00E+00	1.67E+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		
U-233	3.6128E-04	57.02	57.02	0.00E+00	2.06E-02	2.06E-02		
U-234	1.2788E-02	57.02	57.02	0.00E+00	7.29E-01	7.29E-01		
U-235	5.7486E-04	57.02	57.02	5.16E-05	3.28E-02	3.28E-02		
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		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							5.62E+01	6.89E+01
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	(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:		57.02	Nominal burnup set equal to bounding burnup.
Bounding:		57.02	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	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 data confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX STAR 5
SNF ID #: 435
Fuel Units & Descr: 1 - SCRAP
Heavy Metal Mass: BOL = ; EOL=0.139kg
ROD Storage Site: INEEL

Fuel decay start date: 1985
Estimate 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 ₀	x ₁	b	y ₀	y ₁	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	132.10	132.10	0.00E+00	3.05E-04	3.05E-04	Avg. MeV	
Am-241	8.4448E+00	132.10	132.10	0.00E+00	1.12E+03	1.12E+03	0.0150	1.619E+14
Am-242m	1.6848E-02	132.10	132.10	0.00E+00	2.23E+00	2.23E+00	0.0250	3.221E+13
Am-243	1.6320E-02	132.10	132.10	0.00E+00	2.16E+00	2.16E+00	0.0375	2.814E+13
C-14	1.2090E-01	132.10	132.10	0.00E+00	1.60E+01	1.60E+01	0.0575	4.428E+13
Cl-36	2.2849E-03	132.10	132.10	0.00E+00	3.02E-01	3.02E-01	0.0850	1.728E+13
Cm-243	8.6824E-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-136	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	1.450E+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-08	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	-8.8120E-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		
Re-226	6.4400E-08	132.10	132.10	0.00E+00	8.51E-06	8.51E-06		
Re-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-08	132.10	132.10	0.00E+00	2.31E-04	2.31E-04		
Th-230	5.8704E-08	132.10	132.10	0.00E+00	7.75E-04	7.75E-04		
Th-232	6.0208E-07	132.10	132.10	0.00E+00	7.95E-05	7.95E-05		
Th-208	8.7573E-05	132.10	132.10	0.00E+00	1.16E-02	1.16E-02		
U-232	2.3706E-04	132.10	132.10	0.00E+00	3.13E-02	3.13E-02		
U-233	3.6128E-04	132.10	132.10	0.00E+00	4.77E-02	4.77E-02		
U-234	1.2788E-02	132.10	132.10	0.00E+00	1.69E+00	1.69E+00		
U-235	5.7486E-04	132.10	132.10	1.20E-04	7.61E-02	7.61E-02		
U-236	2.3486E-04	132.10	132.10	0.00E+00	3.10E-02	3.10E-02		
U-238	1.1581E-04	132.10	132.10	1.49E-05	1.53E-02	1.53E-02		
Y-90	1.9804E+01	132.10	132.10	0.00E+00	2.62E+03	2.62E+03		
Other Radionuclides					8.15E+03	8.15E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

*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 _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	1.699E+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	6.578E+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+12
Cs-137	2.1049E+01	65.57	65.57	0.00E+00	1.38E+03	1.38E+03	1.2500	1.361E+14
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	6.48E+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	7.80E-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:
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)¹

	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

¹Fuel decay start date: 1985
Estimates as of: 2030
Template: (Worst Case)
²Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186965
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	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
Cl-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	1.803E+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+06
I-129	1.0618E-06	330.72	330.72	0.00E+00	3.51E-03	3.51E-03	5.0000	3.498E+05
Kr-85	5.9882E-01	330.72	330.72	0.00E+00	1.98E+02	1.98E+02	7.0000	4.006E+04
Np-237	1.5668E-04	330.72	330.72	0.00E+00	5.18E-02	5.18E-02	11.0000	4.583E+03
Pa-231	2.8656E-06	330.72	330.72	0.00E+00	9.48E-04	9.48E-04		
Pb-210	2.3918E-08	330.72	330.72	0.00E+00	7.91E-06	7.91E-06		
Pm-147	1.6900E-02	330.72	330.72	0.00E+00	5.59E+00	5.59E+00		
Pu-238	-8.6120E-01	330.72	0.00	8.94E+01	0.00E+00	8.94E+01		
Pu-239	-4.8440E-02	330.72	0.00	1.08E+01	0.00E+00	1.08E+01		
Pu-240	-3.0095E-01	330.72	0.00	1.38E+01	0.00E+00	1.38E+01		
Pu-241	-1.0411E+02	330.72	0.00	3.56E+03	0.00E+00	3.56E+03		
Pu-242	-1.1381E-04	330.72	0.00	5.98E-02	2.22E-02	5.98E-02		
Ra-226	6.4400E-08	330.72	330.72	0.00E+00	2.13E-05	2.13E-05		
Ra-228	5.9952E-07	330.72	330.72	0.00E+00	1.98E-04	1.98E-04		
Ru-106	8.5526E-07	330.72	330.72	0.00E+00	2.83E-04	2.83E-04		
Se-79	1.9181E-04	330.72	330.72	0.00E+00	6.34E-02	6.34E-02		
Sn-126	1.6671E-04	330.72	330.72	0.00E+00	5.51E-02	5.51E-02		
Sr-90	1.9799E+01	330.72	330.72	0.00E+00	6.55E+03	6.55E+03		
Tc-99	6.7678E-03	330.72	330.72	0.00E+00	2.24E+00	2.24E+00		
Th-229	1.7488E-06	330.72	330.72	0.00E+00	5.78E-04	5.78E-04		
Th-230	5.8704E-06	330.72	330.72	0.00E+00	1.94E-03	1.94E-03		
Th-232	6.0208E-07	330.72	330.72	0.00E+00	1.99E-04	1.99E-04		
Tl-208	8.7573E-05	330.72	330.72	0.00E+00	2.90E-02	2.90E-02		
U-232	2.3706E-04	330.72	330.72	0.00E+00	7.84E-02	7.84E-02	Thermal Power	
U-233	3.6128E-04	330.72	330.72	0.00E+00	1.19E-01	1.19E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	330.72	330.72	0.00E+00	4.23E+00	4.23E+00	3.26E+02	3.30E+02
U-235	5.7486E-04	330.72	330.72	2.99E-04	1.90E-01	1.90E-01	Total	Total
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		

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 estimates: Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal:		330.72	
Bounding:		330.72	

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-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): 0.0018685
Template Decay Time: 50 years

Estimated
Canister usage:
18"x15"
0.44

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	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
Ci-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	1.8669E-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-206	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		
U-233	3.6128E-04	61.01	61.01	0.00E+00	2.20E-02	2.20E-02		
U-234	1.2788E-02	61.01	61.01	0.00E+00	7.80E-01	7.80E-01		
U-235	6.7486E-04	61.01	61.01	5.52E-05	3.51E-02	3.51E-02		
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:
Reactor Moderator:	FAST	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	SST	SST/Inconel	
BOL HM Constituents:	Pu and U	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd)²

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

Checks

	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: 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, 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:
18"x10"
2.00

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/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	9.891E+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-06	2,348.47	2,546.71	0.00E+00	1.12E-01	1.22E-01	0.0575	2.290E+13
Cl-36	8.0297E-07	2,348.47	2,546.71	0.00E+00	1.89E-03	2.04E-03	0.0850	1.070E+13
Cm-243	1.7426E-04	2,348.47	2,546.71	0.00E+00	4.09E-01	4.44E-01	0.1250	7.118E+12
Cm-244	2.7616E-02	2,348.47	2,546.71	0.00E+00	6.49E+01	7.03E+01	0.2250	9.135E+12
Co-60	3.5610E-04	2,348.47	2,546.71	0.00E+00	8.36E-01	9.07E-01	0.3750	3.945E+12
Cs-134	2.6260E-07	2,348.47	2,546.71	0.00E+00	6.17E-04	6.69E-04	0.5750	9.290E+13
Cs-135	1.4433E-05	2,348.47	2,546.71	0.00E+00	3.39E-02	3.68E-02	0.8500	9.071E+11
Cs-137	9.8870E-01	2,348.47	2,546.71	0.00E+00	2.32E+03	2.52E+03	1.2500	5.772E+11
Eu-154	6.0320E-03	2,348.47	2,546.71	0.00E+00	1.42E+01	1.54E+01	1.7500	2.538E+10
Eu-155	2.1770E-04	2,348.47	2,546.71	0.00E+00	5.11E-01	5.54E-01	2.2500	4.172E+08
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+08
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	5.168E+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-08	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	3.88E+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		
Th-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	Thermal Power	
U-234	5.2665E-05	2,348.47	2,546.71	0.00E+00	1.24E-01	1.34E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-1.4487E-08	2,348.47	0.00	3.30E-02	2.96E-02	3.30E-02	4.25E+01	4.61E+01
U-236	7.5888E-08	2,348.47	2,546.71	0.00E+00	1.78E-02	1.93E-02	Total	Total
U-238	-2.6129E-07	2,348.47	0.00	8.05E-02	7.98E-02	8.05E-02		
Y-90	6.4180E-01	2,348.47	2,546.71	0.00E+00	1.51E+03	1.63E+03		
Other Radionuclides					2.24E+03	2.43E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	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) ³			Basis for burnup used in estimates:
	From SFD	Estimated	
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			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.28		1.00
Bounding:	0.29	1.84	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3547E-10	920.05	1,840.09	0.00E+00	2.17E-07	4.33E-07	Avg. MeV	
Am-241	6.5811E-02	920.05	1,840.09	0.00E+00	6.05E+01	1.21E+02	0.0150	2.626E+14
Am-242m	3.2913E-04	920.05	1,840.09	0.00E+00	3.03E-01	6.06E-01	0.0250	6.048E+13
Am-243	6.2742E-04	920.05	1,840.09	0.00E+00	5.77E-01	1.15E+00	0.0375	5.862E+13
C-14	4.8078E-05	920.05	1,840.09	0.00E+00	4.42E-02	8.85E-02	0.0575	5.276E+13
Cf-252	8.0313E-07	920.05	1,840.09	0.00E+00	7.39E-04	1.48E-03	0.0850	3.332E+13
Cm-243	5.2039E-04	920.05	1,840.09	0.00E+00	4.78E-01	9.57E-01	0.1250	3.016E+13
Cm-244	1.5441E-01	920.05	1,840.09	0.00E+00	1.42E+02	2.84E+02	0.2250	2.835E+13
Co-60	1.3196E-01	920.05	1,840.09	0.00E+00	1.21E+02	2.43E+02	0.3750	1.591E+13
Cs-134	9.8528E-01	920.05	1,840.09	0.00E+00	8.88E+02	1.78E+03	0.5750	2.933E+14
Cs-135	1.4433E-05	920.05	1,840.09	0.00E+00	1.33E-02	2.66E-02	0.8500	6.786E+13
Cs-137	2.7939E+00	920.05	1,840.09	0.00E+00	2.57E+03	5.14E+03	1.2500	3.156E+13
Eu-154	2.2626E-01	920.05	1,840.09	0.00E+00	2.08E+02	4.16E+02	1.7500	4.894E+11
Eu-155	1.1680E-01	920.05	1,840.09	0.00E+00	1.07E+02	2.15E+02	2.2500	2.456E+11
Fe-55	1.2760E-01	920.05	1,840.09	0.00E+00	1.17E+02	2.35E+02	2.7500	8.226E+09
H-3	1.1168E-01	920.05	1,840.09	0.00E+00	1.03E+02	2.05E+02	3.5000	1.056E+09
I-129	9.8288E-07	920.05	1,840.09	0.00E+00	9.04E-04	1.81E-03	5.0000	1.732E+06
Kr-85	1.9606E-01	920.05	1,840.09	0.00E+00	1.80E+02	3.61E+02	7.0000	1.997E+05
Np-237	9.6915E-06	920.05	1,840.09	0.00E+00	8.92E-03	1.78E-02	11.0000	2.294E+04
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	7.5846E-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	4.025941269	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		920.05
Bounding:		1,840.09

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.08	
Bounding:	0.17	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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
 Estimate 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"
 2.98

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	1.2581E-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
Ci-38	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	5.58E+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	8.900E+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	1.1813E-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		
Ti-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	2.6847E-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	1.78E-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: 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 LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	5.965123648	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:		35,707.51	
Bounding:		71,415.03	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.90		
Bounding:	3.80		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RESOLUE FAILED PBF RODS
 SNF ID #: 361
 Fuel Units & Descr: 1 - DEBRIS
 Heavy Metal Mass: BOL = : EOL=1.100kg
 ROD Storage Site: NREL

Template decay start date: 1985
 Estimates as of: 2030
 Template: Partner (UgWt Water, SST, 60 to 100%, U)
 Heavy Metal Mass (HT): 6.01
 Template Decay Time: 0.00012882
 35 years

Estimated
 Canister usage:
 HIC
 1.00

II. Estimates	m	%	%	B	Y ₁	Y ₂	Gamma Sources
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy/ Group
Ac-227	2.334E-08	1.047.61	1.047.61	0.00E+00	2.45E-05	2.45E-05	0.0150
Am-241	1.1135E-04	1.047.61	1.047.61	0.00E+00	1.17E-01	1.17E-01	0.0150
Am-242m	8.5075E-09	1.047.61	1.047.61	0.00E+00	8.91E-06	8.91E-06	0.0250
Am-243	8.8519E-10	1.047.61	1.047.61	0.00E+00	1.03E-06	1.03E-06	0.0375
C-14	2.3012E-04	1.047.61	1.047.61	0.00E+00	2.41E-01	2.41E-01	0.0675
Co-60	1.2261E-06	1.047.61	1.047.61	0.00E+00	1.29E-03	1.29E-03	0.0850
Co-243	2.4875E-10	1.047.61	1.047.61	0.00E+00	2.61E-07	2.61E-07	0.1250
Co-244	2.3178E-02	1.047.61	1.047.61	0.00E+00	2.43E-06	2.43E-06	0.2750
Co-60	7.0849E-02	1.047.61	1.047.61	0.00E+00	7.42E-01	7.42E-01	0.5750
Co-134	3.0266E-06	1.047.61	1.047.61	0.00E+00	3.17E-03	3.17E-03	0.5750
Co-136	3.0318E-05	1.047.61	1.047.61	0.00E+00	3.18E-02	3.18E-02	1.2500
Co-137	1.4511E+00	1.047.61	1.047.61	0.00E+00	1.52E+03	1.52E+03	1.7500
Eu-154	6.8655E-04	1.047.61	1.047.61	0.00E+00	7.01E-01	7.01E-01	2.2500
Eu-155	6.8650E-04	1.047.61	1.047.61	0.00E+00	7.32E-01	7.32E-01	2.7500
Fe-55	1.2318E-03	1.047.61	1.047.61	0.00E+00	1.29E+00	1.29E+00	3.00E+07
H-3	2.5141E-03	1.047.61	1.047.61	0.00E+00	2.63E+00	2.63E+00	3.5000
I-129	7.3185E-07	1.047.61	1.047.61	0.00E+00	7.67E-04	7.67E-04	5.0000
K-40	4.1281E-02	1.047.61	1.047.61	0.00E+00	4.32E+01	4.32E+01	7.0000
Np-237	1.1489E-06	1.047.61	1.047.61	0.00E+00	1.20E-03	1.20E-03	11.0000
Pa-231	4.5241E-08	1.047.61	1.047.61	0.00E+00	4.74E-05	4.74E-05	
Pb-210	6.4478E-13	1.047.61	1.047.61	0.00E+00	6.75E-10	6.75E-10	
Pb-210	1.1651E-03	1.047.61	1.047.61	0.00E+00	1.22E+00	1.22E+00	
Pb-238	2.8517E-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	7.48E-01	7.48E-01	
Pu-242	1.9717E-09	1.047.61	1.047.61	0.00E+00	2.07E-06	2.07E-06	
Pa-226	1.7654E-12	1.047.61	1.047.61	0.00E+00	1.85E-09	1.85E-09	
Pa-228	8.2528E-12	1.047.61	1.047.61	0.00E+00	8.69E-09	8.69E-09	
Bu-106	1.8419E-10	1.047.61	1.047.61	0.00E+00	1.93E-07	1.93E-07	
Se-79	1.3222E-05	1.047.61	1.047.61	0.00E+00	1.38E-02	1.38E-02	
Sm-126	1.1493E-05	1.047.61	1.047.61	0.00E+00	1.20E-02	1.20E-02	
Sc-40	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	1.8617E-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	
Th-238	2.1664E-08	1.047.61	1.047.61	0.00E+00	2.27E-05	2.27E-05	
U-232	5.8659E-08	1.047.61	1.047.61	0.00E+00	6.15E-05	6.15E-05	
U-233	3.1847E-07	1.047.61	1.047.61	0.00E+00	3.34E-05	3.34E-05	
U-234	3.6769E-07	1.047.61	1.047.61	0.00E+00	4.06E-04	4.06E-04	
U-235	-2.7761E-06	1.047.61	1.047.61	0.00	4.48E-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	1.047.61	0.00	4.84E-05	4.84E-05	
Y-90	1.3652E+00	1.047.61	1.047.61	0.00E+00	1.73E+03	1.73E+03	

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: UGWT WATER	UGWT WATER
Fuel Cladding: SST	SST
BOL HMI Constituents: U	U
BOL Enrichment %:	60 to 100

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

Burnup Summary (MWd)²

From SFD	Estimated
Nominal:	1.047.61
Bounding:	1.047.61

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

Checks

Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.12
Bounding:	10.12

Estimated EOL HMI/Given EOL HMI
 1.02

Reactor shutdown, core removal, storage, shipping or other data 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/MHT).

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

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 _n	x _s	b	y _n	y _s	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	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	1.686E+15
Am-243	6.2484E-04	154,660.60	218,499.95	0.00E+00	9.66E+01	1.37E+02	0.0375	1.570E+15
C-14	4.7820E-05	154,660.60	218,499.95	0.00E+00	7.40E+00	1.04E+01	0.0575	1.965E+15
Cl-38	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	2.7816E-02	154,660.60	218,499.95	0.00E+00	4.27E+03	6.03E+03	0.2250	7.837E+14
Co-60	3.5810E-04	154,660.60	218,499.95	0.00E+00	5.51E+01	7.78E+01	0.3750	3.385E+14
Cs-134	2.6260E-07	154,660.60	218,499.95	0.00E+00	4.06E-02	5.74E-02	0.5750	7.971E+15
Cs-135	1.4433E-05	154,660.60	218,499.95	0.00E+00	2.23E+00	3.15E+00	0.8500	7.783E+13
Cs-137	9.8870E-01	154,660.60	218,499.95	0.00E+00	1.53E+05	2.16E+05	1.2500	4.952E+13
Eu-154	6.0320E-03	154,660.60	218,499.95	0.00E+00	9.33E+02	1.32E+03	1.7500	2.177E+12
Eu-155	2.1770E-04	154,660.60	218,499.95	0.00E+00	3.37E+01	4.76E+01	2.2500	3.579E+08
Fe-55	7.9296E-07	154,660.60	218,499.95	0.00E+00	1.23E-01	1.73E-01	2.7500	1.261E+09
H-3	8.9486E-03	154,660.60	218,499.95	0.00E+00	1.38E+03	1.96E+03	3.5000	9.001E+07
I-129	9.8288E-07	154,660.60	218,499.95	0.00E+00	1.52E-01	2.15E-01	5.0000	3.847E+07
Kr-85	1.0707E-02	154,660.60	218,499.95	0.00E+00	1.66E+03	2.34E+03	7.0000	4.432E+06
Np-237	1.1927E-05	154,660.60	218,499.95	0.00E+00	1.84E+00	2.61E+00	11.0000	5.089E+05
Pa-231	1.4703E-09	154,660.60	218,499.95	0.00E+00	2.27E-04	3.21E-04		
Pb-210	1.6828E-10	154,660.60	218,499.95	0.00E+00	2.60E-05	3.68E-05		
Pm-147	6.9606E-08	154,660.60	218,499.95	0.00E+00	1.08E+00	1.52E+00		
Pu-238	8.6263E-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		
Ti-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	-2.8129E-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3.48003585	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

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

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

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

Estimated EOL HM/Given EOL HM
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 (UEM)
SNF ID #: 840
Fuel Units & Descr: 65 - PARTICULATE
Heavy Metal Mass: BOL=119.775kg; EOL=119.775kg
ROD Storage Site: INEEL

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

Estimated
Canister usage:
18"x15"
5.91

Radionuclide	m	x _m	x _b	b	y _m	y _b	Gamma Sources
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	8.7456E-07	2,276.58	4,553.16	0.00E+00	1.99E-03	3.98E-03	0.0150 2.884E+16
Am-241	4.2816E+00	2,276.58	4,553.16	0.00E+00	9.75E+03	1.95E+04	0.0250 5.207E+15
Am-242m	1.9312E-02	2,276.58	4,553.16	0.00E+00	4.40E+01	8.79E+01	0.0375 4.516E+15
Am-243	1.6368E-02	2,276.58	4,553.16	0.00E+00	3.73E+01	7.45E+01	0.0575 4.402E+15
C-14	1.2134E-01	2,276.58	4,553.16	0.00E+00	2.76E+02	5.52E+02	0.0850 2.396E+15
Cl-36	2.2860E-03	2,276.58	4,553.16	0.00E+00	5.20E+00	1.04E+01	0.1250 2.560E+15
Cm-243	1.7968E-03	2,276.58	4,553.16	0.00E+00	4.09E+00	8.18E+00	0.2250 1.812E+15
Cm-244	5.3120E-01	2,276.58	4,553.16	0.00E+00	1.21E+03	2.42E+03	0.3750 7.848E+14
Co-60	1.4534E+03	2,276.58	4,553.16	0.00E+00	3.31E+06	6.62E+06	0.5750 9.588E+15
Cs-134	8.1336E+00	2,276.58	4,553.16	0.00E+00	1.85E+04	3.70E+04	0.8500 2.576E+15
Cs-135	4.3976E-04	2,276.58	4,553.16	0.00E+00	1.00E+00	2.00E+00	1.2500 4.911E+17
Cs-137	4.2070E+01	2,276.58	4,553.16	0.00E+00	9.58E+04	1.92E+05	1.7500 4.442E+13
Eu-154	1.4005E+01	2,276.58	4,553.16	0.00E+00	3.19E+04	6.38E+04	2.2500 2.094E+13
Eu-155	4.5553E+00	2,276.58	4,553.16	0.00E+00	1.04E+04	2.07E+04	2.7500 1.745E+11
Fe-55	8.7194E+02	2,276.58	4,553.16	0.00E+00	1.99E+06	3.97E+06	3.5000 1.744E+10
H-3	1.3083E+00	2,276.58	4,553.16	0.00E+00	2.98E+03	5.96E+03	5.0000 1.544E+07
I-129	1.0618E-05	2,276.58	4,553.16	0.00E+00	2.42E-02	4.83E-02	7.0000 1.776E+06
Kr-85	4.1611E+00	2,276.58	4,553.16	0.00E+00	9.47E+03	1.89E+04	11.0000 2.038E+05
Np-237	1.5617E-04	2,276.58	4,553.16	0.00E+00	3.56E-01	7.11E-01	
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	
Th-208	1.0992E-04	2,276.58	4,553.16	0.00E+00	2.50E-01	5.00E-01	
U-232	3.1650E-04	2,276.58	4,553.16	0.00E+00	7.21E-01	1.44E+00	
U-233	3.6144E-04	2,276.58	4,553.16	0.00E+00	8.23E-01	1.65E+00	
U-234	1.2788E-02	2,276.58	4,553.16	0.00E+00	2.91E+01	5.82E+01	
U-235	5.7486E-04	2,276.58	4,553.16	2.41E-01	1.55E+00	2.86E+00	
U-236	2.3485E-04	2,276.58	4,553.16	0.00E+00	5.35E-01	1.07E+00	
U-238	1.1581E-04	2,276.58	4,553.16	2.81E-03	2.66E-01	5.30E-01	
Y-90	4.0426E+01	2,276.58	4,553.16	0.00E+00	9.20E+04	1.84E+05	
Other Radionuclides					2.88E+05	5.76E+05	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)¹

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.57		13.02
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: 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, 80 to 100%, Th and U)
²Template Burnup (MWd): 10289.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 35 years

Estimated
Canister usage:
24"x18"
3.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	0.0675	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	3.80E-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-08	3.54E-08		
Se-79	3.5417E-05	50,103.24	88,060.24	0.00E+00	1.77E+00	3.12E+00		
Sn-126	3.9648E-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-06	50,103.24	88,060.24	0.00E+00	3.24E+00	5.69E+00		
Th-230	1.1432E-08	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		
Th-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	Thermal Power	
U-234	8.1769E-04	50,103.24	88,060.24	0.00E+00	4.10E+01	7.20E+01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	5.7813E-08	50,103.24	88,060.24	2.76E-04	3.17E-03	5.37E-03	1.37E+03	2.39E+03
U-236	1.3273E-07	50,103.24	88,060.24	0.00E+00	6.65E-03	1.17E-02	Total	Total
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
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Claddings:	ZIRC	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	0.089989331	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:	50,103.24	39,413.10
Bounding:	88,060.24	78,826.19

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.59	0.79
Bounding:	1.04	0.90

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BUKT II
SNF ID #: 375
Fuel Units & Descr: 3 - 251 ROD ARRAY
Heavy Metal Mass: BOL=4373.5kg; EOL=4331.7kg
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"
3.00

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd)*	Bounding Fuel Burnup (MWd)*	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-06	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	5.82E+01	9.83E+01	0.3750	4.023E+14
Cs-134	2.5601E-04	64,290.45	110,212.20	0.00E+00	1.85E+00	2.82E+00	0.5750	6.143E+15
Cs-135	2.8639E-05	64,290.45	110,212.20	0.00E+00	1.84E+00	3.16E+00	0.8500	1.098E+14
Cs-137	1.4772E+00	64,290.45	110,212.20	0.00E+00	9.50E+04	1.63E+05	1.2500	4.849E+13
Eu-154	8.6025E-03	64,290.45	110,212.20	0.00E+00	5.53E+02	9.48E+02	1.7500	7.562E+12
Eu-155	6.6062E-04	64,290.45	110,212.20	0.00E+00	4.25E+01	7.28E+01	2.2500	2.197E+08
Fe-55	2.3011E-06	64,290.45	110,212.20	0.00E+00	1.48E-01	2.54E-01	2.7500	5.404E+13
H-3	2.1277E-03	64,290.45	110,212.20	0.00E+00	1.37E+02	2.35E+02	3.5000	2.026E+05
I-129	1.5853E-06	64,290.45	110,212.20	0.00E+00	1.02E-01	1.75E-01	5.0000	6.353E+04
Kr-85	6.2625E-02	64,290.45	110,212.20	0.00E+00	4.03E+03	6.90E+03	7.0000	4.647E+03
Np-237	1.2620E-07	64,290.45	110,212.20	0.00E+00	8.11E-03	1.39E-02	11.0000	3.580E+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	4.0631E-08	64,290.45	110,212.20	0.00E+00	2.83E-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	9.80E+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	-0.0328E-08	64,290.45	0.00	4.82E-01	4.56E-01	4.62E-01		
Th-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		

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 %:	0.071220718	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)*

	From SFD	Estimated
Nominal:	64,290.45	40,678.11
Bounding:	110,212.20	81,356.22

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.66	0.63
Bounding:	1.13	0.74

Estimated EOL HM/Given EOL HM
0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT III

SNF ID #: 378

Fuel Units & Descr: 6 - 445 ROD ARRAY

Heavy Metal Mass: BOL=8776.5kg, EOL=8700.87kg

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	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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
Cf-252	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	2.5801E-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	6.6082E-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+06
I-129	1.5853E-06	129,014.55	221,167.80	0.00E+00	2.05E-01	3.51E-01	5.0000	1.275E+06
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-06	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		
Th-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-06	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

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	0.072866152	60 to 100	

Burnup Summary (MWd)^a

	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:	129,014.55	73,600.31	
Bounding:	221,167.80	147,200.62	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 0.99
Nominal:	0.66	0.57	
Bounding:	1.13	0.67	

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

^aTotal burnup for all fuel associated with this worksheet must be 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	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	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	8.15E+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-06	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	8.8025E-03	25,281.52	51,712.20	0.00E+00	2.17E+02	4.45E+02	1.7500	3.548E+12
Eu-155	6.8062E-04	25,281.52	51,712.20	0.00E+00	1.87E+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	2.805E+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		
Th-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-60	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	Bounding Heat
Output (Watts)	Output (Watts)
7.90E+02	1.80E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	60 to 100	60 to 100	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:	25,281.52	97.22	
Bounding:	51,712.20	194.44	
			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:	0.10	0.00	
Bounding:	0.20	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: SHIPPINGPORT LWBR REFLCT. 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
Estimate 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 ₀	X ₀	b	Y ₀	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	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	1.872E+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	8.2625E-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	4.58E-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		
Th-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		

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	

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, Zinc, 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:
NIC
7.00

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	CMWD From Template	Nominal Fuel Burnup (MWd) ³	Bounding 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	0.0650	1.893E+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	1.863E+14
Cs-137	1.4772E+00	10,315.62	166,981.81	0.00E+00	1.52E+04	2.47E+05	1.2500	7.347E+13
Eu-154	8.6025E-03	10,315.62	166,981.81	0.00E+00	8.87E+01	1.44E+03	1.7500	1.146E+13
Eu-155	6.6062E-04	10,315.62	166,981.81	0.00E+00	6.81E+00	1.10E+02	2.2500	3.329E+08
Fe-55	2.3011E-06	10,315.62	166,981.81	0.00E+00	2.37E-02	3.84E-01	2.7500	8.188E+13
H-3	2.1277E-03	10,315.62	166,981.81	0.00E+00	2.19E+01	3.55E+02	3.5000	2.989E+05
I-129	1.5853E-06	10,315.62	166,981.81	0.00E+00	1.64E-02	2.65E-01	5.0000	9.384E+04
Kr-85	6.2625E-02	10,315.62	166,981.81	0.00E+00	6.46E+02	1.05E+04	7.0000	6.884E+03
Np-237	1.2620E-07	10,315.62	166,981.81	0.00E+00	1.30E-03	2.11E-02	11.0000	5.294E+02
Pa-231	1.2017E-04	10,315.62	166,981.81	0.00E+00	1.24E+00	2.01E+01		
Pb-210	1.4247E-08	10,315.62	166,981.81	0.00E+00	1.47E-04	2.38E-03		
Pm-147	2.6224E-04	10,315.62	166,981.81	0.00E+00	2.71E+00	4.38E+01		
Pu-238	4.2477E-04	10,315.62	166,981.81	0.00E+00	4.38E+00	7.09E+01		
Pu-239	2.7519E-05	10,315.62	166,981.81	0.00E+00	2.84E-01	4.60E+00		
Pu-240	1.6184E-05	10,315.62	166,981.81	0.00E+00	1.67E-01	2.70E+00		
Pu-241	1.4695E-03	10,315.62	166,981.81	0.00E+00	1.52E+01	2.45E+02		
Pu-242	4.0831E-08	10,315.62	166,981.81	0.00E+00	4.21E-04	6.82E-03		
Ra-226	2.1423E-08	10,315.62	166,981.81	0.00E+00	2.21E-04	3.58E-03		
Ra-228	4.6236E-06	10,315.62	166,981.81	0.00E+00	4.77E-02	7.72E-01		
Ru-106	4.0208E-11	10,315.62	166,981.81	0.00E+00	4.15E-07	6.71E-06		
Sa-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		
To-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-06	10,315.62	0.00	3.30E-01	3.29E-01	3.30E-01		
Th-208	1.3664E-02	10,315.62	166,981.81	0.00E+00	1.44E+02	2.33E+03		
U-232	3.7822E-02	10,315.62	166,981.81	0.00E+00	3.90E+02	6.32E+03		
U-233	-3.3244E-03	10,315.62	0.00	1.11E+03	1.08E+03	1.11E+03		
U-234	8.1769E-04	10,315.62	166,981.81	0.00E+00	8.44E+00	1.37E+02		
U-235	5.7813E-08	10,315.62	166,981.81	2.27E-04	8.24E-04	9.88E-03		
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			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:	Th and U	Th and U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup taken directly from SFD (converted to MWd).
	From SFD	Estimated	
Nominal:		10,315.62	
Bounding:	166,981.81	20,631.25	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.15		
Bounding:	2.39	0.12	

³Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

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

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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7380E-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	2.804E+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-06	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-06	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		
Th-206	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	Basic 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 %:	0.71	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basic for burnup used in estimate:
Nominal:		1,654.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	13,061.64	3,306.75	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.30		1.00
Bounding:	2.39	0.25	

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

^aTotal burnup for all fuel associated with this worksheet must be 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=5218.5kg; EOL=5110.5kg
ROD Storage Site: INEEL

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

Estimated
Canister usage:
18"x15"
12.00

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	9.7360E-05	155,505.33	278,657.20	0.00E+00	1.51E+01	2.71E+01		
Am-241	2.4345E-04	155,505.33	278,657.20	0.00E+00	3.79E+01	6.78E+01	0.0150	2.298E+16
Am-242m	1.4821E-06	155,505.33	278,657.20	0.00E+00	2.30E-01	4.13E-01	0.0250	4.734E+15
Am-243	3.1152E-07	155,505.33	278,657.20	0.00E+00	4.84E-02	8.68E-02	0.0375	4.046E+15
C-14	9.2432E-05	155,505.33	278,657.20	0.00E+00	1.44E+01	2.58E+01	0.0575	4.422E+15
Cl-36	1.8103E-06	155,505.33	278,657.20	0.00E+00	2.82E-01	5.04E-01	0.0850	2.825E+15
Cm-243	3.0597E-07	155,505.33	278,657.20	0.00E+00	4.76E-02	8.53E-02	0.1250	1.770E+15
Cm-244	1.4149E-05	155,505.33	278,657.20	0.00E+00	2.20E+00	3.94E+00	0.2250	2.533E+15
Co-60	8.7369E-04	155,505.33	278,657.20	0.00E+00	1.36E+02	2.43E+02	0.3750	1.017E+15
Cs-134	2.5601E-05	155,505.33	278,657.20	0.00E+00	3.98E+00	7.13E+00	0.5750	1.553E+16
Cs-135	2.8639E-05	155,505.33	278,657.20	0.00E+00	4.45E+00	7.98E+00	0.8500	2.775E+14
Cs-137	1.4772E+00	155,505.33	278,657.20	0.00E+00	2.30E+05	4.12E+05	1.2500	1.226E+14
Eu-154	8.6025E-03	155,505.33	278,657.20	0.00E+00	1.34E+03	2.40E+03	1.7500	1.912E+13
Eu-155	6.6062E-04	155,505.33	278,657.20	0.00E+00	1.03E+02	1.84E+02	2.2500	5.555E+08
Fe-55	2.3011E-06	155,505.33	278,657.20	0.00E+00	3.58E-01	6.41E-01	2.7500	1.366E+14
H-3	2.1277E-03	155,505.33	278,657.20	0.00E+00	3.31E+02	5.93E+02	3.5000	4.988E+05
I-129	1.5853E-06	155,505.33	278,657.20	0.00E+00	2.47E-01	4.42E-01	5.0000	1.566E+05
Kr-85	6.2625E-02	155,505.33	278,657.20	0.00E+00	9.74E+03	1.75E+04	7.0000	1.149E+04
Np-237	1.2620E-07	155,505.33	278,657.20	0.00E+00	1.96E-02	3.52E-02	11.0000	8.834E+02
Pa-231	1.2017E-04	155,505.33	278,657.20	0.00E+00	1.87E+01	3.35E+01		
Pb-210	1.4247E-08	155,505.33	278,657.20	0.00E+00	2.22E-03	3.97E-03		
Pm-147	2.6224E-04	155,505.33	278,657.20	0.00E+00	4.08E+01	7.31E+01		
Pu-238	4.2477E-04	155,505.33	278,657.20	0.00E+00	6.61E+01	1.18E+02		
Pu-239	2.7519E-05	155,505.33	278,657.20	0.00E+00	4.28E+00	7.67E+00		
Pu-240	1.6184E-05	155,505.33	278,657.20	0.00E+00	2.52E+00	4.51E+00		
Pu-241	1.4695E-03	155,505.33	278,657.20	0.00E+00	2.29E+02	4.09E+02		
Pu-242	4.0631E-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		
Ti-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	6.88E+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

	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.
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	0.070817874	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	155,505.33	104,906.57	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup taken directly from SFD (converted to MWd).
Bounding:	278,657.20	209,813.14	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.33	0.67	0.99
Bounding:	2.39	0.75	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: SHARPPOPORT PWR C1 BLKT
 Site ID #: 191
 Fuel Units & Descr: 36 - 17 FLAT PLATES
 Heavy Metal Mass: BOL-583.92kg EOL-569.66kg
 ROD Storage Site: INEL

II. Estimates
 Fuel decay start date: 1989
 Estimates as of: 2000
 Template: PWR (Light Water, Zirc. 0 to 5% U)
 Template BOL Heavy Metal Mass (HT): 61.92
 Template Decay Time: 0.00176911 50 years

Estimated
 Canister Usage:
 18-215
 36.00

Radionuclide	CUAWM 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	Photon/sec (bounding)
Ac-227	1.0733E-09	13,560.21	27,120.41	0.00E+00	1.48E-05	2.91E-05	1.032E+16	1.032E+16
Am-241	1.4751E-01	13,560.21	27,120.41	0.00E+00	2.00E+03	4.00E+03	0.0150	2.008E+14
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	8.48E-01	1.30E+00	0.0575	2.439E+14
Ce-138	8.0297E-07	13,560.21	27,120.41	0.00E+00	1.09E-02	2.18E-02	0.0250	1.130E+14
Cm-243	1.7429E-04	13,560.21	27,120.41	0.00E+00	2.39E+00	4.73E+00	0.1750	7.580E+13
Cm-244	2.7618E-02	13,560.21	27,120.41	0.00E+00	3.74E+02	7.49E+02	0.2250	9.272E+13
Co-60	3.5810E-04	13,560.21	27,120.41	0.00E+00	4.83E+00	9.66E+00	0.3750	4.201E+13
Ce-134	2.6260E-07	13,560.21	27,120.41	0.00E+00	3.56E-03	7.12E-03	0.5750	9.893E+12
Ce-135	1.4433E-05	13,560.21	27,120.41	0.00E+00	1.96E-01	3.91E-01	0.8500	9.860E+12
Ce-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	8.0320E-03	13,560.21	27,120.41	0.00E+00	8.18E+01	1.64E+02	1.7500	2.709E+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	7.9236E-07	13,560.21	27,120.41	0.00E+00	1.09E-02	2.18E-02	2.7500	1.560E+08
H-3	8.8488E-03	13,560.21	27,120.41	0.00E+00	1.21E+02	2.43E+02	3.5000	1.117E+07
I-129	8.8289E-07	13,560.21	27,120.41	0.00E+00	1.33E-02	2.67E-02	5.0000	4.774E+08
K-46	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	1.1827E-05	13,560.21	27,120.41	0.00E+00	1.62E-01	3.23E-01	11.0000	6.319E+04
Pa-231	1.4703E-09	13,560.21	27,120.41	0.00E+00	1.99E-05	3.99E-05		
Pb-210	1.8829E-10	13,560.21	27,120.41	0.00E+00	2.20E-06	4.39E-06		
Pm-147	8.9608E-08	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-242	4.3769E-01	13,560.21	27,120.41	0.00E+00	5.93E+03	1.19E+04		
Pu-243	8.4280E-05	13,560.21	27,120.41	0.00E+00	8.71E-01	1.74E+00		
Re-228	3.8501E-10	13,560.21	27,120.41	0.00E+00	6.22E-06	1.04E-05		
Re-228	5.2953E-12	13,560.21	27,120.41	0.00E+00	7.19E-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-76	1.2378E-05	13,560.21	27,120.41	0.00E+00	1.68E-01	3.36E-01		
Se-78	2.5210E-05	13,560.21	27,120.41	0.00E+00	3.42E-01	6.84E-01		
Sm-148	6.4163E-01	13,560.21	27,120.41	0.00E+00	8.70E+03	1.74E+04		
Tc-99	3.9257E-04	13,560.21	27,120.41	0.00E+00	5.34E+00	1.07E+01		
Th-229	1.5844E-10	13,560.21	27,120.41	0.00E+00	2.12E-08	4.24E-08		
Th-230	2.7872E-08	13,560.21	27,120.41	0.00E+00	3.79E-04	7.59E-04		
Th-232	5.3038E-12	13,560.21	27,120.41	0.00E+00	7.19E-08	1.44E-07		
Th-230	1.5138E-07	13,560.21	27,120.41	0.00E+00	2.03E-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	5.2685E-05	13,560.21	27,120.41	0.00E+00	7.14E-01	1.43E+00		
U-235	-1.4487E-06	13,560.21	27,120.41	0.00E+00	1.03E-01	2.06E-01		
U-236	7.5889E-08	13,560.21	27,120.41	0.00E+00	1.03E-01	2.06E-01		
U-238	-2.6129E-07	13,560.21	27,120.41	0.00E+00	1.94E-01	3.88E-01		
U-238	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	From SFD	Used	Batch for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HIN Constituents:	U	U	
BOL Enrichment %:	0.58643828	0 to 5	

Burnup Summary (MWd/G)	From SFD	Estimated	Batch for burnup used in estimator:
Nominal:	6,481.51	13,560.21	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		27,120.41	Bounding burnup assumed to be two nominal burnup.

Checks	Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HIN/Given EOL HIN
Bounding:	1.33	2.03	1.01	

Reactor shutdown, core removal, storage, shipping or other data 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/HM).

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

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:
 18"x15"
 17.00

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Gamma Sources
							Photon Energy Group
							Total Photons/sec (bounding)
Ac-227	1.0733E-09	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
Am-242m	2.6809E-04	270,675.47	541,350.94	0.00E+00	7.26E+01	1.45E+02	0.0250
Am-243	6.2484E-04	270,675.47	541,350.94	0.00E+00	1.69E+02	3.38E+02	0.0375
C-14	4.7820E-06	270,675.47	541,350.94	0.00E+00	1.29E+01	2.59E+01	0.0675
Cl-36	8.0297E-07	270,675.47	541,350.94	0.00E+00	2.17E-01	4.35E-01	0.0850
Co-243	1.7426E-04	270,675.47	541,350.94	0.00E+00	4.72E+01	9.43E+01	0.1250
Co-244	2.7616E-02	270,675.47	541,350.94	0.00E+00	7.48E+03	1.50E+04	0.2250
Co-60	3.5610E-04	270,675.47	541,350.94	0.00E+00	9.64E+01	1.93E+02	0.3750
Cs-134	2.6260E-07	270,675.47	541,350.94	0.00E+00	7.11E-02	1.42E-01	0.5750
Cs-135	1.4433E-06	270,675.47	541,350.94	0.00E+00	3.91E+00	7.81E+00	0.8500
Cs-137	9.8870E-01	270,675.47	541,350.94	0.00E+00	2.68E+05	5.35E+05	1.2500
Eu-154	6.0320E-03	270,675.47	541,350.94	0.00E+00	1.63E+03	3.27E+03	1.7500
Eu-155	2.1770E-04	270,675.47	541,350.94	0.00E+00	5.89E+01	1.18E+02	2.2500
Fe-55	7.9296E-07	270,675.47	541,350.94	0.00E+00	2.15E-01	4.29E-01	2.7500
H-3	8.9486E-03	270,675.47	541,350.94	0.00E+00	2.42E+03	4.84E+03	3.5000
I-129	9.8288E-07	270,675.47	541,350.94	0.00E+00	2.66E-01	5.32E-01	5.0000
Kr-85	1.0707E-02	270,675.47	541,350.94	0.00E+00	2.90E+03	5.80E+03	7.0000
Np-237	1.1927E-05	270,675.47	541,350.94	0.00E+00	3.23E+00	6.46E+00	11.0000
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	6.8263E-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	8.4163E-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	
Th-208	1.5136E-07	270,675.47	541,350.94	0.00E+00	4.10E-02	8.19E-02	
U-232	4.1005E-07	270,675.47	541,350.94	0.00E+00	1.11E-01	2.22E-01	
U-233	2.5856E-08	270,675.47	541,350.94	0.00E+00	7.00E-03	1.40E-02	
U-234	5.2665E-05	270,675.47	541,350.94	0.00E+00	1.43E+01	2.85E+01	
U-235	-1.4487E-06	270,675.47	0.00	2.03E-02	0.00E+00	2.03E-02	
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
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.71	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	18,892.25	270,675.47
Bounding:		541,350.94

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:	5.84	14.33
Bounding:	11.89	

Estimated EOL HM/Given EOL HM

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

Fuel decay start date: 1984
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
 *Template Burnup (MWd): 6.01
 Template BOL Heavy Metal Mass (MT): 0.00012882
 Template Decay Time: 65 years

Estimated
 Canister usage:
 18"x18"
 1.00

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	4.906E+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	9.80E-03	1.92E-02	2.2500	2.318E+06
Fe-55	4.1631E-07	908.00	1,815.99	0.00E+00	3.78E-04	7.56E-04	2.7500	1.038E+06
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	4.732E+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-06	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	8.6566E-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		
Ti-206	1.6228E-08	908.00	1,815.99	0.00E+00	1.47E-06	2.95E-06		
U-232	4.3960E-06	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	6.6839E-01	908.00	1,815.99	0.00E+00	6.07E+02	1.21E+03		
Other Radionuclides					8.25E+02	1.65E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.39E+08	1.48E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	This Template was used for the following reasons: This fuel matches 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:
Nominal:	From SFD	Estimated	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		908.00 1,815.99	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	1.01
Bounding:	6.44 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

Fuel decay start date: 1969

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"

19.00

II. Estimates

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources
Ac-227	3.4276E-08	116,375.01	232,750.02	0.00E+00	3.99E-03	7.98E-03	Photon Energy Group
Am-241	1.1458E-04	116,375.01	232,750.02	0.00E+00	1.33E+01	2.67E+01	Total Photons/sec (bounding)
Am-242m	7.9468E-09	116,375.01	232,750.02	0.00E+00	9.25E-04	1.85E-03	Avg. MeV
Am-243	9.8386E-10	116,375.01	232,750.02	0.00E+00	1.14E-04	2.29E-04	0.0150 1.214E+16
C-14	2.2978E-04	116,375.01	232,750.02	0.00E+00	2.67E+01	5.35E+01	0.0250 2.522E+15
Cl-36	1.2261E-06	116,375.01	232,750.02	0.00E+00	1.43E-01	2.85E-01	0.0375 2.187E+15
Cm-243	1.7271E-10	116,375.01	232,750.02	0.00E+00	2.01E-05	4.02E-05	0.0675 2.352E+15
Cm-244	1.3058E-09	116,375.01	232,750.02	0.00E+00	1.52E-04	3.04E-04	0.0850 1.421E+16
Co-60	9.8636E-03	116,375.01	232,750.02	0.00E+00	1.15E+03	2.30E+03	0.1250 9.217E+14
Cs-134	1.9617E-08	116,375.01	232,750.02	0.00E+00	2.28E-03	4.57E-03	0.2250 1.224E+15
Cs-135	3.0316E-05	116,375.01	232,750.02	0.00E+00	3.53E+00	7.06E+00	0.3750 5.341E+14
Cs-137	1.0263E+00	116,375.01	232,750.02	0.00E+00	1.19E+05	2.39E+05	0.5750 8.892E+15
Eu-154	2.0017E-04	116,375.01	232,750.02	0.00E+00	2.33E+01	4.66E+01	0.8500 8.779E+13
Eu-155	8.5957E-05	116,375.01	232,750.02	0.00E+00	1.00E+01	2.00E+01	1.2500 1.999E+14
Fe-55	2.2646E-05	116,375.01	232,750.02	0.00E+00	2.64E+00	5.27E+00	1.7500 2.280E+12
H-3	1.0835E-03	116,375.01	232,750.02	0.00E+00	1.26E+02	2.52E+02	2.2500 1.146E+09
I-129	7.3195E-07	116,375.01	232,750.02	0.00E+00	8.52E-02	1.70E-01	2.7500 1.561E+08
Kr-85	1.5661E-02	116,375.01	232,750.02	0.00E+00	1.82E+03	3.64E+03	3.5000 1.361E+04
Np-237	1.1494E-06	116,375.01	232,750.02	0.00E+00	1.34E-01	2.68E-01	5.0000 5.620E+03
Pa-231	5.8070E-08	116,375.01	232,750.02	0.00E+00	6.76E-03	1.35E-02	7.0000 6.206E+02
Pb-210	1.2985E-12	116,375.01	232,750.02	0.00E+00	1.51E-07	3.02E-07	11.0000 6.968E+01
Pm-147	2.2196E-05	116,375.01	232,750.02	0.00E+00	2.58E+00	5.17E+00	
Pu-238	2.8223E-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	
Ti-208	1.8752E-08	116,375.01	232,750.02	0.00E+00	2.18E-03	4.36E-03	
U-232	5.0782E-08	116,375.01	232,750.02	0.00E+00	5.91E-03	1.18E-02	
U-233	3.2596E-09	116,375.01	232,750.02	0.00E+00	3.79E-04	7.59E-04	
U-234	3.9817E-07	116,375.01	232,750.02	0.00E+00	4.63E-02	9.27E-02	
U-235	-2.7761E-06	116,375.01	0.00	6.90E-01	3.67E-01	6.90E-01	
U-236	1.6190E-05	116,375.01	232,750.02	0.00E+00	1.88E+00	3.77E+00	
U-238	-2.8547E-09	116,375.01	0.00	8.07E-03	7.74E-03	8.07E-03	
Y-90	9.5557E-01	116,375.01	232,750.02	0.00E+00	1.11E+05	2.22E+05	
Other Radionuclides					1.42E+05	2.84E+05	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	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 #: 198
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
Estimate 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"x18"
20.00

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	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	1.180E+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	2.249E+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		
Ru-106	6.1464E-15	111,247.37	222,494.74	0.00E+00	6.84E-10	1.37E-09		
Se-79	1.3221E-05	111,247.37	222,494.74	0.00E+00	1.47E+00	2.94E+00		
Sn-126	1.1491E-05	111,247.37	222,494.74	0.00E+00	1.28E+00	2.56E+00		
Sr-90	9.5541E-01	111,247.37	222,494.74	0.00E+00	1.06E+05	2.13E+05		
Tc-99	4.6656E-04	111,247.37	222,494.74	0.00E+00	5.19E+01	1.04E+02		
Th-229	1.9085E-11	111,247.37	222,494.74	0.00E+00	2.12E-08	4.25E-08		
Th-230	2.1913E-10	111,247.37	222,494.74	0.00E+00	2.44E-06	4.88E-06		
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	-2.7781E-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

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.00000016	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:		111,247.37	
Bounding:		222,494.74	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	5.69		
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

Fuel decay start date: 1971
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"
5.81

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-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
Ci-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	2.85E+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	1.0635E-03	13,248.12	26,496.23	0.00E+00	1.44E+01	2.87E+01	3.5000	1.558E+03
I-129	7.3195E-07	13,248.12	26,496.23	0.00E+00	9.70E-03	1.94E-02	5.0000	6.431E+02
Kr-85	1.5661E-02	13,248.12	26,496.23	0.00E+00	2.07E+02	4.15E+02	7.0000	7.104E+01
Np-237	1.1494E-06	13,248.12	26,496.23	0.00E+00	1.52E-02	3.05E-02	11.0000	7.974E+00
Pa-231	5.8070E-08	13,248.12	26,496.23	0.00E+00	7.69E-04	1.54E-03		
Pb-210	1.2985E-12	13,248.12	26,496.23	0.00E+00	1.72E-08	3.44E-08		
Pm-147	2.2196E-05	13,248.12	26,496.23	0.00E+00	2.94E-01	5.88E-01		
Pu-238	2.6223E-04	13,248.12	26,496.23	0.00E+00	3.47E+00	6.95E+00		
Pu-239	6.6739E-04	13,248.12	26,496.23	0.00E+00	8.84E+00	1.77E+01		
Pu-240	8.6705E-05	13,248.12	26,496.23	0.00E+00	1.15E+00	2.30E+00		
Pu-241	3.4759E-04	13,248.12	26,496.23	0.00E+00	4.60E+00	9.21E+00		
Pu-242	1.9717E-09	13,248.12	26,496.23	0.00E+00	2.61E-05	5.22E-05		
Ra-226	3.0000E-12	13,248.12	26,496.23	0.00E+00	3.97E-08	7.95E-08		
Ra-228	8.3328E-12	13,248.12	26,496.23	0.00E+00	1.10E-07	2.21E-07		
Ru-106	6.1464E-15	13,248.12	26,496.23	0.00E+00	8.14E-11	1.63E-10		
Se-79	1.3221E-05	13,248.12	26,496.23	0.00E+00	1.75E-01	3.50E-01		
Sn-126	1.1491E-05	13,248.12	26,496.23	0.00E+00	1.52E-01	3.04E-01		
Sr-90	9.5541E-01	13,248.12	26,496.23	0.00E+00	1.27E+04	2.53E+04		
Tc-99	4.6656E-04	13,248.12	26,496.23	0.00E+00	6.18E+00	1.24E+01		
Th-229	1.9085E-11	13,248.12	26,496.23	0.00E+00	2.53E-07	5.06E-07		
Th-230	2.1913E-10	13,248.12	26,496.23	0.00E+00	2.90E-06	5.81E-06		
Th-232	8.3478E-12	13,248.12	26,496.23	0.00E+00	1.11E-07	2.21E-07		
Ti-208	1.8752E-08	13,248.12	26,496.23	0.00E+00	2.48E-04	4.97E-04		
U-232	5.0782E-08	13,248.12	26,496.23	0.00E+00	6.73E-04	1.35E-03		
U-233	3.2596E-09	13,248.12	26,496.23	0.00E+00	4.32E-05	8.64E-05		
U-234	3.9817E-07	13,248.12	26,496.23	0.00E+00	5.27E-03	1.05E-02		
U-235	-2.7761E-06	13,248.12	0.00	1.60E-01	1.24E-01	1.80E-01		
U-236	1.8180E-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.01311673	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	406.77	13,248.12
Bounding:		26,496.23

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.56	32.41
Bounding:	7.12	

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: SNAP
SNF ID #: 203
Fuel Units & Descr: 615 - DECLAD ROD
Heavy Metal Mass: BOL = : EOL=29.766kg
ROD Storage Site: INEEL

Fuel decay start date: 1958
Estimate as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 65 years

Estimated
Canister usage:
HIC
6.15

II. Estimates	m	x ₀	x ₀	b	y ₀	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	1.2442E-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	0.0675	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	7.385E+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
Ce-134	1.5970E-10	28,414.84	28,414.84	0.00E+00	4.54E-08	4.54E-08	0.5750	7.289E+14
Ce-135	3.2195E-05	28,414.84	28,414.84	0.00E+00	9.15E-01	9.15E-01	0.8500	7.012E+12
Ce-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	3.480E+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-08	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			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 LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:		10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
	From SFD	Estimated	
Nominal:		28,414.84	
Bounding:		28,414.84	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SODIUM LOOP SAFETY FAC.
SNF ID #: 352
Fuel Units & Descr: 20 - ROD
Heavy Metal Mass: BOL=4.2kg; EOL=3.968kg
ROD Storage Site: INEEL

Fuel decay start date: 1981
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:
16"x10"
0.42

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	4.988E+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	5.9832E-01	220.48	440.96	0.00E+00	1.32E+02	2.64E+02	7.0000	5.836E+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	-8.4440E-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:
Reactor Moderator:	From SFD LIGHT WATER	Used (Worst Case)	
Fuel Cladding:	SST	SST/Inconel	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	Pu and U	U, Th, & Pu	
BOL Enrichment %:	78.235	0 to 100	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.57	5.25	35.20
Bounding:	3.14		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: SODAM LOOP SAFETY FAC.
 SWP ID #: 367
 Fuel Units & Dates: 12 - ROD
 Heavy Metal Mass: BOL=256kg EOL=7.352kg
 ROD Storage Site: NEEL

Fuel decay start date: 1981
 Estimates as of: 2030
 Template: (Worst Case)
 Template BOL Heavy Metal Mass (LRT): 62.5
 Template Decay Time: 0.00186965
 35 Years

Estimated
 Container usage:
 18" x 10"
 0.25

II. Estimator	m	k _a	k _b	b	Y _a	Y _b	Gamma Sources
Radionuclide	CI/MSD From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	2.3072E-06	62.56	125.11	0.00E+00	1.44E-04	2.89E-04	Avg. 144v
Am-241	8.4448E+00	62.56	125.11	0.00E+00	5.29E+02	1.06E+03	0.0150
Am-242m	1.6848E-02	62.56	125.11	0.00E+00	1.05E+00	2.11E+00	0.0250
Am-243	1.6300E-02	62.56	125.11	0.00E+00	1.02E+00	2.04E+00	0.0375
C-14	1.2090E-01	62.56	125.11	0.00E+00	7.56E+00	1.51E+01	0.0375
Cm-243	2.2849E-03	62.56	125.11	0.00E+00	1.43E-01	2.89E-01	0.0850
Cm-244	8.6824E-04	62.56	125.11	0.00E+00	5.42E-02	1.08E-01	0.1250
Co-60	1.6848E-01	62.56	125.11	0.00E+00	1.05E+01	2.11E+01	0.2250
Co-134	2.8086E+01	62.56	125.11	0.00E+00	1.79E+03	3.51E+03	0.3750
Co-136	3.4148E-04	62.56	125.11	0.00E+00	2.14E-02	4.27E-02	0.5750
Co-137	4.3976E-04	62.56	125.11	0.00E+00	2.75E-02	5.50E-02	0.5900
Eu-154	1.2500E+00	62.56	125.11	0.00E+00	1.32E+03	2.63E+03	1.2500
Eu-155	6.8896E-02	62.56	125.11	0.00E+00	7.82E+01	1.56E+02	1.7500
Fe-55	2.9308E-01	62.56	125.11	0.00E+00	4.33E+00	8.63E+00	2.2500
H-3	2.4311E-01	62.56	125.11	0.00E+00	1.83E+01	3.67E+01	2.7500
K-46	1.0618E-05	62.56	125.11	0.00E+00	6.64E-04	1.33E-03	5.0000
K-46	5.9882E-01	62.56	125.11	0.00E+00	3.75E+01	7.49E+01	7.0000
Np-237	2.8658E-08	62.56	125.11	0.00E+00	9.80E-03	1.96E-02	11.0000
Pu-231	2.3918E-08	62.56	125.11	0.00E+00	1.50E-06	2.99E-06	
Pu-238	1.6900E-02	62.56	125.11	0.00E+00	1.09E+00	2.11E+00	
Pu-239	4.6120E-01	62.56	0.00	8.04E+02	7.50E+02	8.04E+02	
Pu-240	4.8440E-02	62.56	0.00	9.73E+01	9.42E+01	9.73E+01	
Pu-241	3.0065E-01	62.56	0.00	1.24E+02	1.05E+02	1.24E+02	
Pu-242	-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	
Pu-246	6.4400E-08	62.56	125.11	0.00E+00	4.03E-06	8.06E-06	
Ra-226	5.9520E-07	62.56	125.11	0.00E+00	3.75E-05	7.50E-05	
Ra-106	8.5528E-07	62.56	125.11	0.00E+00	5.35E-05	1.07E-04	
Sa-78	1.9181E-04	62.56	125.11	0.00E+00	1.20E-02	2.40E-02	
Sr-90	1.6671E-04	62.56	125.11	0.00E+00	1.04E-02	2.08E-02	
Tc-99	1.6799E+01	62.56	125.11	0.00E+00	1.24E+03	2.48E+03	
Ti-229	6.7678E-08	62.56	125.11	0.00E+00	4.22E-01	8.47E-01	
Ti-230	5.8704E-06	62.56	125.11	0.00E+00	1.09E-04	2.19E-04	
Ti-232	6.0208E-07	62.56	125.11	0.00E+00	3.67E-04	7.34E-04	
Ti-238	6.0208E-07	62.56	125.11	0.00E+00	3.77E-05	7.53E-05	
U-232	2.3706E-04	62.56	125.11	0.00E+00	5.48E-03	1.10E-02	
U-233	3.6128E-04	62.56	125.11	0.00E+00	2.28E-02	4.56E-02	
U-234	1.2788E-02	62.56	125.11	0.00E+00	8.00E-01	1.60E+00	
U-235	5.7488E-04	62.56	125.11	2.69E-02	3.87E-02	7.48E-02	
U-238	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	
					3.89E+03	7.72E+03	

Thermal Power	
Nominal Heat Output (Watts)	Heat Output (Watts)
8.33E+01	1.58E+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/thermal
BOL HMI Constituents: Pu and U	U, Th, & Pu
BOL Enrichment %: 87.054	0 to 100

Basis for Parameter Differences:
 This list does not contain any existing templates. Therefore the worst case template was used.

Burnup Summary (MWd) ^a	
From SFD	Estimated
Nominal: 62.56	-1.022E+06
Bounding: 125.11	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Basis for burnup used in estimator:

Checks	
Nominal: 0.30	Burnup Multiplier
Bounding: 0.60	Given Burnup
	Estimated EOL HMI/Given EOL HMI
	5.94

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

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	x_1	x_2	x_3	b	y_1	y_2	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	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	5.5533E-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
H-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		
Th-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			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	ORGANIC	HEAVY WATER	This Template was used for the following reasons: This fuel matches on cladding and BOL heavy metal, heavy water is a conservative assumption for moderator, and it is fairly close on enrichment.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	5.146443515	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		45.43	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Bounding:		90.86	

Checks			Estimated EOL NM/Given EOL NM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.43		0.98
Bounding:	0.87		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SPSS (SPERT)
SNF ID #: 213
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.59kg; EOL=0.588kg
ROD Storage Site: INEEL

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): 0.00012382
Template Decay Time: 65 years

Estimated
Canister usage:
18"x10"
0.06

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	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	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	2.868E+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	2.872E+10
Ci-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	2.560E+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		
Ti-206	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	-2.7781E-06	1.89	0.00	1.19E-03	1.18E-03	1.19E-03		
U-236	1.6190E-05	1.89	3.78	0.00E+00	3.06E-05	6.12E-05		
U-238	-2.8547E-09	1.89	0.00	1.38E-05	1.38E-05	1.38E-05		
Y-90	6.6889E-01	1.89	3.78	0.00E+00	1.26E+00	2.53E+00		
Other Radionuclides					1.72E+00	3.43E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		1.89
Bounding:		3.78

Basis for burnup used in estimates:

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:	0.07	
Bounding:	0.14	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TMA-2
SNF ID #: 228
Fuel Units & Decay: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL-40.022kg EOL-40.022kg
MOD Storage Site: MEEI

Fuel decay start date: 1879
Estimates as of: 2000
Template: PWR (Light Water, Zirc. 0 to 5% U)
Template Burnup (MWd): 61.92
Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated
Canister Usage:
18.110
0.05

II. Estimates	m	kg	g	B	Y ₁	Y ₂	Gamma Sources
Radionuclide	CLAIMD From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
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
Am-243m	2.6609E-04	0.19	0.38	0.00E+00	5.10E-05	1.02E-04	0.0260
Am-243	6.2494E-04	0.19	0.38	0.00E+00	1.19E-04	2.38E-04	0.0975
C-14	4.7820E-05	0.19	0.38	0.00E+00	9.09E-06	1.82E-05	0.0575
C-36	8.0297E-07	0.19	0.38	0.00E+00	1.53E-07	3.05E-07	0.0650
Co-243	1.7428E-04	0.19	0.38	0.00E+00	3.31E-05	6.63E-05	0.1250
Co-244	2.7616E-02	0.19	0.38	0.00E+00	6.25E-03	1.25E-02	0.2250
Co-60	3.5610E-04	0.19	0.38	0.00E+00	6.77E-05	1.35E-04	0.5750
Co-134	2.6280E-07	0.19	0.38	0.00E+00	4.99E-08	9.99E-08	0.8500
Co-137	1.4433E-05	0.19	0.38	0.00E+00	2.75E-06	5.49E-06	1.2500
Co-157	9.8870E-01	0.19	0.38	0.00E+00	1.88E-01	3.76E-01	1.5500
Eu-154	6.0309E-03	0.19	0.38	0.00E+00	1.15E-03	2.29E-03	1.7500
Eu-155	2.1770E-04	0.19	0.38	0.00E+00	4.14E-05	8.28E-05	2.2500
Fe-55	7.8236E-07	0.19	0.38	0.00E+00	1.51E-07	3.02E-07	2.7500
H-3	8.8488E-03	0.19	0.38	0.00E+00	1.70E-03	3.40E-03	3.5000
H-129	9.8288E-07	0.19	0.38	0.00E+00	1.87E-07	3.74E-07	6.0000
K-45	1.0707E-02	0.19	0.38	0.00E+00	2.04E-03	4.07E-03	7.0000
Nb-237	1.1927E-05	0.19	0.38	0.00E+00	2.27E-06	4.54E-06	11.0000
Pb-201	1.4703E-09	0.19	0.38	0.00E+00	2.80E-10	5.59E-10	
Pb-210	1.8828E-10	0.19	0.38	0.00E+00	3.20E-11	6.40E-11	
Pm-147	6.9605E-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	1.28E-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	3.5501E-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	2.8210E-05	0.19	0.38	0.00E+00	4.79E-06	9.59E-06	
Si-40	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	7.48E-05	1.50E-04	
Th-229	1.5644E-10	0.19	0.38	0.00E+00	2.89E-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	5.2655E-05	0.19	0.38	0.00E+00	1.00E-05	2.00E-05	
U-235	-1.4487E-05	0.19	0.38	2.50E-06	2.22E-06	2.50E-06	
U-236	7.5888E-05	0.19	0.38	0.00E+00	1.44E-06	2.89E-06	
U-238	-2.6128E-07	0.19	0.38	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	
Thermal Power							
Nominal Heat Output (Watts)							
Bounding Heat Output (Watts)							
Total							

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From STD	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: ZIRC	ZIRC
BOL HMI Constituents: U	U
BOL Enrichment %: 3.568	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)³

From STD	Estimated
Nominal:	0.19 ⁴ Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	0.38 ⁵ Bounding burnup assumed to be twice nominal burnup.

Checks

Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL NIMChien EOL HMI
Nominal: 0.17		1.00
Bounding: 0.34		

Header shutdown, core removal, storage, shipping or other data confirming that radiation 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/HM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TMI-2 CORE DEBRIS
SNF ID #: 914
Fuel Units & Descr: 341 - DEBRIS
Heavy Metal Mass: BOL=82038.394kg; EOL=81749.226kg
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"
341.00

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	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+16
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
Cf-252	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	2.7618E-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	2.6280E-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+06
Fe-55	7.9296E-07	274,985.09	549,970.18	0.00E+00	2.18E-01	4.36E-01	2.7500	3.175E+06
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	9.886E+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	6.4280E-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	6.4183E-01	274,985.09	549,970.18	0.00E+00	1.78E+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 Claddings:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.539514873	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	260,471.90	274,985.09	
Bounding:	489,359.02	549,970.18	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.10	1.06	
Bounding:	0.19	1.12	1.00

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

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

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:
16"x15"
2.00

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	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	7.886E+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-06	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	8.21E-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 Radionuclides					6.34E+01	1.27E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	60.58	66.57
Bounding:	113.81	133.13

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:	0.10	1.10
Bounding:	0.20	1.17

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TORV-1A
 SWF ID #: 230
 Fuel Units at Discharge: 146 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL=48.647kg EOL=48.647kg
 ROD Storage Site: NREEL

Fuel decay start date: 1982
 Estimate as of: 2000
 Template: HFBR (Heavy Water, Ann. 40 to 100%, U)
 Template Burnup (MWd/t): 164.6
 Heavy Metal Mass (MT): 0.000377
 Template Decay Time: 65 years

Estimated
 Canister Usage:
 HIC
 3.65

Radionuclide	C/WND From Template	Nonmetal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nonmetal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources
Ac-227	1.8216E-02	896.18	1.792.36	0.00E+00	1.72E-08	3.44E-08	Photon Energy Group
Am-241	1.0419E-02	896.18	1.792.36	0.00E+00	8.34E-09	1.87E-09	1.0150
Am-242m	1.1154E-06	896.18	1.792.36	0.00E+00	1.00E-03	2.00E-03	0.0250
Am-243	3.6944E-05	896.18	1.792.36	0.00E+00	3.31E-02	6.62E-02	0.0275
C-14	2.6324E-08	896.18	1.792.36	0.00E+00	2.36E-05	4.72E-05	0.0075
C-36	4.4435E-31	896.18	1.792.36	0.00E+00	3.98E-28	7.96E-28	0.0080
Cm-243	1.9101E-06	896.18	1.792.36	0.00E+00	1.71E-03	3.42E-03	0.1250
Cm-244	8.3232E-04	896.18	1.792.36	0.00E+00	7.46E-01	1.49E-01	0.2250
Co-57	2.8943E-09	896.18	1.792.36	0.00E+00	2.59E-08	5.19E-08	0.5750
Co-136	4.2564E-08	896.18	1.792.36	0.00E+00	3.81E-03	7.63E-03	1.2500
Co-137	7.2053E-01	896.18	1.792.36	0.00E+00	6.46E-02	1.29E-02	0.8500
Eu-154	1.3852E-03	896.18	1.792.36	0.00E+00	1.24E-04	2.48E-04	1.7500
Eu-155	2.6634E-05	896.18	1.792.36	0.00E+00	2.39E-02	4.77E-02	2.2500
Fe-55	8.4265E-09	896.18	1.792.36	0.00E+00	7.59E-08	1.51E-05	2.7500
H-3	3.7066E-04	896.18	1.792.36	0.00E+00	3.32E-01	6.64E-01	3.5000
I-129	6.6403E-07	896.18	1.792.36	0.00E+00	5.95E-04	1.19E-03	5.0000
Kr-85	5.9010E-09	896.18	1.792.36	0.00E+00	5.29E-09	1.06E-09	7.0000
Np-237	3.1713E-05	896.18	1.792.36	0.00E+00	2.84E-02	5.68E-02	11.0000
Pb-231	2.9878E-09	896.18	1.792.36	0.00E+00	2.69E-08	5.39E-08	
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-01	
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-02	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	1.18E-06	
Ra-228	5.9019E-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	
Sa-128	1.2333E-05	896.18	1.792.36	0.00E+00	1.11E-02	2.21E-02	
Sc-40	6.5371E-01	896.18	1.792.36	0.00E+00	5.89E-02	1.17E-03	
Tc-99	3.3050E-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	
Th-232	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	6.39E-02	1.27E-01	
U-235	-2.9861E-06	896.18	0.00	8.80E-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	-0.4194E-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	5.89E-02	1.17E-03	
Other Radionuclides					6.23E-02	1.25E-03	

Thermal Power	Nonmetal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	1.08E+01	2.13E+01

II. Template Selection Summary

From SFD

Used

Based for Parameter Differences:

Reactor Moderator	Reactor Fuel	Reactor Fuel
BERYLLIUM	HEAVY WATER	HEAVY WATER
NOXIDE	ALLIUM	ALLIUM
BOL HIR Constituents	U	U
BOL Enrichment %	93.175	40 to 100

This template was used for the following reason:
 The fuel matches on all parameters except cladding (none) and moderator (heavy water is conservative)

Burnup Summary (MWd/t)

From SFD

Estimated

Nonmetal	Bounding
896.18	1.792.36
Nominal burnup assumed to be 7% of BOL heavy metal mass.	
Bounded burnup assumed to be twice nominal burnup.	

Checks

Nonmetal	Burnup Multiple	Estimated Burnup/ Given Burnup
Bounding	0.04	0.08
Estimated EOL H/WND= EOL HM		
0.98		

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

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

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=59.061kg; EOL=59.061kg
 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 ₀	x _b	b	y ₀	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	1.9216E-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	1.817E+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	2.8324E-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	0.0650	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	1.803E+10
Eu-155	2.6634E-05	1,088.39	2,176.79	0.00E+00	2.90E-02	5.80E-02	2.2500	1.835E+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	1.822E+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	2.8678E-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	5.6019E-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

	From SFD	Used	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:	BERYLLIUM	HEAVY WATER	
Fuel Cladding:	NONE	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.147	40 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:		1,088.39	
Bounding:		2,176.79	

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TREAT DRIVER
SNF ID #: 232
Fuel Units & Descr: 391 - ASSEMBLY
Heavy Metal Mass: BOL=15.64kg; EOL=14.897kg
ROD Storage Site: INEEL

Fuel decay start date: 1994
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: 35 years

Estimated
Canister usage:
18"x15"
14.48

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	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	8.6451E-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+08
Fe-55	2.5807E-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	8.74E-04	1.35E-03	5.0000	1.389E+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	8.71E-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	8.1020E-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	Thermal Power	
U-234	6.5575E-05	783.73	1,567.46	0.00E+00	5.14E-02	1.03E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-1.2944E-06	783.73	0.00	3.13E-02	3.02E-02	3.13E-02	1.34E+01	2.67E+01
U-236	1.1951E-05	783.73	1,567.46	0.00E+00	9.37E-03	1.87E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD GRAPHITE	Used GRAPHITE	
Fuel Cladding:	ZIRC	ZIRC	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.5	0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD 30.19	Estimated 783.73	
Bounding:		1,567.46	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 8.35	Estimated Burnup/ Given Burnup 25.99	
Bounding:	16.70		1.01

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

^bTotal burnup for all fuel associated with this worksheet must be divided 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: NEEL

Fuel decay start date: 2025

Estimates as of: 2030

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

Template Burnup(MWd): 6.85

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated
Canister usage:

18"x10"

0.04

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	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	1.8962E-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	9.81E-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

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	4.88	7.73
Bounding:		15.46

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:	0.47	1.85
Bounding:	0.94	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR UNIV. OF CAL-IRVINE
SNF ID #: 1050
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.383kg; EOL=0.38kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimate as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	8.85E-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
Ci-38	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	6.193E+10
Cs-134	9.0541E-02	3.73	7.47	0.00E+00	3.38E-01	6.76E-01	0.5750	8.233E+11
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+08
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-06	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-238	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		

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 %:	20.00002088	10 to 20.1	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.29	0.77	
Bounding:	0.57		1.00

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided 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

Fuel decay start date: 2035
 Estimates as of: 2030
 Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
 Template Burnup (MWd): 6.85
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.01

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	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	1.821E+03
Ci-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	2.286E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	4.514E+06
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	1.2639E+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	2.7546E+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	2.853E-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:
	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 %:	19.9996708	10 to 20.1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.00		
Bounding:			
			Nominal burnup taken directly from SFD (converted to MWd).
			Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (ACPR 1220) JAPAN
 SWF ID #: 480
 Fuel Units & Description: 182 - ELEMENT
 Heavy Metal Mass: BOL=48.357kg EOL=48.23kg
 ROD Storage Site: NEEEL

Fuel decay start date: 2010
 Estimate as of: 2000
 Template: TRIGA-SS (LWAL-Zr, SST, 10 to 20%, U)
 Template BOL Heavy Metal Mass (MT): 6.66
 Template Decay Time: 0.000185
 20 years

Estimated
 Canister usage:
 18 "110"

1.04

II. Estimates	m	x _e	x _g	b	y _e	y _g	Gamma Sources
Radionuclide	C/NALWD From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	2.6439E-09	455.87	911.73	0.00E+00	1.21E-08	2.41E-08	Avg. MW
Am-241	3.1429E-08	455.87	911.73	0.00E+00	1.43E-08	2.97E-08	0.0150
Am-243m	1.3199E-06	455.87	911.73	0.00E+00	6.02E-04	1.20E-03	0.0250
Am-243	1.4753E-07	455.87	911.73	0.00E+00	6.73E-05	1.35E-04	0.0075
C-14	1.2847E-04	455.87	911.73	0.00E+00	5.98E-02	1.17E-01	0.0075
C-28	2.9120E-08	455.87	911.73	0.00E+00	1.28E-03	2.56E-03	0.0050
Co-243	1.2485E-07	455.87	911.73	0.00E+00	5.69E-05	1.14E-04	0.0250
Co-244	9.5564E-07	455.87	911.73	0.00E+00	4.36E-04	8.71E-04	0.2250
Co-60	1.7890E-01	455.87	911.73	0.00E+00	8.15E-01	1.63E-02	0.3750
Co-134	5.8682E-04	455.87	911.73	0.00E+00	2.69E-01	5.35E-01	0.5750
Co-136	3.2195E-05	455.87	911.73	0.00E+00	1.47E-02	2.94E-02	0.8500
Co-137	1.9489E-00	455.87	911.73	0.00E+00	8.88E-02	1.78E-03	1.2500
Eu-154	4.5895E-03	455.87	911.73	0.00E+00	2.09E-00	4.18E-00	1.7500
Eu-155	3.6045E-03	455.87	911.73	0.00E+00	1.64E-00	3.29E-00	2.2500
Fe-55	1.4188E-02	455.87	911.73	0.00E+00	6.47E-00	1.29E-01	2.7500
H-3	4.7896E-03	455.87	911.73	0.00E+00	2.18E-00	4.37E-00	3.5000
I-129	7.3694E-07	455.87	911.73	0.00E+00	6.72E-04	6.72E-04	5.0000
Kr-86	9.5800E-02	455.87	911.73	0.00E+00	4.37E-01	8.74E-01	7.0000
Np-237	1.2632E-08	455.87	911.73	0.00E+00	5.72E-04	1.14E-03	11.0000
Pb-231	7.0406E-09	455.87	911.73	0.00E+00	3.21E-08	6.42E-08	
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	2.55E-00	5.04E-00	
Pu-240	2.1248E-03	455.87	911.73	0.00E+00	9.69E-01	1.94E-00	
Pu-241	4.5649E-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	2.4528E-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	
Sm-146	1.2015E-05	455.87	911.73	0.00E+00	5.83E-03	1.16E-02	
Sm-147	1.2165E-05	455.87	911.73	0.00E+00	5.55E-03	1.11E-02	
Sm-148	1.8226E-00	455.87	911.73	0.00E+00	8.31E-02	1.66E-03	
Sn-90	4.4241E-04	455.87	911.73	0.00E+00	2.02E-01	4.03E-01	
Tb-229	3.0982E-11	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-09	3.86E-09	
Th-232	2.5278E-10	455.87	911.73	0.00E+00	1.15E-07	2.30E-07	
Th-234	1.5820E-08	455.87	911.73	0.00E+00	7.21E-08	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	8.10E-05	1.62E-04	
U-235	-2.6194E-05	455.87	0.00	2.00E-02	1.97E-02	2.08E-02	
U-236	1.2683E-06	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	1.78E+03	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	1.4E+01	2.2E+01
Total		

III. Template Selection Summary, Burnup Summary, and Checks

Basic for Parameter Differences:

Template Selection Summary	From SFD	Used
Reactor Moderator: LW AND U ZIRC HYDROIDE		
Fuel Cladding: SST		
BOL HML Constituents: U		
BOL Enrichment %: 18.95001243		10 to 20.1

Burnup Summary (MWd)³

Basic for Burnup used in estimate:

Burnup Summary	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

Checks	Burnup Multiple	Estimated Burnup/ Given Burnup
Nominal: 0.28		0.27
Bounding: 0.55		

Estimated EOL HML Given EOL HML 0.50

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: TRIGA (ACFR 1220) PENN. STATE UNIV.
 SNF ID #: 1002
 Fuel Units & Descr: 46 - ELEMENT
 Heavy Metal Mass: BOL=12.77kg; EOL=12.003kg
 ROD Storage Bkg: NIEL

Fuel decay start date: 2005
Estimates as of: 2000
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
 18 x10
 0.41

Radionuclide	m	%	%	B	Y _n	Y _s	Photon Energy Group	Total Photons/sec (Bouding)
Ac-227	8.5173E-10	737.72	1.475.44	0.00E+00	6.28E-07	1.26E-06	0.0150	2.38E+14
Am-241	1.8331E-03	737.72	1.475.44	0.00E+00	1.35E+00	2.70E+00	0.0150	2.38E+14
Am-242m	1.4129E-06	737.72	1.475.44	0.00E+00	1.00E-03	2.08E-03	0.0250	5.24E+13
Am-243	1.4774E-07	737.72	1.475.44	0.00E+00	1.00E-04	2.18E-04	0.0375	4.46E+13
C-14	1.2871E-04	737.72	1.475.44	0.00E+00	8.49E-02	1.90E-01	0.0575	4.58E+13
Cl-36	2.8120E-06	737.72	1.475.44	0.00E+00	2.07E-03	4.15E-03	0.0550	2.24E+13
Cm-243	1.7840E-07	737.72	1.475.44	0.00E+00	1.32E-04	2.65E-04	0.1250	2.06E+13
Cm-244	1.6602E-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	0.5750	1.820E+14
Co-134	8.0541E-02	737.72	1.475.44	0.00E+00	6.68E+01	1.34E+02	0.5750	1.820E+14
Co-137	3.2195E-05	737.72	1.475.44	0.00E+00	2.38E-02	4.75E-02	0.8500	6.97E+12
Cr-53	2.7644E+00	737.72	1.475.44	0.00E+00	2.03E+03	4.07E+03	1.2500	1.47E+14
Eu-154	1.3383E-02	737.72	1.475.44	0.00E+00	1.13E+01	2.27E+01	1.7500	9.44E+13
Eu-155	2.8239E-02	737.72	1.475.44	0.00E+00	2.16E+01	4.32E+01	2.2500	1.52E+14
Fe-55	7.7159E-01	737.72	1.475.44	0.00E+00	5.69E+02	1.14E+03	2.7500	1.20E+14
H-3	1.1111E-02	737.72	1.475.44	0.00E+00	8.20E+00	1.64E+01	3.5000	1.40E+14
I-129	7.3684E-07	737.72	1.475.44	0.00E+00	5.44E-04	1.09E-03	6.0000	7.81E+12
K-45	2.5636E-01	737.72	1.475.44	0.00E+00	1.85E+02	3.73E+02	7.0000	8.44E+13
Nb-237	1.2427E-06	737.72	1.475.44	0.00E+00	9.17E-04	1.83E-03	11.0000	1.007E+01
Nb-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		
Pb-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	5.5939E-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	1.0185E-07	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		
Pu-236	5.2782E-14	737.72	1.475.44	0.00E+00	3.89E-11	7.79E-11		
Pu-238	1.8338E-10	737.72	1.475.44	0.00E+00	1.43E-07	2.85E-07		
Pu-106	8.1684E-02	737.72	1.475.44	0.00E+00	6.76E+01	1.35E+02		
Se-76	1.2018E-05	737.72	1.475.44	0.00E+00	9.60E-03	1.92E-02		
Sm-146	1.2167E-05	737.72	1.475.44	0.00E+00	8.98E-03	1.80E-02		
Sn-90	2.6045E+00	737.72	1.475.44	0.00E+00	1.92E+03	3.84E+03		
Tb-99	4.4241E-04	737.72	1.475.44	0.00E+00	3.28E-01	6.53E-01		
Tb-229	1.5713E-10	737.72	1.475.44	0.00E+00	1.01E-07	2.02E-07		
Tb-230	1.8090E-11	737.72	1.475.44	0.00E+00	1.33E-08	2.67E-08		
Tb-232	2.5278E-10	737.72	1.475.44	0.00E+00	1.86E-07	3.73E-07		
Tb-208	1.8947E-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	1.2303E-07	737.72	1.475.44	0.00E+00	9.00E-05	1.80E-04		
U-234	1.5625E-07	737.72	1.475.44	0.00E+00	1.17E-04	2.35E-04		
U-235	2.6194E-06	737.72	1.475.44	0.00E+00	3.54E-03	6.47E-03		
U-236	737.72	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	1.82E+03	3.44E+03		
Y-90	2.8066E+00	737.72	1.475.44	0.00E+00	1.82E+03	3.65E+03		

Thermal Power		Bouding	
Normal Heat	Output (Watts)	Heat Output	(Watts)
4.39E+01	4.39E+01	6.85E+01	6.85E+01
Total	Total	Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Burnup Summary		Checks	
Reactor Moderator:	LW AND U ZIRC HYDROIDE	Used	Basis for Parameter Differences:	From BFD	Used
Fuel Cladding:	SST	SST			
BOL HMI Constituents:	U	U			
BOL Enrichment %:	19.78593942	10 to 20.1			

Burnup Summary (MWd)		Basis for Burnup used in estimate:	
Normal:	From BFD	Estimated	Normal Burnup calculated from the heavy metal mass destroyed.
Bouding:	240.93	1.475.44	Bouding burnup assumed to be the normal burnup.

Checks		Estimated EOL MATCHED EOL NM	
Normal:	Burnup Multiplier	Estimated Burnup	Given Burnup
Bouding:	1.69	3.05	1.00

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

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

Fuel decay start date: 1998
Estimate as of: 2030
Template: TRIGA-SS (LWAU-Zn, 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"
0.01

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/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	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+08
Am-242m	1.2899E-08	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+06
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+08
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	4.487E-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	7.2684E-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	1.2682E-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		

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 %:	19.88316824	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	0.00		
Bounding:			Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (ACPR) ROMANIA
 SNF ID #: 1077
 Fuel Units & Descr: 75 - ELEMENT
 Heavy Metal Mass: BOL=14.7kg; EOL=14.445kg
 ROD Storage S&E: INEEL

Fuel decay start date: 1999
 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"
 0.68

II. Estimates

	m	x ₀	x ₁	b	y ₀	y ₁	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	4.1459E-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
Ci-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	2.817E+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	1.2185E-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	3.96E-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 %:	19.896	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

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

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

Fuel decay start date: 2035

Estimate as of: 2030

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

Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated

Canister usage:

18"x10"

0.01

II. Estimates							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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg. MeV	
Ac-227	8.5173E-10	13.46	26.92	0.00E+00	1.15E-08	2.29E-08	0.0150	4.351E+12
Am-241	1.8331E-03	13.46	26.92	0.00E+00	2.47E-02	4.93E-02	0.0250	9.574E+11
Am-242m	1.4129E-06	13.46	26.92	0.00E+00	1.90E-05	3.80E-05	0.0375	8.153E+11
Am-243	1.4774E-07	13.46	26.92	0.00E+00	1.99E-06	3.98E-06	0.0575	8.368E+11
C-14	1.2871E-04	13.46	26.92	0.00E+00	1.73E-03	3.46E-03	0.0850	5.184E+11
Cl-36	2.8120E-06	13.46	26.92	0.00E+00	3.78E-05	7.57E-05	0.1250	3.765E+11
Cm-243	1.7940E-07	13.46	26.92	0.00E+00	2.41E-06	4.83E-06	0.2250	4.398E+11
Cm-244	1.6962E-06	13.46	26.92	0.00E+00	2.28E-05	4.57E-05	0.3750	2.232E+11
Co-60	1.2839E+00	13.46	26.92	0.00E+00	1.73E+01	3.46E+01	0.5750	2.967E+12
Cs-134	9.0541E-02	13.46	26.92	0.00E+00	1.22E+00	2.44E+00	0.8500	1.273E+11
Cs-135	3.2195E-05	13.46	26.92	0.00E+00	4.33E-04	8.67E-04	1.2500	2.586E+12
Cs-137	2.7564E+00	13.46	26.92	0.00E+00	3.71E+01	7.42E+01	1.7500	1.724E+09
Eu-154	1.5368E-02	13.46	26.92	0.00E+00	2.07E-01	4.14E-01	2.2500	2.779E+09
Eu-155	2.9293E-02	13.46	26.92	0.00E+00	3.94E-01	7.89E-01	2.7500	2.205E+07
Fe-55	7.7158E-01	13.46	26.92	0.00E+00	1.04E+01	2.08E+01	3.5000	2.566E+06
H-3	1.1111E-02	13.46	26.92	0.00E+00	1.50E-01	2.99E-01	5.0000	1.423E+01
I-129	7.3684E-07	13.46	26.92	0.00E+00	9.92E-06	1.98E-05	7.0000	1.611E+00
Kr-85	2.5263E-01	13.46	26.92	0.00E+00	3.40E+00	6.80E+00	11.0000	1.835E-01
Np-237	1.2427E-06	13.46	26.92	0.00E+00	1.67E-05	3.35E-05		
Pa-231	3.8511E-09	13.46	26.92	0.00E+00	5.18E-08	1.04E-07		
Pb-210	7.3880E-15	13.46	26.92	0.00E+00	9.94E-14	1.99E-13		
Pm-147	2.1023E+00	13.46	26.92	0.00E+00	2.83E+01	5.66E+01		
Pu-238	1.0383E-03	13.46	26.92	0.00E+00	1.40E-02	2.80E-02		
Pu-239	5.5293E-03	13.46	26.92	0.00E+00	7.44E-02	1.49E-01		
Pu-240	2.1278E-03	13.46	26.92	0.00E+00	2.86E-02	5.73E-02		
Pu-241	1.0195E-01	13.46	26.92	0.00E+00	1.37E+00	2.74E+00		
Pu-242	2.3128E-07	13.46	26.92	0.00E+00	3.11E-06	6.23E-06		
Ra-226	5.2782E-14	13.46	26.92	0.00E+00	7.10E-13	1.42E-12		
Ra-228	1.9338E-10	13.46	26.92	0.00E+00	2.60E-09	5.21E-09		
Ru-106	9.1684E-02	13.46	26.92	0.00E+00	1.23E+00	2.47E+00		
Se-79	1.3018E-05	13.46	26.92	0.00E+00	1.75E-04	3.50E-04		
Sr-128	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	4.2421E-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-206	1.6947E-06	13.46	26.92	0.00E+00	2.28E-07	4.56E-07		
U-232	4.8737E-06	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-06	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		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	2.85	13.46	
Bounding:		26.92	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.02	4.72	
Bounding:	4.05		1.00

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

^bTotal burnup for all fuel associated with this worksheet must be divided 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: INEEL

¹Fuel decay start date: 1996
 Estimates as of: 2030
 Template: TRIGA-SS (LWA/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"
 0.04

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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
Cl-36	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	6.0000	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		
Sn-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		
Ti-208	1.5088E-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	3.8331E-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		Basis for Parameter Differences:	
Reactor Moderator:	From SFD: LW AND U ZIRC HYDRIDE Used: LW AND U ZIRC HYDRIDE	This Template was used for the following reasons:	
Fuel Cladding:	SST	This fuel matches on all parameters except enrichment.	
BOL HM Constituents:	U		
BOL Enrichment %:	46.09053498	10 to 20.1	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:	
Nominal:	From SFD: 14.21 Estimated: 25.58	Nominal burnup calculated from the heavy metal mass destroyed.	
Bounding:	51.17	Bounding burnup assumed to be twice nominal burnup.	

Checks		Estimated EOL HM/Given EOL HM	
Burnup Multiplier	Estimated Burnup/Given Burnup		
Nominal: 1.29	1.80	1.00	
Bounding: 2.57			

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

²Total burnup for all fuel associated with this worksheet must be divided 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-4 20/20) MALAYSIA

SNF ID #: 497

Fuel Units & Descr: 94 - ELEMENT

Heavy Metal Mass: BOL=47.378kg; EOL=46.53kg

ROD Storage Sht: INEEL

Fuel decay start date: 2010

Estimates as of: 2030

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

Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

0.85

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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-08	4.27E-08	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
Ci-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-08	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-08	1.14E-06		
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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Claddings:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.03968254	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimates:
Nominal:	From SFD 446.61	Estimated 807.60	
Bounding:		1,615.20	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 0.50	Estimated Burnup/ Given Burnup 1.81	
Bounding:	1.00		

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

^aTotal burnup for all fuel associated with this worksheet must be divided 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-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"
 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) ^a	Bounding Fuel Burnup (MWd) ^a	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
Ci-36	2.8120E-06	2,381.55	4,763.11	0.00E+00	6.70E-03	1.34E-02	0.0850	5.590E+13
Cm-243	1.2465E-07	2,381.55	4,763.11	0.00E+00	2.97E-04	5.94E-04	0.1250	3.654E+13
Cm-244	9.5564E-07	2,381.55	4,763.11	0.00E+00	2.28E-03	4.55E-03	0.2250	4.800E+13
Co-60	1.7880E-01	2,381.55	4,763.11	0.00E+00	4.26E+02	8.52E+02	0.3750	2.104E+13
Cs-134	5.8692E-04	2,381.55	4,763.11	0.00E+00	1.40E+00	2.80E+00	0.5750	3.460E+14
Cs-135	3.2195E-06	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	6.78E+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	6.0000	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	1.2185E-06	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	Thermal Power	
U-233	1.2211E-07	2,381.55	4,763.11	0.00E+00	2.91E-04	5.82E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.9955E-07	2,381.55	4,763.11	0.00E+00	4.75E-04	9.50E-04	5.96E+01	1.19E+02
U-235	-2.6194E-06	2,381.55	0.00	7.86E-03	1.62E-03	7.86E-03	Total	Total
U-236	1.2693E-06	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 Radionuclides					4.59E+03	9.17E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	20.03968254	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	855.20	2,381.55
Bounding:		4,763.11

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.85	2.78
Bounding:	7.70	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FUP LEU-I) BANGLADESH
 SNF ID #: 470
 Fuel Units & Descr: 100 - ELEMENT
 Heavy Metal Mass: BOL=50.4kg; EOL=48.06kg
 ROD Storage Shc: 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"
 0.90

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	2.6436E-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	1.811E+14
Cl-38	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	8.356E+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	8.004E+08
Fe-55	1.4185E-02	4,143.00	8,285.99	0.00E+00	5.88E+01	1.18E+02	2.7500	6.815E+08
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	4.887E+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-06	5.83E-06		
Pb-210	5.8000E-14	4,143.00	8,285.99	0.00E+00	2.40E-10	4.81E-10		
Pm-147	4.0075E-02	4,143.00	8,285.99	0.00E+00	1.66E+02	3.32E+02		
Pu-238	9.2256E-04	4,143.00	8,285.99	0.00E+00	3.82E+00	7.64E+00		
Pu-239	5.5278E-03	4,143.00	8,285.99	0.00E+00	2.29E+01	4.58E+01		
Pu-240	2.1248E-03	4,143.00	8,285.99	0.00E+00	8.80E+00	1.76E+01		
Pu-241	4.9549E-02	4,143.00	8,285.99	0.00E+00	2.05E+02	4.11E+02		
Pu-242	2.3128E-07	4,143.00	8,285.99	0.00E+00	9.58E-04	1.92E-03		
Ra-226	2.4526E-13	4,143.00	8,285.99	0.00E+00	1.02E-09	2.03E-09		
Ra-228	2.4015E-10	4,143.00	8,285.99	0.00E+00	9.95E-07	1.99E-06		
Ru-106	3.0602E-06	4,143.00	8,285.99	0.00E+00	1.27E-02	2.54E-02		
Se-79	1.3015E-05	4,143.00	8,285.99	0.00E+00	5.39E-02	1.08E-01		
Sn-126	1.2165E-05	4,143.00	8,285.99	0.00E+00	5.04E-02	1.01E-01		
Sr-90	1.8226E+00	4,143.00	8,285.99	0.00E+00	7.55E+03	1.51E+04		
Tc-99	4.4241E-04	4,143.00	8,285.99	0.00E+00	1.83E+00	3.67E+00		
Th-229	3.0962E-10	4,143.00	8,285.99	0.00E+00	1.28E-06	2.57E-06		
Th-230	4.2346E-11	4,143.00	8,285.99	0.00E+00	1.75E-07	3.51E-07		
Th-232	2.5278E-10	4,143.00	8,285.99	0.00E+00	1.05E-06	2.09E-06		
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		
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.0398254	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 #: 409
Fuel Units & Descr: 128 - ELEMENT
Heavy Metal Mass: BOL=105.472kg; EOL=105.344kg
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"
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) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-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	3.504E+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	Thermal Power	
U-234	1.9955E-07	994.28	1,988.57	0.00E+00	1.98E-04	3.97E-04	Nominal Heat	Bounding Heat
U-235	-2.6194E-06	994.28	0.00	4.56E-02	4.30E-02	4.56E-02	Output (Watts)	Output (Watts)
U-236	1.2693E-05	994.28	1,988.57	0.00E+00	1.26E-02	2.52E-02	2.49E+01	4.98E+01
U-238	-3.6331E-08	994.28	0.00	2.84E-02	2.83E-02	2.84E-02	Total	Total
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	
Reactor Moderator:	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST
BOL HM Constituents:	U
BOL Enrichment %:	20.02427184

Basis for Parameter Differences:

Burnup Summary (MWd) ³	
Nominal:	994.28
Bounding:	1,988.57

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
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 LEU-II 20/30) TAWAN
SNF ID #: 498
Fuel Units & Descr: 144 - ELEMENT
Heavy Metal Mass: BOL=118.656kg; EOL=118.512kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zn, 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"
1.30

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	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	1.788E+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-206	1.5820E-08	1,118.57	2,237.14	0.00E+00	1.77E-05	3.54E-05		
U-232	4.2647E-08	1,118.57	2,237.14	0.00E+00	4.77E-05	9.54E-05		
U-233	1.2211E-07	1,118.57	2,237.14	0.00E+00	1.37E-04	2.73E-04		
U-234	1.9955E-07	1,118.57	2,237.14	0.00E+00	2.23E-04	4.46E-04		
U-235	2.6194E-06	1,118.57	0.00	5.13E-02	4.84E-02	5.13E-02		
U-236	1.2693E-05	1,118.57	2,237.14	0.00E+00	1.42E-02	2.84E-02		
U-238	3.6331E-08	1,118.57	0.00	3.19E-02	3.19E-02	3.19E-02		
Y-90	1.8241E+00	1,118.57	2,237.14	0.00E+00	2.04E+03	4.08E+03		
Other Radionuclides					2.15E+03	4.31E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.024	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,118.57	137.48	
Bounding:		2,237.14	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	0.12	
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)
SNF ID #: 729
Fuel Units & Descr: 111 - ELEMENT
Heavy Metal Mass: BOL=21.534kg; EOL=16.35kg
ROD Storage Site: NEEEL

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	g1	x ₀	x ₀	b	y ₀	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	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	1.080E+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	2.929E+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	-2.8572E-06	4,926.69	0.00	3.2E-02	1.95E-02	3.26E-02		
U-236	1.3575E-05	4,926.69	9,853.39	0.00E+00	6.89E-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) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	4,897.97	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	1.06	
Bounding:	1.35		
			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
SNF ID #: 354

Fuel Units & Descr: 6 - ELEMENT

Heavy Metal Mass: BOL=1.068kg; EOL=0.970kg

ROD Storage Site: INEEL

Fuel decay start date: 1994

Estimates as of: 2030

Template: TRIGA-FLIP (LWA/J-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"
0.05

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	2.235E+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+06
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-08	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			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 %:	70.2247191	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	77.67	84.97	
Bounding:	43.79	169.94	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.23	1.09	
Bounding:	0.47	3.88	1.00

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

^aTotal burnup for all fuel associated with this worksheet must be divided 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=10.602kg
ROD Storage Site: INEEL

Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zr, SST, 80 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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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-06	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		
U-234	7.1407E-06	263.21	445.18	0.00E+00	1.88E-03	3.18E-03		
U-235	-2.6572E-06	263.21	0.00	1.65E-02	1.58E-02	1.65E-02		
U-236	1.3576E-05	263.21	445.18	0.00E+00	3.57E-03	6.04E-03		
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

	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	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	263.21	243.50
Bounding:	445.18	487.00

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.07	0.93
Bounding:	0.12	1.09

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) AUSTRIA
SNF ID #: 492
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=1.95kg; EOL=1.95kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.09

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	7.1933E-10	47.51	95.02	0.00E+00	3.42E-08	6.84E-08	Avg. MeV		
Am-241	1.3109E-02	47.51	95.02	0.00E+00	6.23E-01	1.25E+00	0.0150	9.433E+12	
Am-242m	2.2835E-05	47.51	95.02	0.00E+00	1.08E-03	2.17E-03	0.0250	1.956E+12	
Am-243	3.0938E-05	47.51	95.02	0.00E+00	1.47E-03	2.94E-03	0.0375	1.724E+12	
C-14	1.2566E-04	47.51	95.02	0.00E+00	5.97E-03	1.19E-02	0.0575	1.840E+12	
Ct-38	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+08	
Eu-155	6.5259E-03	47.51	95.02	0.00E+00	3.10E-01	6.20E-01	2.2500	6.664E+08	
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			
Ti-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			

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.27E+06	2.55E+06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	69.89795818	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD 47.51	Estimated 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
Nominal:	Burnup Multiplier 0.07	Estimated Burnup/ Given Burnup 0.20	
Bounding:	0.14		

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

^aTotal burnup for all fuel associated with this worksheet must be divided 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-05	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-206	1.4313E-07	339.87	679.74	0.00E+00	4.86E-05	9.73E-05		
U-232	4.1927E-07	339.87	679.74	0.00E+00	1.42E-04	2.85E-04		
U-233	6.8491E-08	339.87	679.74	0.00E+00	2.33E-05	4.66E-05		
U-234	2.0189E-06	339.87	679.74	0.00E+00	6.86E-04	1.37E-03		
U-235	2.6572E-06	339.87	0.00	1.46E-03	5.57E-04	1.46E-03		
U-236	1.3575E-05	339.87	679.74	0.00E+00	4.61E-03	9.23E-03		
U-238	2.2698E-08	339.87	0.00	9.71E-05	8.94E-05	9.71E-05		
Y-90	2.5646E+00	339.87	679.74	0.00E+00	8.72E+02	1.74E+03		
Other Radionuclides					1.21E+03	2.42E+03		

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 %:	70.05184872	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	327.42	339.87
Bounding:		679.74

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:	1.04	1.04
Bounding:	2.08	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) FFCR OSU

SNF ID #: 702

Fuel Units & Descr: 4 - ELEMENT

Heavy Metal Mass: BOL=0.64kg; EOL=0.617kg

ROD Storage Site: INEEL

Fuel decay start date: 2025

Estimates as of: 2030

Template: TRIGA-FLIP (LWAU-Zr, SST, 60 to 100%, U)

*Template Burnup (MWd): 66.52

Template BOL Heavy Metal Mass (MT): 0.000198

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) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-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	1.367E+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	5.918E+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	1.288E+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	2.5646E+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		
Th-206	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	2.5646E+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:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	69.9	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	6.03	21.67	
Bounding:		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
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	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) FPCR SO. KOREA
SNF ID #: 733

Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.638kg; EOL=0.561kg
ROD Storage Site: INEEL

Fuel decay start date: 1997
Estimates as of: 2030

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

Template Burnup (MWd): 66.62

Template BOL Heavy Metal Mass (MT): 0.000196

Template Decay Time: 25 years

Estimated
Canister usage:
16"x10"
0.05

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	2.622E+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	5.845E+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	1.8431E-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		
Ti-208	1.3982E-07	73.37	146.74	0.00E+00	1.03E-05	2.05E-05		
U-232	3.7943E-07	73.37	146.74	0.00E+00	2.78E-05	5.57E-05		
U-233	6.9814E-08	73.37	146.74	0.00E+00	5.12E-06	1.02E-05		
U-234	5.4059E-06	73.37	146.74	0.00E+00	3.97E-04	7.93E-04		
U-235	-2.6572E-06	73.37	0.00	9.85E-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		

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 %:	69.96432602	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	30.07	73.37
Bounding:		146.74

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:	0.34	2.44
Bounding:	0.68	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) MEXICO
SNF ID #: 493
Fuel Units & Descr: 35 - ELEMENT
Heavy Metal Mass: BOL=6.86kg; EOL=6.825kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
²Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.32

II. Estimates	m	X ₀	X ₁	b	Y ₀	Y ₁	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	9.4683E-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		

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:	64.67	33.26
Bounding:		129.34

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:	0.03	0.51
Bounding:	0.06	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 2025
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, 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"
0.78

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	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	6.0000	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		
Ra-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	4.1827E-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

	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:	482.25	1,356.06
Bounding:		2,712.12

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	2.81
Bounding:	0.47	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) SLOVENIA

SNF ID #: 495

Fuel Units & Descr: 26 - ELEMENT

Heavy Metal Mass: BOL=4.967kg; EOL=4.69kg

ROD Storage Site: INEL

¹Fuel decay start date: 1999

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"

0.23

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 Avg. MeV Total Photons/sec (bounding)
Ac-227	1.0386E-09	281.70	563.41	0.00E+00	2.93E-07	5.85E-07	0.0150 4.952E+13
Am-241	1.4973E-02	281.70	563.41	0.00E+00	4.22E+00	8.44E+00	0.0250 1.025E+13
Am-242m	2.2324E-05	281.70	563.41	0.00E+00	6.29E-03	1.26E-02	0.0375 9.011E+12
Am-243	3.0823E-05	281.70	563.41	0.00E+00	8.71E-03	1.74E-02	0.0575 9.682E+12
C-14	1.2559E-04	281.70	563.41	0.00E+00	3.54E-02	7.08E-02	0.0850 5.780E+12
Cl-36	2.6624E-06	281.70	563.41	0.00E+00	7.50E-04	1.50E-03	0.1250 3.946E+12
Cm-243	2.3527E-05	281.70	563.41	0.00E+00	6.63E-03	1.33E-02	0.2250 4.893E+12
Cm-244	1.9092E-03	281.70	563.41	0.00E+00	5.38E-01	1.08E+00	0.3750 2.167E+12
Co-60	8.9552E-02	281.70	563.41	0.00E+00	2.52E+01	5.05E+01	0.5750 3.823E+13
Cs-134	7.9074E-04	281.70	563.41	0.00E+00	2.23E-01	4.46E-01	0.8500 6.088E+11
Cs-135	1.9753E-05	281.70	563.41	0.00E+00	5.56E-03	1.11E-02	1.2500 4.121E+12
Cs-137	1.7243E+00	281.70	563.41	0.00E+00	4.86E+02	9.71E+02	1.7500 1.711E+10
Eu-154	2.4609E-02	281.70	563.41	0.00E+00	6.93E+00	1.39E+01	2.2500 2.081E+07
Eu-155	3.2456E-03	281.70	563.41	0.00E+00	9.14E-01	1.83E+00	2.7500 2.846E+06
Fe-55	3.8605E-03	281.70	563.41	0.00E+00	1.09E+00	2.18E+00	3.5000 1.666E+04
H-3	3.4305E-03	281.70	563.41	0.00E+00	9.66E-01	1.93E+00	5.0000 7.027E+03
I-129	7.1287E-07	281.70	563.41	0.00E+00	2.01E-04	4.02E-04	7.0000 8.068E+02
Kr-85	6.8536E-02	281.70	563.41	0.00E+00	1.93E+01	3.86E+01	11.0000 9.247E+01
Np-237	1.2219E-05	281.70	563.41	0.00E+00	3.44E-03	6.88E-03	
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-206	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-08	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-06	281.70	0.00	5.03E-04	4.07E-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	

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 Claddings:	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 irradiation ceased for fuel.

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

*Fuel decay start date: 1996
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: 25 years

Estimated
Canister usage:
18"x10"
1.03

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	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	8.634E+13
Am-243	3.0923E-05	2,426.99	4,853.99	0.00E+00	7.50E-02	1.50E-01	0.0375	7.784E+13
C-14	1.2659E-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	1.8092E-03	2,426.99	4,853.99	0.00E+00	4.83E+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-06	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		

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 %:	70	60 to 100	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:	
Nominal:	From SFD 816.76	Estimated 2,426.99	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,853.99	Bounding burnup assumed to be twice nominal burnup.

Checks		Estimated EOL HM/Given EOL HM	
Burnup Multiplier	Estimated Burnup/ Given Burnup		
Nominal:	0.33	2.97	1.00
Bounding:	0.66		

*Reactor shutdown, core removal, storage, shipping or other data 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	Fuel decay start date:	1976	
SNF ID #: 239	Estimate as of:	2030	
Fuel Units & Descr: 7 - ELEMENT	Template:	TRIGA-FLIP (LWAU-Zrx, SST, 60 to 100%.	
Heavy Metal Mass: BOL=1.372kg; EOL=1.182kg	^a Template Burnup(MWd):	66.52	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT):	0.000196	
	Template Decay Time:	50 years	

II. Estimates		Template Decay Time: 50 years					Gamma Sources	
	m	x _a	x _b	b	y _a	y _b		
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0776E-09	180.29	360.59	0.00E+00	3.75E-07	7.49E-07	Avg. MeV	
Am-241	1.6777E-02	180.29	360.59	0.00E+00	3.02E+00	6.05E+00	0.0150	1.746E+1
Am-242m	1.9919E-05	180.29	360.59	0.00E+00	3.59E-03	7.18E-03	0.0250	3.606E+1
Am-243	3.0848E-05	180.29	360.59	0.00E+00	5.56E-03	1.11E-02	0.0375	3.150E+1
C-14	1.2521E-04	180.29	360.59	0.00E+00	2.26E-02	4.51E-02	0.0575	3.442E+1
Cl-36	2.6624E-06	180.29	360.59	0.00E+00	4.80E-04	9.60E-04	0.0850	2.028E+1
Cm-243	1.2813E-05	180.29	360.59	0.00E+00	2.31E-03	4.62E-03	0.1250	1.332E+1
Cm-244	7.3361E-04	180.29	360.59	0.00E+00	1.32E-01	2.65E-01	0.2250	1.750E+1
Co-60	3.3494E-03	180.29	360.59	0.00E+00	6.04E-01	1.21E+00	0.3750	7.617E+1
Cs-134	1.7799E-07	180.29	360.59	0.00E+00	3.21E-05	6.42E-05	0.5750	1.299E+1
Cs-135	1.9738E-06	180.29	360.59	0.00E+00	3.56E-03	7.12E-03	0.8500	1.445E+1
Cs-137	9.6843E-01	180.29	360.59	0.00E+00	1.75E+02	3.49E+02	1.2500	1.534E+1
Eu-154	3.2877E-03	180.29	360.59	0.00E+00	5.93E-01	1.19E+00	1.7500	3.873E+0
Eu-155	9.8812E-05	180.29	360.59	0.00E+00	1.78E-02	3.56E-02	2.2500	8.320E+0
Fe-55	4.9444E-08	180.29	360.59	0.00E+00	8.91E-04	1.78E-03	2.7500	1.403E+0
H-3	8.4381E-04	180.29	360.59	0.00E+00	1.52E-01	3.04E-01	3.5000	4.505E+0
I-129	7.1287E-07	180.29	360.59	0.00E+00	1.29E-04	2.57E-04	6.0000	1.911E+0
Kr-85	1.3624E-02	180.29	360.59	0.00E+00	2.46E+00	4.91E+00	7.0000	2.183E+0
Np-237	1.2375E-05	180.29	360.59	0.00E+00	2.23E-03	4.46E-03	11.0000	2.495E+0
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							

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Claddings:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	69.69795918	60 to 100	

Burnup Summary (MWd)		basis for burnup used in estimate:	
	From SFD	Estimated	
Nominal:	38.80	180.29	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		360.59	Bounding burnup assumed to be twice nominal burnup.

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.39	4.65	1.00
Bounding:	0.77		

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

*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"

0.86

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	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	0.0650	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	6.496E+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		
Th-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	2.8572E-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 LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	70.00179205	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	792.76	2,080.28	
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=0.873kg; EOL=0.812kg

ROD Storage Shc: INEEL

Fuel decay start date: 2036

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"

0.05

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	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	5.3037E-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	3.19E-04	6.38E-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		
Ti-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	8.8491E-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-08	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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.16E+00	8.35E+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 %:	66.95587031	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	24.96	63.68
Bounding:		127.36

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	Estimated EOL HM/Given EOL HM
Nominal:	0.21	2.58	1.00
Bounding:	0.43		

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

^aTotal burnup for all fuel associated with this worksheet must be divided 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) U OF WI

SNF ID #: 1035

Fuel Units & Descr: 9 - ELEMENT

Heavy Metal Mass: BOL=1.573kg; EOL=1.573kg

ROO Storage Site: INEEL

¹Fuel decay start date:

2035

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"

0.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	59.32	118.64	0.00E+00	1.69E-08	3.38E-08	Avg. MeV	
Am-241	7.5767E-03	59.32	118.64	0.00E+00	4.49E-01	8.99E-01	0.0150	1.914E+13
Am-242m	2.4459E-05	59.32	118.64	0.00E+00	1.45E-03	2.90E-03	0.0250	4.201E+12
Am-243	3.0983E-05	59.32	118.64	0.00E+00	1.84E-03	3.68E-03	0.0375	3.716E+12
C-14	1.2590E-04	59.32	118.64	0.00E+00	7.47E-03	1.49E-02	0.0575	3.706E+12
Cl-36	2.6624E-06	59.32	118.64	0.00E+00	1.58E-04	3.16E-04	0.0850	2.308E+12
Cm-243	3.8244E-05	59.32	118.64	0.00E+00	2.27E-03	4.54E-03	0.1250	1.853E+12
Cm-244	4.1010E-03	59.32	118.64	0.00E+00	2.43E-01	4.87E-01	0.2250	1.961E+12
Co-60	1.2410E+00	59.32	118.64	0.00E+00	7.35E+01	1.47E+02	0.3750	9.786E+11
Cs-134	6.5454E-01	59.32	118.64	0.00E+00	3.88E+01	7.77E+01	0.5750	1.820E+13
Cs-135	1.9753E-05	59.32	118.64	0.00E+00	1.17E-03	2.34E-03	0.8500	2.971E+12
Cs-137	2.7375E+00	59.32	118.64	0.00E+00	1.62E+02	3.25E+02	1.2500	1.141E+13
Eu-154	1.2324E-01	59.32	118.64	0.00E+00	7.31E+00	1.46E+01	1.7500	1.526E+10
Eu-155	5.3037E-02	59.32	118.64	0.00E+00	3.15E+00	6.29E+00	2.2500	1.196E+10
Fe-55	7.9555E-01	59.32	118.64	0.00E+00	4.72E+01	9.44E+01	2.7500	1.085E+08
H-3	1.0531E-02	59.32	118.64	0.00E+00	6.25E-01	1.25E+00	3.5000	1.277E+07
I-129	7.1287E-07	59.32	118.64	0.00E+00	4.23E-05	8.46E-05	5.0000	3.059E+03
Kr-85	2.4955E-01	59.32	118.64	0.00E+00	1.48E+01	2.96E+01	7.0000	3.520E+02
Np-237	1.2121E-05	59.32	118.64	0.00E+00	7.19E-04	1.44E-03	11.0000	4.039E+01
Pa-231	1.1230E-09	59.32	118.64	0.00E+00	6.66E-08	1.33E-07		
Pb-210	6.1636E-14	59.32	118.64	0.00E+00	3.66E-12	7.31E-12		
Pm-147	1.1302E+00	59.32	118.64	0.00E+00	6.70E+01	1.34E+02		
Pu-238	5.4826E-02	59.32	118.64	0.00E+00	3.25E+00	6.50E+00		
Pu-239	1.4056E-03	59.32	118.64	0.00E+00	8.34E-02	1.67E-01		
Pu-240	1.1536E-03	59.32	118.64	0.00E+00	6.84E-02	1.37E-01		
Pu-241	4.2995E-01	59.32	118.64	0.00E+00	2.55E+01	5.10E+01		
Pu-242	4.9910E-06	59.32	118.64	0.00E+00	2.96E-04	5.92E-04		
Ra-226	2.4008E-13	59.32	118.64	0.00E+00	1.42E-11	2.85E-11		
Ra-228	1.8220E-11	59.32	118.64	0.00E+00	1.08E-09	2.16E-09		
Ru-106	1.0343E-01	59.32	118.64	0.00E+00	6.14E+00	1.23E+01		
Se-79	1.2832E-05	59.32	118.64	0.00E+00	7.61E-04	1.52E-03		
Sn-126	1.2090E-05	59.32	118.64	0.00E+00	7.17E-04	1.43E-03		
Sr-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02		
Tc-99	4.0318E-04	59.32	118.64	0.00E+00	2.39E-02	4.78E-02		
Th-229	7.7375E-11	59.32	118.64	0.00E+00	4.59E-09	9.18E-09		
Th-230	1.2211E-10	59.32	118.64	0.00E+00	7.24E-09	1.45E-08		
Th-232	2.3842E-11	59.32	118.64	0.00E+00	1.41E-09	2.83E-09		
Ti-208	1.4313E-07	59.32	118.64	0.00E+00	8.49E-06	1.70E-05		
U-232	4.1927E-07	59.32	118.64	0.00E+00	2.49E-05	4.97E-05		
U-233	6.8491E-08	59.32	118.64	0.00E+00	4.06E-06	8.13E-06		
U-234	2.0189E-06	59.32	118.64	0.00E+00	1.20E-04	2.40E-04		
U-235	-2.6572E-06	59.32	0.00	2.38E-03	2.22E-03	2.38E-03		
U-236	1.3575E-05	59.32	118.64	0.00E+00	8.05E-04	1.61E-03		
U-238	-2.2698E-08	59.32	0.00	1.59E-04	1.58E-04	1.59E-04		
Y-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02		
Other Radionuclides					2.11E+02	4.23E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	59.32	
Bounding:		118.64

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:	0.11	0.00
Bounding:	0.22	

Estimated EOL HM/ Given EOL HM

0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) UNIV OF WISCONSIN
SNF ID #: 242
Fuel Units & Descr: 02 - ELEMENT
Heavy Metal Mass: BOL=18.032kg; EOL=15.53kg
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"
0.83

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	2,378.33	4,756.66	0.00E+00	6.78E-07	1.36E-06	Avg. MeV	
Am-241	7.5767E-03	2,378.33	4,756.66	0.00E+00	1.80E+01	3.60E+01	0.0150	7.675E+14
Am-242m	2.4459E-05	2,378.33	4,756.66	0.00E+00	5.82E-02	1.16E-01	0.0250	1.684E+14
Am-243	3.0983E-05	2,378.33	4,756.66	0.00E+00	7.37E-02	1.47E-01	0.0375	1.490E+14
C-14	1.2590E-04	2,378.33	4,756.66	0.00E+00	2.99E-01	5.99E-01	0.0575	1.487E+14
Cl-36	2.6624E-06	2,378.33	4,756.66	0.00E+00	6.33E-03	1.27E-02	0.0850	9.252E+13
Cm-243	3.8244E-05	2,378.33	4,756.66	0.00E+00	9.10E-02	1.82E-01	0.1250	7.429E+13
Cm-244	4.1010E-03	2,378.33	4,756.66	0.00E+00	9.75E+00	1.95E+01	0.2250	7.863E+13
Co-60	1.2410E+00	2,378.33	4,756.66	0.00E+00	2.96E+03	5.90E+03	0.3750	3.923E+13
Cs-134	6.5454E-01	2,378.33	4,756.66	0.00E+00	1.56E+03	3.11E+03	0.5750	6.493E+14
Cs-135	1.9753E-05	2,378.33	4,756.66	0.00E+00	4.70E-02	9.40E-02	0.8500	1.191E+14
Cs-137	2.7375E+00	2,378.33	4,756.66	0.00E+00	6.51E+03	1.30E+04	1.2500	4.575E+14
Eu-154	1.2324E-01	2,378.33	4,756.66	0.00E+00	2.93E+02	5.86E+02	1.7500	6.120E+11
Eu-155	5.3037E-02	2,378.33	4,756.66	0.00E+00	1.26E+02	2.52E+02	2.2500	4.797E+11
Fe-55	7.9555E-01	2,378.33	4,756.66	0.00E+00	1.89E+03	3.78E+03	2.7500	4.349E+09
H-3	1.0531E-02	2,378.33	4,756.66	0.00E+00	2.50E+01	5.01E+01	3.5000	5.118E+08
I-129	7.1287E-07	2,378.33	4,756.66	0.00E+00	1.70E-03	3.39E-03	5.0000	1.226E+05
Kr-85	2.4955E-01	2,378.33	4,756.66	0.00E+00	5.94E+02	1.19E+03	7.0000	1.411E+04
Np-237	1.1212E-05	2,378.33	4,756.66	0.00E+00	2.88E-02	5.77E-02	11.0000	1.619E+03
Pa-231	1.1230E-09	2,378.33	4,756.66	0.00E+00	2.67E-06	5.34E-06		
Pb-210	6.1636E-14	2,378.33	4,756.66	0.00E+00	1.47E-10	2.93E-10		
Pm-147	1.1302E+00	2,378.33	4,756.66	0.00E+00	2.69E+03	5.38E+03		
Pu-238	5.4826E-02	2,378.33	4,756.66	0.00E+00	1.30E+02	2.61E+02		
Pu-239	1.4056E-03	2,378.33	4,756.66	0.00E+00	3.34E+00	6.69E+00		
Pu-240	1.1536E-03	2,378.33	4,756.66	0.00E+00	2.74E+00	5.49E+00		
Pu-241	4.2995E-01	2,378.33	4,756.66	0.00E+00	1.02E+03	2.05E+03		
Pu-242	4.9910E-08	2,378.33	4,756.66	0.00E+00	1.19E-02	2.37E-02		
Ra-226	2.4008E-13	2,378.33	4,756.66	0.00E+00	5.71E-10	1.14E-09		
Ra-228	1.8220E-11	2,378.33	4,756.66	0.00E+00	4.33E-08	8.67E-08		
Ru-106	1.0343E-01	2,378.33	4,756.66	0.00E+00	2.46E+02	4.92E+02		
Se-79	1.2832E-05	2,378.33	4,756.66	0.00E+00	3.05E-02	6.10E-02		
Sn-126	1.2090E-05	2,378.33	4,756.66	0.00E+00	2.88E-02	5.75E-02		
Sr-90	2.5646E+00	2,378.33	4,756.66	0.00E+00	6.10E+03	1.22E+04		
Tc-99	4.0319E-04	2,378.33	4,756.66	0.00E+00	9.59E-01	1.92E+00		
Th-229	7.7375E-11	2,378.33	4,756.66	0.00E+00	1.84E-07	3.68E-07		
Th-230	1.2211E-10	2,378.33	4,756.66	0.00E+00	2.90E-07	5.81E-07		
Th-232	2.3842E-11	2,378.33	4,756.66	0.00E+00	5.67E-08	1.13E-07		
Ti-208	1.4313E-07	2,378.33	4,756.66	0.00E+00	3.40E-04	6.81E-04		
U-232	4.1927E-07	2,378.33	4,756.66	0.00E+00	9.97E-04	1.99E-03		
U-233	6.8491E-08	2,378.33	4,756.66	0.00E+00	1.63E-04	3.26E-04		
U-234	2.0189E-06	2,378.33	4,756.66	0.00E+00	4.80E-03	9.60E-03		
U-235	2.6572E-06	2,378.33	0.00	2.72E-02	2.09E-02	2.72E-02		
U-238	1.3575E-05	2,378.33	4,756.66	0.00E+00	3.23E-02	6.46E-02		
U-238	2.2698E-08	2,378.33	0.00	1.82E-03	1.77E-03	1.82E-03		
Y-90	2.5646E+00	2,378.33	4,756.66	0.00E+00	6.10E+03	1.22E+04		
Other Radionuclides							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.56E+02	3.12E+02
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)³

	From SFD	Estimated
Nominal:	509.96	2,378.33
Bounding:		4,756.66

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	4.66
Bounding:	0.78	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) WSU
SNF ID #: 243
Fuel Units & Descr: 78 - ELEMENT
Heavy Metal Mass: BOL=15.288kg; EOL=13.291kg
ROD Storage SRe: 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"
0.70

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	1,897.80	3,795.60	0.00E+00	5.41E-07	1.08E-06	Avg. MeV	
Am-241	7.5767E-03	1,897.80	3,795.60	0.00E+00	1.44E+01	2.88E+01	0.0150	6.124E+14
Am-242m	2.4459E-05	1,897.80	3,795.60	0.00E+00	4.84E-02	9.28E-02	0.0250	1.344E+14
Am-243	3.0963E-05	1,897.80	3,795.60	0.00E+00	5.88E-02	1.18E-01	0.0375	1.189E+14
C-14	1.2590E-04	1,897.80	3,795.60	0.00E+00	2.39E-01	4.78E-01	0.0575	1.186E+14
Cl-36	2.6624E-06	1,897.80	3,795.60	0.00E+00	5.05E-03	1.01E-02	0.0850	7.383E+13
Cm-243	3.8244E-05	1,897.80	3,795.60	0.00E+00	7.26E-02	1.45E-01	0.1250	5.928E+13
Cm-244	4.1010E-03	1,897.80	3,795.60	0.00E+00	7.78E+00	1.56E+01	0.2250	6.274E+13
Co-60	1.2410E+00	1,897.80	3,795.60	0.00E+00	2.36E+03	4.71E+03	0.3750	3.131E+13
Cs-134	6.5454E-01	1,897.80	3,795.60	0.00E+00	1.24E+03	2.48E+03	0.5750	5.181E+14
Cs-135	1.9753E-05	1,897.80	3,795.60	0.00E+00	3.75E-02	7.50E-02	0.8500	9.505E+13
Cs-137	2.7375E+00	1,897.80	3,795.60	0.00E+00	5.20E+03	1.04E+04	1.2500	3.651E+14
Eu-154	1.2324E-01	1,897.80	3,795.60	0.00E+00	2.34E+02	4.68E+02	1.7500	4.883E+11
Eu-155	5.3037E-02	1,897.80	3,795.60	0.00E+00	1.01E+02	2.01E+02	2.2500	3.828E+11
Fe-55	7.9555E-01	1,897.80	3,795.60	0.00E+00	1.51E+03	3.02E+03	2.7500	3.470E+09
H-3	1.0531E-02	1,897.80	3,795.60	0.00E+00	2.00E+01	4.00E+01	3.5000	4.084E+08
I-129	7.1287E-07	1,897.80	3,795.60	0.00E+00	1.35E-03	2.71E-03	5.0000	9.784E+04
Kr-85	2.4955E-01	1,897.80	3,795.60	0.00E+00	4.74E+02	9.47E+02	7.0000	1.126E+04
Np-237	1.2121E-05	1,897.80	3,795.60	0.00E+00	2.30E-02	4.60E-02	11.0000	1.292E+03
Pa-231	1.1230E-09	1,897.80	3,795.60	0.00E+00	2.13E-06	4.26E-06		
Pb-210	6.1636E-14	1,897.80	3,795.60	0.00E+00	1.17E-10	2.34E-10		
Pm-147	1.1302E+00	1,897.80	3,795.60	0.00E+00	2.14E+03	4.29E+03		
Pu-238	5.4826E-02	1,897.80	3,795.60	0.00E+00	1.04E+02	2.08E+02		
Pu-239	1.4056E-03	1,897.80	3,795.60	0.00E+00	2.67E+00	5.34E+00		
Pu-240	1.1536E-03	1,897.80	3,795.60	0.00E+00	2.19E+00	4.38E+00		
Pu-241	4.2995E-01	1,897.80	3,795.60	0.00E+00	8.16E+02	1.63E+03		
Pu-242	4.8910E-06	1,897.80	3,795.60	0.00E+00	9.47E-03	1.89E-02		
Ra-226	2.4008E-13	1,897.80	3,795.60	0.00E+00	4.56E-10	9.11E-10		
Ra-228	1.8220E-11	1,897.80	3,795.60	0.00E+00	3.46E-08	6.92E-08		
Ru-106	1.0343E-01	1,897.80	3,795.60	0.00E+00	1.96E+02	3.93E+02		
Se-79	1.2832E-05	1,897.80	3,795.60	0.00E+00	2.44E-02	4.87E-02		
Sn-126	1.2090E-05	1,897.80	3,795.60	0.00E+00	2.29E-02	4.59E-02		
Sr-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03		
Tc-99	4.0319E-04	1,897.80	3,795.60	0.00E+00	7.85E-01	1.53E+00		
Th-229	7.7375E-11	1,897.80	3,795.60	0.00E+00	1.47E-07	2.94E-07		
Th-230	1.2211E-10	1,897.80	3,795.60	0.00E+00	2.32E-07	4.63E-07		
Th-232	2.3842E-11	1,897.80	3,795.60	0.00E+00	4.52E-08	9.05E-08		
Ti-208	1.4313E-07	1,897.80	3,795.60	0.00E+00	2.72E-04	5.43E-04		
U-232	4.1927E-07	1,897.80	3,795.60	0.00E+00	7.96E-04	1.59E-03		
U-233	6.8491E-08	1,897.80	3,795.60	0.00E+00	1.30E-04	2.60E-04		
U-234	2.0189E-06	1,897.80	3,795.60	0.00E+00	3.83E-03	7.66E-03		
U-235	-2.6572E-06	1,897.80	0.00	2.31E-02	1.81E-02	2.31E-02		
U-236	1.3575E-05	1,897.80	3,795.60	0.00E+00	2.58E-02	5.15E-02		
U-238	-2.2698E-08	1,897.80	0.00	1.54E-03	1.50E-03	1.54E-03		
Y-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03		
Other Radionuclides					6.76E+03	1.35E+04		

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:	432.36	1,897.80
Bounding:		3,795.60

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.37	4.39
Bounding:	0.73	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) (HEU)
SNF ID #: 998
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.117kg; EOL=0.117kg
ROD Storage Site: INEEL

Fuel decay start date: 1970
Estimates as of: 2030
Template: TRIGA-FLP (LW/U-Zr, SST, 60 to 100%, U)
Template Burnup (MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.05

Radionuclide	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0776E-09	2.22	4.44	0.00E+00	4.61E-09	9.23E-09	Avg. MeV	
Am-241	1.6777E-02	2.22	4.44	0.00E+00	3.72E-02	7.45E-02	0.0150	2.150E+11
Am-242m	1.9919E-05	2.22	4.44	0.00E+00	4.42E-05	8.84E-05	0.0250	4.441E+10
Am-243	3.0848E-05	2.22	4.44	0.00E+00	6.85E-05	1.37E-04	0.0375	3.879E+10
C-14	1.2521E-04	2.22	4.44	0.00E+00	2.78E-04	5.56E-04	0.0575	4.239E+10
Cl-38	2.6824E-06	2.22	4.44	0.00E+00	5.91E-06	1.18E-05	0.0850	2.498E+10
Cm-243	1.2813E-05	2.22	4.44	0.00E+00	2.84E-05	5.69E-05	0.1250	1.640E+10
Cm-244	7.3361E-04	2.22	4.44	0.00E+00	1.63E-03	3.26E-03	0.2250	2.155E+10
Co-60	3.3494E-03	2.22	4.44	0.00E+00	7.44E-03	1.49E-02	0.3750	9.379E+09
Cs-134	1.7799E-07	2.22	4.44	0.00E+00	3.95E-07	7.90E-07	0.5750	1.800E+11
Cs-135	1.9738E-05	2.22	4.44	0.00E+00	4.38E-05	8.76E-05	0.8500	1.779E+09
Cs-137	9.6843E-01	2.22	4.44	0.00E+00	2.15E+00	4.30E+00	1.2500	1.889E+08
Eu-154	3.2877E-03	2.22	4.44	0.00E+00	7.30E-03	1.46E-02	1.7500	4.770E+07
Eu-155	9.8812E-05	2.22	4.44	0.00E+00	2.19E-04	4.39E-04	2.2500	1.025E+04
Fe-55	4.9444E-06	2.22	4.44	0.00E+00	1.10E-05	2.20E-05	2.7500	1.727E+04
H-3	8.4381E-04	2.22	4.44	0.00E+00	1.87E-03	3.75E-03	3.5000	5.549E+01
I-129	7.1287E-07	2.22	4.44	0.00E+00	1.58E-06	3.17E-06	5.0000	2.353E+01
Kr-85	1.3624E-02	2.22	4.44	0.00E+00	3.02E-02	6.05E-02	7.0000	2.688E+00
Np-237	1.2375E-05	2.22	4.44	0.00E+00	2.75E-05	5.50E-05	11.0000	3.073E-01
Pa-231	3.2066E-09	2.22	4.44	0.00E+00	7.12E-09	1.42E-08		
Pb-210	1.0925E-11	2.22	4.44	0.00E+00	2.43E-11	4.85E-11		
Pm-147	7.8187E-06	2.22	4.44	0.00E+00	1.74E-05	3.47E-05		
Pu-238	3.8440E-02	2.22	4.44	0.00E+00	8.53E-02	1.71E-01		
Pu-239	1.4038E-03	2.22	4.44	0.00E+00	3.12E-03	6.23E-03		
Pu-240	1.1560E-03	2.22	4.44	0.00E+00	2.57E-03	5.13E-03		
Pu-241	4.9354E-02	2.22	4.44	0.00E+00	1.10E-01	2.19E-01		
Pu-242	4.9910E-06	2.22	4.44	0.00E+00	1.11E-05	2.22E-05		
Ra-226	2.9330E-11	2.22	4.44	0.00E+00	6.51E-11	1.30E-10		
Ra-228	2.3857E-11	2.22	4.44	0.00E+00	5.30E-11	1.06E-10		
Ru-108	3.8455E-15	2.22	4.44	0.00E+00	8.54E-15	1.71E-14		
Se-79	1.2826E-05	2.22	4.44	0.00E+00	2.85E-05	5.70E-05		
Sn-126	1.2067E-05	2.22	4.44	0.00E+00	2.68E-05	5.37E-05		
Sr-90	8.7913E-01	2.22	4.44	0.00E+00	1.95E+00	3.90E+00		
Tc-99	4.0304E-04	2.22	4.44	0.00E+00	8.95E-04	1.79E-03		
Th-229	4.3912E-10	2.22	4.44	0.00E+00	9.75E-10	1.95E-09		
Th-230	2.8879E-09	2.22	4.44	0.00E+00	6.41E-09	1.28E-08		
Th-232	2.3888E-11	2.22	4.44	0.00E+00	5.30E-11	1.06E-10		
Ti-208	1.1027E-07	2.22	4.44	0.00E+00	2.45E-07	4.90E-07		
U-232	2.9871E-07	2.22	4.44	0.00E+00	6.63E-07	1.33E-06		
U-233	7.1407E-08	2.22	4.44	0.00E+00	1.59E-07	3.17E-07		
U-234	8.6801E-06	2.22	4.44	0.00E+00	1.93E-05	3.85E-05		
U-235	-2.6572E-06	2.22	0.00	2.35E-04	2.29E-04	2.35E-04		
U-236	1.3576E-05	2.22	4.44	0.00E+00	3.01E-05	6.03E-05		
U-238	-2.2698E-08	2.22	0.00	2.69E-06	2.64E-06	2.69E-06		
Y-90	8.7928E-01	2.22	4.44	0.00E+00	1.95E+00	3.90E+00		
Other Radionuclides					2.15E+00	4.30E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	INCOLOY	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.152	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:		2.22	
Bounding:		4.44	

Checks			Estimated EOL HM/Given EOL HM 0.98
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.08		
Bounding:	0.11		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 302
Fuel Units & Descr: 611 - ELEMENT
Heavy Metal Mass: BOL=27.067kg; EOL=13.992kg
ROD Storage Site: INEEL

Fuel decay start date: 1978
Estimates as of: 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: 50 years

Estimated
Canister usage:
18"x10"
5.50

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0776E-09	12,427.12	24,854.25	0.00E+00	2.58E-05	5.16E-05	Avg. MeV	
Am-241	1.6777E-02	12,427.12	24,854.25	0.00E+00	2.08E+02	4.17E+02	0.0150	1.203E+15
Am-242m	1.9919E-05	12,427.12	24,854.25	0.00E+00	2.48E-01	4.95E-01	0.0250	2.486E+14
Am-243	3.0848E-05	12,427.12	24,854.25	0.00E+00	3.83E-01	7.67E-01	0.0375	2.171E+14
C-14	1.2521E-04	12,427.12	24,854.25	0.00E+00	1.56E+00	3.11E+00	0.0575	2.373E+14
Cl-36	2.6624E-06	12,427.12	24,854.25	0.00E+00	3.31E-02	6.62E-02	0.0650	1.368E+14
Cm-243	1.2813E-05	12,427.12	24,854.25	0.00E+00	1.59E-01	3.18E-01	0.1250	9.179E+13
Cm-244	7.3361E-04	12,427.12	24,854.25	0.00E+00	9.12E+00	1.82E+01	0.2250	1.206E+14
Co-60	3.3494E-03	12,427.12	24,854.25	0.00E+00	4.16E+01	8.32E+01	0.3750	5.250E+13
Cs-134	1.7799E-07	12,427.12	24,854.25	0.00E+00	2.21E-03	4.42E-03	0.5750	8.953E+14
Cs-135	1.9738E-05	12,427.12	24,854.25	0.00E+00	2.45E-01	4.91E-01	0.8500	9.957E+12
Cs-137	9.8843E-01	12,427.12	24,854.25	0.00E+00	1.20E+04	2.41E+04	1.2500	1.057E+13
Eu-154	3.2877E-03	12,427.12	24,854.25	0.00E+00	4.09E+01	8.17E+01	1.7500	2.670E+11
Eu-155	9.8812E-05	12,427.12	24,854.25	0.00E+00	1.23E+00	2.46E+00	2.2500	5.735E+07
Fe-55	4.9444E-06	12,427.12	24,854.25	0.00E+00	6.14E-02	1.23E-01	2.7500	9.668E+07
H-3	8.4381E-04	12,427.12	24,854.25	0.00E+00	1.05E+01	2.10E+01	3.5000	3.105E+05
I-129	7.1287E-07	12,427.12	24,854.25	0.00E+00	8.86E-03	1.77E-02	5.0000	1.317E+05
Kr-85	1.3624E-02	12,427.12	24,854.25	0.00E+00	1.69E+02	3.39E+02	7.0000	1.504E+04
Np-237	1.2375E-05	12,427.12	24,854.25	0.00E+00	1.54E-01	3.08E-01	11.0000	1.719E+03
Pa-231	3.2066E-09	12,427.12	24,854.25	0.00E+00	3.98E-05	7.97E-05		
Pb-210	1.0925E-11	12,427.12	24,854.25	0.00E+00	1.36E-07	2.72E-07		
Pm-147	7.8187E-06	12,427.12	24,854.25	0.00E+00	9.72E-02	1.94E-01		
Pu-238	3.8440E-02	12,427.12	24,854.25	0.00E+00	4.78E+02	9.55E+02		
Pu-239	1.4038E-03	12,427.12	24,854.25	0.00E+00	1.74E+01	3.49E+01		
Pu-240	1.1560E-03	12,427.12	24,854.25	0.00E+00	1.44E+01	2.87E+01		
Pu-241	4.9354E-02	12,427.12	24,854.25	0.00E+00	6.13E+02	1.23E+03		
Pu-242	4.9910E-06	12,427.12	24,854.25	0.00E+00	6.20E-02	1.24E-01		
Ra-226	2.9330E-11	12,427.12	24,854.25	0.00E+00	3.64E-07	7.29E-07		
Ra-228	2.3857E-11	12,427.12	24,854.25	0.00E+00	2.96E-07	5.93E-07		
Ru-106	3.8455E-15	12,427.12	24,854.25	0.00E+00	4.78E-11	9.56E-11		
Se-79	1.2826E-05	12,427.12	24,854.25	0.00E+00	1.59E-01	3.19E-01		
Sn-126	1.2087E-05	12,427.12	24,854.25	0.00E+00	1.50E-01	3.00E-01		
Sr-90	8.7913E-01	12,427.12	24,854.25	0.00E+00	1.06E+04	2.19E+04		
Tc-99	4.0304E-04	12,427.12	24,854.25	0.00E+00	5.01E+00	1.00E+01		
Th-229	4.3912E-10	12,427.12	24,854.25	0.00E+00	5.46E-06	1.09E-05		
Th-230	2.8879E-09	12,427.12	24,854.25	0.00E+00	3.59E-05	7.18E-05		
Th-232	2.3888E-11	12,427.12	24,854.25	0.00E+00	2.97E-07	5.94E-07		
Th-234	1.1027E-07	12,427.12	24,854.25	0.00E+00	1.37E-03	2.74E-03		
U-232	2.9871E-07	12,427.12	24,854.25	0.00E+00	3.71E-03	7.42E-03		
U-233	7.1407E-06	12,427.12	24,854.25	0.00E+00	8.87E-04	1.77E-03		
U-234	8.6801E-06	12,427.12	24,854.25	0.00E+00	1.08E-01	2.16E-01		
U-235	2.6572E-06	12,427.12	0.00	5.45E-02	2.15E-02	5.45E-02		
U-236	1.3576E-05	12,427.12	24,854.25	0.00E+00	1.69E-01	3.37E-01		
U-238	2.2698E-08	12,427.12	0.00	6.24E-04	3.42E-04	6.24E-04		
Y-90	8.7928E-01	12,427.12	24,854.25	0.00E+00	1.09E+04	2.19E+04		
Other Radionuclides					1.20E+04	2.40E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons:
Fuel Cladding:	INCOLOY	SST	This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.14	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		12,427.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		24,854.25	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.35		1.00
Bounding:	2.71		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 930
Fuel Units & Descr: 257 - ELEMENT
Heavy Metal Mass: BOL=11.828kg; EOL=5.53kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1999
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): 0.000198
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
2.41

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	1.0386E-09	5,938.04	11,241.67	0.00E+00	6.17E-08	1.17E-05	0.0150 9.881E+14
Am-241	1.4973E-02	5,938.04	11,241.67	0.00E+00	8.89E+01	1.68E+02	0.0250 2.046E+14
Am-242m	2.2324E-05	5,938.04	11,241.67	0.00E+00	1.33E-01	2.51E-01	0.0375 1.798E+14
Am-243	3.0923E-05	5,938.04	11,241.67	0.00E+00	1.84E-01	3.48E-01	0.0575 1.932E+14
C-14	1.2559E-04	5,938.04	11,241.67	0.00E+00	7.46E-01	1.41E+00	0.0850 1.153E+14
Cl-36	2.6624E-06	5,938.04	11,241.67	0.00E+00	1.58E-02	2.99E-02	0.1250 7.874E+13
Cm-243	2.3527E-05	5,938.04	11,241.67	0.00E+00	1.40E-01	2.64E-01	0.2250 9.962E+13
Cm-244	1.9092E-03	5,938.04	11,241.67	0.00E+00	1.13E+01	2.15E+01	0.3750 4.324E+13
Co-60	8.9552E-02	5,938.04	11,241.67	0.00E+00	5.32E+02	1.01E+03	0.5750 7.229E+13
Cs-134	7.9074E-04	5,938.04	11,241.67	0.00E+00	4.70E+00	8.89E+00	0.8500 1.215E+13
Cs-135	1.9753E-05	5,938.04	11,241.67	0.00E+00	1.17E-01	2.22E-01	1.2500 8.223E+13
Cs-137	1.7243E+00	5,938.04	11,241.67	0.00E+00	1.02E+04	1.94E+04	1.7500 3.414E+11
Eu-154	2.4609E-02	5,938.04	11,241.67	0.00E+00	1.46E+02	2.77E+02	2.2500 4.153E+08
Eu-155	3.2456E-03	5,938.04	11,241.67	0.00E+00	1.93E+01	3.65E+01	2.7500 5.679E+07
Fe-55	3.8605E-03	5,938.04	11,241.67	0.00E+00	2.29E+01	4.34E+01	3.5000 3.303E+05
H-3	3.4305E-03	5,938.04	11,241.67	0.00E+00	2.04E+01	3.86E+01	5.0000 1.402E+05
I-129	7.1287E-07	5,938.04	11,241.67	0.00E+00	4.23E-03	8.01E-03	7.0000 1.610E+04
Kr-85	6.8536E-02	5,938.04	11,241.67	0.00E+00	4.07E+02	7.70E+02	11.0000 1.845E+03
Np-237	1.2219E-05	5,938.04	11,241.67	0.00E+00	7.26E-02	1.37E-01	
Pa-231	2.0701E-09	5,938.04	11,241.67	0.00E+00	1.23E-05	2.33E-05	
Pb-210	1.3279E-12	5,938.04	11,241.67	0.00E+00	7.88E-09	1.49E-08	
Pm-147	5.7517E-03	5,938.04	11,241.67	0.00E+00	3.42E+01	6.47E+01	
Pu-238	4.6828E-02	5,938.04	11,241.67	0.00E+00	2.78E+02	5.26E+02	
Pu-239	1.4048E-03	5,938.04	11,241.67	0.00E+00	8.34E+00	1.58E+01	
Pu-240	1.1563E-03	5,938.04	11,241.67	0.00E+00	6.87E+00	1.30E+01	
Pu-241	1.6431E-01	5,938.04	11,241.67	0.00E+00	9.76E+02	1.85E+03	
Pu-242	4.9910E-08	5,938.04	11,241.67	0.00E+00	2.96E-02	5.61E-02	
Ra-226	5.4390E-12	5,938.04	11,241.67	0.00E+00	3.23E-08	6.11E-08	
Ra-228	2.3437E-11	5,938.04	11,241.67	0.00E+00	1.39E-07	2.63E-07	
Ru-106	1.1115E-07	5,938.04	11,241.67	0.00E+00	6.60E-04	1.25E-03	
Se-79	1.2829E-05	5,938.04	11,241.67	0.00E+00	7.62E-02	1.44E-01	
Sn-126	1.2088E-05	5,938.04	11,241.67	0.00E+00	7.18E-02	1.36E-01	
Sr-90	1.5935E+00	5,938.04	11,241.67	0.00E+00	9.45E+03	1.79E+04	
Tc-99	4.0319E-04	5,938.04	11,241.67	0.00E+00	2.39E+00	4.53E+00	
Th-229	2.4023E-10	5,938.04	11,241.67	0.00E+00	1.43E-08	2.70E-08	
Th-230	9.6948E-10	5,938.04	11,241.67	0.00E+00	5.76E-08	1.09E-06	
Th-232	2.3857E-11	5,938.04	11,241.67	0.00E+00	1.42E-07	2.68E-07	
Ti-208	1.3982E-07	5,938.04	11,241.67	0.00E+00	8.30E-04	1.57E-03	
U-232	3.7943E-07	5,938.04	11,241.67	0.00E+00	2.25E-03	4.27E-03	
U-233	6.9814E-08	5,938.04	11,241.67	0.00E+00	4.15E-04	7.85E-04	
U-234	5.4059E-06	5,938.04	11,241.67	0.00E+00	3.21E-02	6.08E-02	
U-235	-2.6572E-06	5,938.04	0.00	2.38E-02	8.03E-03	2.38E-02	
U-236	1.3576E-05	5,938.04	11,241.67	0.00E+00	8.06E-02	1.53E-01	
U-238	-2.2698E-08	5,938.04	0.00	2.72E-04	1.38E-04	2.72E-04	
Y-90	1.5935E+00	5,938.04	11,241.67	0.00E+00	9.46E+03	1.79E+04	
Other Radionuclides					1.01E+04	1.90E+04	

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		5,938.04	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.
Bounding:		11,241.67	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.48		1.00
Bounding:	2.80		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 2020 FFCR MNRC

SNF ID #: 737

Fuel Units & Descr: 6 - ELEMENT

Heavy Metal Mass: BOL=2.462kg; EOL=2.462kg

ROD Storage Site: INEEL

Fuel decay start date: 2035

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: 5 years

Estimated

Canister usage:

18"x10"

0.06

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	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		Avg. MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.0150	2.607E+07
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.0375	3.553E+04
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.0575	2.174E+04
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.0850	3.036E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.1250	5.994E+06
Cm-244	1.8962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.2250	2.121E+07
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.3750	5.293E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.5750	2.604E+03
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		0.8500	4.065E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		1.2500	2.427E+01
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		1.7500	1.188E+01
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		2.2500	6.879E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		2.7500	3.997E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		3.5000	3.573E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		6.0000	1.535E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		7.0000	1.767E-01
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		11.0000	2.032E-02
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pu-238	1.0863E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Ti-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
U-235	-2.6194E-06	0.00	0.00	1.05E-03	1.05E-03	1.05E-03			
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
U-238	-3.6331E-08	0.00	0.00	6.64E-04	6.64E-04	6.64E-04			
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00			
Other Radionuclides									

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 NM Constituents:	U	U
BOL Enrichment %:	19.76779631	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 NM/Given EOL NM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 30/20 FFCR MNRC

SNF ID #: 1055

Fuel Units & Descr: 1 - ELEMENT

Heavy Metal Mass: BOL=0.675kg; EOL=0.675kg

ROD Storage Sbr: INEEL

¹Fuel decay start date: 2035

Estimates as of: 2030

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

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated

Canister usage:

18"x10"

0.01

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	7.138E+08
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	8.726E+03
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	5.967E+03
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	8.309E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	1.641E+08
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	5.806E+06
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.449E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	7.127E+02
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	1.113E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	6.652E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	3.255E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	1.885E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	1.095E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	9.793E-01
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	4.207E-01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	4.843E-02
Np-237	1.2427E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	5.568E-03
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	2.88E-04	2.88E-04	2.88E-04		
U-236	1.2683E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	1.82E-04	1.82E-04	1.82E-04		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	19.74748008	10 to 20.1

Basic for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

Basic for burnup used in estimator:

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 8.520 FFCR
SNF ID #: 1003
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=1.604kg; EOL=1.541kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.14

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07	Avg. MeV	
Am-241	1.8331E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01	0.0150	1.944E+13
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-05	1.70E-04	0.0250	4.278E+12
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05	0.0375	3.643E+12
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.55E-02	0.0575	3.739E+12
Cf-252	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04	0.0850	2.316E+12
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05	0.1250	1.682E+12
Cm-244	1.6962E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04	0.2250	1.965E+12
Co-60	1.2839E+00	60.14	120.28	0.00E+00	7.72E+01	1.54E+02	0.3750	9.972E+11
Cs-134	9.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01	0.5750	1.326E+13
Cs-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03	0.8500	5.890E+11
Cs-137	2.7564E+00	60.14	120.28	0.00E+00	1.66E+02	3.32E+02	1.2500	1.155E+13
Eu-154	1.5368E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00	1.7500	7.702E+09
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.76E+00	3.52E+00	2.2500	1.241E+10
Fe-55	7.7158E-01	60.14	120.28	0.00E+00	4.84E+01	9.28E+01	2.7500	9.852E+07
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.68E-01	1.34E+00	3.5000	1.147E+07
I-129	7.3684E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05	5.0000	6.404E+01
Kr-85	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01	7.0000	7.250E+00
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04	11.0000	8.259E-01
Pa-231	3.8511E-09	60.14	120.28	0.00E+00	2.32E-07	4.63E-07		
Pb-210	7.3880E-15	60.14	120.28	0.00E+00	4.44E-13	8.89E-13		
Pm-147	2.1023E+00	60.14	120.28	0.00E+00	1.26E+02	2.53E+02		
Pu-238	1.0383E-03	60.14	120.28	0.00E+00	6.24E-02	1.25E-01		
Pu-239	5.5293E-03	60.14	120.28	0.00E+00	3.33E-01	6.65E-01		
Pu-240	2.1278E-03	60.14	120.28	0.00E+00	1.28E-01	2.56E-01		
Pu-241	1.0195E-01	60.14	120.28	0.00E+00	6.13E+00	1.23E+01		
Pu-242	2.3128E-07	60.14	120.28	0.00E+00	1.39E-05	2.78E-05		
Ra-226	5.2782E-14	60.14	120.28	0.00E+00	3.17E-12	6.35E-12		
Ra-228	1.9338E-10	60.14	120.28	0.00E+00	1.16E-08	2.33E-08		
Ru-106	9.1684E-02	60.14	120.28	0.00E+00	5.51E+00	1.10E+01		
Se-79	1.3018E-05	60.14	120.28	0.00E+00	7.83E-04	1.57E-03		
Sn-126	1.2167E-05	60.14	120.28	0.00E+00	7.32E-04	1.46E-03		
Sr-90	2.6045E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02		
Tc-99	4.4241E-04	60.14	120.28	0.00E+00	2.66E-02	5.32E-02		
Th-229	1.3713E-10	60.14	120.28	0.00E+00	8.25E-09	1.65E-08		
Th-230	1.8090E-11	60.14	120.28	0.00E+00	1.09E-09	2.18E-09		
Th-232	2.5278E-10	60.14	120.28	0.00E+00	1.52E-08	3.04E-08		
Ti-208	1.6947E-08	60.14	120.28	0.00E+00	1.02E-06	2.04E-06		
U-232	4.8737E-08	60.14	120.28	0.00E+00	2.93E-06	5.86E-06		
U-233	1.2203E-07	60.14	120.28	0.00E+00	7.34E-06	1.47E-05		
U-234	1.5925E-07	60.14	120.28	0.00E+00	9.58E-06	1.92E-05		
U-235	-2.6194E-06	60.14	0.00	6.68E-04	5.10E-04	6.68E-04		
U-236	1.2693E-05	60.14	120.28	0.00E+00	7.63E-04	1.53E-03		
U-238	-3.6331E-08	60.14	0.00	4.35E-04	4.33E-04	4.35E-04		
Y-90	2.6060E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02		
Other Radionuclides					2.17E+02	4.34E+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 %:	19.26433915	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	54.71	60.14
Bounding:		120.28

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.10	1.10
Bounding:	2.20	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR AFRR1

SNF ID #: 999

Fuel Units & Descr: 3 - ELEMENT

Heavy Metal Mass: BOL = 0.026kg

ROD Storage Site: INEEL

*Fuel decay start date: 2019

Estimates as of: 2030

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

*Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 10 years

Estimated

Canister usage:

18"x10"

0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	9.20	18.40	0.00E+00	1.26E-08	2.53E-08	Avg. MeV	
Am-241	2.3865E-03	9.20	18.40	0.00E+00	2.20E-02	4.39E-02	0.0150	2.377E+12
Am-242m	1.3812E-06	9.20	18.40	0.00E+00	1.27E-05	2.54E-05	0.0250	5.036E+11
Am-243	1.4767E-07	9.20	18.40	0.00E+00	1.36E-06	2.72E-06	0.0375	4.302E+11
C-14	1.2863E-04	9.20	18.40	0.00E+00	1.18E-03	2.37E-03	0.0575	4.585E+11
Cf-252	2.8120E-06	9.20	18.40	0.00E+00	2.59E-05	5.17E-05	0.0850	2.782E+11
Cm-243	1.5895E-07	9.20	18.40	0.00E+00	1.46E-06	2.92E-06	0.1250	1.829E+11
Cm-244	1.4008E-06	9.20	18.40	0.00E+00	1.29E-05	2.58E-05	0.2250	2.372E+11
Co-60	6.6541E-01	9.20	18.40	0.00E+00	6.12E+00	1.22E+01	0.3750	1.090E+11
Cs-134	1.6887E-02	9.20	18.40	0.00E+00	1.55E-01	3.11E-01	0.5750	1.707E+12
Cs-135	3.2195E-05	9.20	18.40	0.00E+00	2.96E-04	5.92E-04	0.8500	3.048E+10
Cs-137	2.4556E+00	9.20	18.40	0.00E+00	2.26E+01	4.52E+01	1.2500	9.164E+11
Eu-154	1.0268E-02	9.20	18.40	0.00E+00	9.45E-02	1.89E-01	1.7500	5.515E+08
Eu-155	1.4570E-02	9.20	18.40	0.00E+00	1.34E-01	2.68E-01	2.2500	2.880E+07
Fe-55	2.0361E-01	9.20	18.40	0.00E+00	1.87E+00	3.75E+00	2.7500	4.768E+05
H-3	8.3940E-03	9.20	18.40	0.00E+00	7.72E-02	1.54E-01	3.5000	5.650E+04
I-129	7.3684E-07	9.20	18.40	0.00E+00	6.78E-06	1.36E-05	5.0000	9.771E+00
Kr-85	1.8286E-01	9.20	18.40	0.00E+00	1.68E+00	3.36E+00	7.0000	1.105E+00
Np-237	1.2462E-06	9.20	18.40	0.00E+00	1.15E-05	2.29E-05	11.0000	1.258E-01
Pa-231	4.9143E-09	9.20	18.40	0.00E+00	4.52E-08	9.04E-08		
Pb-210	1.7173E-14	9.20	18.40	0.00E+00	1.58E-13	3.16E-13		
Pm-147	5.6165E-01	9.20	18.40	0.00E+00	5.17E+00	1.03E+01		
Pu-238	9.9820E-04	9.20	18.40	0.00E+00	9.18E-03	1.84E-02		
Pu-239	5.5293E-03	9.20	18.40	0.00E+00	5.09E-02	1.02E-01		
Pu-240	2.1263E-03	9.20	18.40	0.00E+00	1.96E-02	3.91E-02		
Pu-241	8.0165E-02	9.20	18.40	0.00E+00	7.38E-01	1.48E+00		
Pu-242	2.3128E-07	9.20	18.40	0.00E+00	2.13E-06	4.26E-06		
Ra-226	9.9774E-14	9.20	18.40	0.00E+00	9.18E-13	1.84E-12		
Ra-228	2.1729E-10	9.20	18.40	0.00E+00	2.00E-09	4.00E-09		
Ru-106	2.9519E-03	9.20	18.40	0.00E+00	2.72E-02	5.43E-02		
Se-79	1.3017E-05	9.20	18.40	0.00E+00	1.20E-04	2.40E-04		
Sn-126	1.2167E-05	9.20	18.40	0.00E+00	1.12E-04	2.24E-04		
Sr-90	2.3128E+00	9.20	18.40	0.00E+00	2.13E+01	4.26E+01		
Tc-99	4.4241E-04	9.20	18.40	0.00E+00	4.07E-03	8.14E-03		
Th-229	1.9459E-10	9.20	18.40	0.00E+00	1.79E-09	3.58E-09		
Th-230	2.5564E-11	9.20	18.40	0.00E+00	2.35E-10	4.70E-10		
Th-232	2.5278E-10	9.20	18.40	0.00E+00	2.33E-09	4.65E-09		
Ti-208	1.6947E-08	9.20	18.40	0.00E+00	1.56E-07	3.12E-07		
U-232	4.6812E-08	9.20	18.40	0.00E+00	4.31E-07	8.61E-07		
U-233	1.2206E-07	9.20	18.40	0.00E+00	1.12E-06	2.25E-06		
U-234	1.7323E-07	9.20	18.40	0.00E+00	1.59E-06	3.19E-06		
U-235	2.6194E-06	9.20	0.00	1.17E-04	9.25E-05	1.17E-04		
U-236	1.2693E-05	9.20	18.40	0.00E+00	1.17E-04	2.34E-04		
U-238	3.6331E-08	9.20	0.00	7.25E-06	7.22E-05	7.25E-05		
Y-90	2.3128E+00	9.20	18.40	0.00E+00	2.13E+01	4.26E+01		
Other Radionuclides					2.26E+01	4.51E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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	10 to 20.1

Basis for Parameter Differences:

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

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		9.20
Bounding:		18.40

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=0.27kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	
Bounding:	2.00	

Estimated EOL HM/Given EOL HM

1.00

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

^bTotal burnup for all fuel associated with this worksheet must be divided 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 FFOR ENGLAND

SNF ID #: 987

Fuel Units & Descr: 4 - ELEMENT

Heavy Metal Mass: BOL=0.641kg; EOL=0.624kg

ROD Storage Site: INEEL

Fuel decay start date: 2010

Estimates as of: 2030

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

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	18.75	37.49	0.00E+00	4.96E-08	9.91E-08	Avg. MeV	
Am-241	3.1429E-03	18.75	37.49	0.00E+00	5.89E-02	1.18E-01	0.0150	3.757E+12
Am-242m	1.3195E-06	18.75	37.49	0.00E+00	2.47E-05	4.95E-05	0.0250	7.822E+11
Am-243	1.4753E-07	18.75	37.49	0.00E+00	2.77E-06	5.53E-06	0.0375	6.778E+11
C-14	1.2847E-04	18.75	37.49	0.00E+00	2.41E-03	4.82E-03	0.0575	7.290E+11
Ci-36	2.6120E-06	18.75	37.49	0.00E+00	5.27E-05	1.05E-04	0.0850	4.401E+11
Cm-243	1.2465E-07	18.75	37.49	0.00E+00	2.34E-06	4.67E-06	0.1250	2.876E+11
Cm-244	9.5564E-07	18.75	37.49	0.00E+00	1.79E-05	3.58E-05	0.2250	3.779E+11
Co-60	1.7880E-01	18.75	37.49	0.00E+00	3.35E+00	6.70E+00	0.3750	1.856E+11
Cs-134	5.8692E-04	18.75	37.49	0.00E+00	1.10E-02	2.20E-02	0.5750	2.724E+12
Cs-135	3.2195E-05	18.75	37.49	0.00E+00	6.04E-04	1.21E-03	0.8500	3.070E+10
Cs-137	1.9489E+00	18.75	37.49	0.00E+00	3.65E+01	7.31E+01	1.2500	5.088E+11
Eu-154	4.5895E-03	18.75	37.49	0.00E+00	8.60E-02	1.72E-01	1.7500	7.888E+08
Eu-155	3.6045E-03	18.75	37.49	0.00E+00	6.76E-02	1.35E-01	2.2500	2.717E+06
Fe-55	1.4185E-02	18.75	37.49	0.00E+00	2.66E-01	5.32E-01	2.7500	2.993E+04
H-3	4.7895E-03	18.75	37.49	0.00E+00	8.98E-02	1.80E-01	3.5000	1.664E+02
I-129	7.3684E-07	18.75	37.49	0.00E+00	1.38E-05	2.76E-05	5.0000	1.988E+01
Kr-85	9.5820E-02	18.75	37.49	0.00E+00	1.80E+00	3.59E+00	7.0000	2.246E+00
Np-237	1.2552E-06	18.75	37.49	0.00E+00	2.35E-05	4.71E-05	11.0000	2.555E-01
Pa-231	7.0406E-09	18.75	37.49	0.00E+00	1.32E-07	2.64E-07		
Pb-210	5.8000E-14	18.75	37.49	0.00E+00	1.09E-12	2.17E-12		
Pm-147	4.0075E-02	18.75	37.49	0.00E+00	7.51E-01	1.50E+00		
Pu-238	9.2256E-04	18.75	37.49	0.00E+00	1.73E-02	3.46E-02		
Pu-239	5.5278E-03	18.75	37.49	0.00E+00	1.04E-01	2.07E-01		
Pu-240	2.1248E-03	18.75	37.49	0.00E+00	3.98E-02	7.97E-02		
Pu-241	4.9549E-02	18.75	37.49	0.00E+00	9.29E-01	1.86E+00		
Pu-242	2.3128E-07	18.75	37.49	0.00E+00	4.34E-06	8.67E-06		
Ra-226	2.4526E-13	18.75	37.49	0.00E+00	4.60E-12	9.20E-12		
Ra-228	2.4015E-10	18.75	37.49	0.00E+00	4.50E-09	9.00E-09		
Ru-106	3.0602E-06	18.75	37.49	0.00E+00	5.74E-05	1.15E-04		
Se-79	1.3015E-05	18.75	37.49	0.00E+00	2.44E-04	4.88E-04		
Sn-126	1.2165E-05	18.75	37.49	0.00E+00	2.28E-04	4.56E-04		
Sr-90	1.8226E+00	18.75	37.49	0.00E+00	3.42E+01	6.83E+01		
Tc-99	4.4241E-04	18.75	37.49	0.00E+00	8.29E-03	1.66E-02		
Th-229	3.0962E-10	18.75	37.49	0.00E+00	5.80E-09	1.16E-08		
Th-230	4.2346E-11	18.75	37.49	0.00E+00	7.94E-10	1.59E-09		
Th-232	2.5278E-10	18.75	37.49	0.00E+00	4.74E-09	9.48E-09		
Th-208	1.5820E-08	18.75	37.49	0.00E+00	2.97E-07	5.93E-07		
U-232	4.2647E-08	18.75	37.49	0.00E+00	8.00E-07	1.60E-06		
U-233	1.2211E-07	18.75	37.49	0.00E+00	2.29E-06	4.58E-06		
U-234	1.9955E-07	18.75	37.49	0.00E+00	3.74E-06	7.48E-06		
U-235	-2.6194E-06	18.75	0.00	2.77E-04	2.28E-04	2.77E-04		
U-236	1.2693E-05	18.75	37.49	0.00E+00	2.38E-04	4.76E-04		
U-238	-3.6331E-08	18.75	0.00	1.72E-04	1.72E-04	1.72E-04		
Y-60	1.8241E+00	18.75	37.49	0.00E+00	3.42E+01	6.84E+01		
Other Radionuclides					3.61E+01	7.22E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.69E-01	9.35E-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 %:	19.96879875	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	18.75	16.80
Bounding:		37.49

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:	0.90	0.90
Bounding:	1.71	

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

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LWAJ-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"
0.05

II. Estimates

Radionuclide	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	15.61	31.23	0.00E+00	4.13E-08	8.25E-08	Avg. MeV	
Am-241	3.1429E-03	15.61	31.23	0.00E+00	4.91E-02	9.81E-02	0.0150	3.129E+12
Am-242m	1.3195E-06	15.61	31.23	0.00E+00	2.06E-05	4.12E-05	0.0250	6.514E+11
Am-243	1.4753E-07	15.61	31.23	0.00E+00	2.30E-06	4.61E-06	0.0375	5.643E+11
C-14	1.2847E-04	15.61	31.23	0.00E+00	2.01E-03	4.01E-03	0.0675	6.071E+11
Cl-36	2.8120E-06	15.61	31.23	0.00E+00	4.39E-05	8.78E-05	0.0850	3.665E+11
Cm-243	1.2465E-07	15.61	31.23	0.00E+00	1.95E-06	3.89E-06	0.1250	2.395E+11
Cm-244	9.5564E-07	15.61	31.23	0.00E+00	1.49E-05	2.98E-05	0.2250	3.147E+11
Co-60	1.7880E-01	15.61	31.23	0.00E+00	2.79E+00	5.58E+00	0.3750	1.379E+11
Cs-134	5.8692E-04	15.61	31.23	0.00E+00	9.16E-03	1.83E-02	0.5750	2.268E+12
Cs-135	3.2195E-05	15.61	31.23	0.00E+00	5.03E-04	1.01E-03	0.8500	2.557E+10
Cs-137	1.9489E+00	15.61	31.23	0.00E+00	3.04E+01	6.09E+01	1.2500	4.237E+11
Eu-154	4.5895E-03	15.61	31.23	0.00E+00	7.17E-02	1.43E-01	1.7500	6.589E+08
Eu-155	3.6045E-03	15.61	31.23	0.00E+00	5.63E-02	1.13E-01	2.2500	2.263E+08
Fe-55	1.4185E-02	15.61	31.23	0.00E+00	2.21E-01	4.43E-01	2.7500	2.493E+04
H-3	4.7895E-03	15.61	31.23	0.00E+00	7.48E-02	1.50E-01	3.5000	1.390E+02
I-129	7.3684E-07	15.61	31.23	0.00E+00	1.15E-05	2.30E-05	5.0000	1.672E+01
Kr-85	9.5820E-02	15.61	31.23	0.00E+00	1.50E+00	2.99E+00	7.0000	1.889E+00
Np-237	1.2552E-06	15.61	31.23	0.00E+00	1.96E-05	3.92E-05	11.0000	2.150E-01
Pa-231	7.0406E-09	15.61	31.23	0.00E+00	1.10E-07	2.20E-07		
Pb-210	5.8000E-14	15.61	31.23	0.00E+00	9.06E-13	1.81E-12		
Pm-147	4.0075E-02	15.61	31.23	0.00E+00	6.26E-01	1.25E+00		
Pu-238	9.2256E-04	15.61	31.23	0.00E+00	1.44E-02	2.88E-02		
Pu-239	5.5278E-03	15.61	31.23	0.00E+00	8.63E-02	1.73E-01		
Pu-240	2.1248E-03	15.61	31.23	0.00E+00	3.32E-02	6.63E-02		
Pu-241	4.9549E-02	15.61	31.23	0.00E+00	7.74E-01	1.55E+00		
Pu-242	2.3128E-07	15.61	31.23	0.00E+00	3.61E-06	7.22E-06		
Ra-226	2.4526E-13	15.61	31.23	0.00E+00	3.83E-12	7.66E-12		
Ra-228	2.4015E-10	15.61	31.23	0.00E+00	3.75E-09	7.50E-09		
Ru-106	3.0602E-06	15.61	31.23	0.00E+00	4.78E-05	9.56E-05		
Se-79	1.3015E-05	15.61	31.23	0.00E+00	2.03E-04	4.06E-04		
Sn-126	1.2185E-05	15.61	31.23	0.00E+00	1.90E-04	3.80E-04		
Sr-90	1.8226E+00	15.61	31.23	0.00E+00	2.85E+01	5.69E+01		
Tc-99	4.4241E-04	15.61	31.23	0.00E+00	6.91E-03	1.38E-02		
Th-229	3.0962E-10	15.61	31.23	0.00E+00	4.83E-09	9.67E-09		
Th-230	4.2346E-11	15.61	31.23	0.00E+00	6.81E-10	1.32E-09		
Th-232	2.5278E-10	15.61	31.23	0.00E+00	3.95E-09	7.89E-09		
Th-234	1.5820E-08	15.61	31.23	0.00E+00	2.47E-07	4.94E-07		
U-232	4.2647E-08	15.61	31.23	0.00E+00	6.66E-07	1.33E-06		
U-233	1.2211E-07	15.61	31.23	0.00E+00	1.91E-06	3.81E-06		
U-234	1.9955E-07	15.61	31.23	0.00E+00	3.12E-06	6.23E-06		
U-235	-2.6194E-06	15.61	0.00	3.44E-04	3.03E-04	3.44E-04		
U-236	1.2693E-05	15.61	31.23	0.00E+00	1.98E-04	3.96E-04		
U-238	-3.6331E-08	15.61	0.00	2.16E-04	2.15E-04	2.16E-04		
Y-90	1.8241E+00	15.61	31.23	0.00E+00	2.85E+01	5.70E+01		
Other Radionuclides					3.01E+01	6.01E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.85018727	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	15.61	10.02
Bounding:		31.23

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	0.64
Bounding:	1.14	

Estimated EOL HM/Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR ITALY

SNF ID #: 730

Fuel Units & Descr: 3 - ELEMENT

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

ROD Storage Site: INEEL

Fuel decay start date: 1959

Estimates as of: 2030

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

Template Burnup (MWd): 6.85

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 65 years

Estimated

Canister usage:

18"x10"

0.04

II. Estimates	m	x ₀	x ₀	b	y ₀	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	1.2442E-08	24.34	48.68	0.00E+00	3.03E-07	6.06E-07	Avg. MeV	
Am-241	4.0120E-03	24.34	48.68	0.00E+00	9.77E-02	1.95E-01	0.0150	1.865E+12
Am-242m	1.0749E-06	24.34	48.68	0.00E+00	2.62E-05	5.23E-05	0.0250	3.456E+11
Am-243	1.4692E-07	24.34	48.68	0.00E+00	3.58E-06	7.15E-06	0.0375	3.015E+11
C-14	1.2777E-04	24.34	48.68	0.00E+00	3.11E-03	6.22E-03	0.0575	3.248E+11
Cl-36	2.8120E-06	24.34	48.68	0.00E+00	6.85E-05	1.37E-04	0.0650	1.946E+11
Cm-243	4.1759E-08	24.34	48.68	0.00E+00	1.02E-06	2.03E-06	0.1250	1.262E+11
Cm-244	1.7098E-07	24.34	48.68	0.00E+00	4.16E-06	8.32E-06	0.2250	1.876E+11
Co-60	4.8241E-04	24.34	48.68	0.00E+00	1.17E-02	2.35E-02	0.3750	7.311E+10
Cs-134	1.5970E-10	24.34	48.68	0.00E+00	3.89E-09	7.77E-09	0.5750	1.249E+12
Cs-135	3.2195E-05	24.34	48.68	0.00E+00	7.84E-04	1.57E-03	0.8500	1.201E+10
Cs-137	6.8977E-01	24.34	48.68	0.00E+00	1.68E+01	3.36E+01	1.2500	5.826E+09
Eu-154	1.2238E-04	24.34	48.68	0.00E+00	2.98E-03	5.96E-03	1.7500	3.091E+08
Eu-155	6.7158E-06	24.34	48.68	0.00E+00	1.63E-04	3.27E-04	2.2500	4.290E+04
Fe-55	8.8165E-08	24.34	48.68	0.00E+00	2.15E-06	4.29E-06	2.7500	1.771E+04
H-3	3.8376E-04	24.34	48.68	0.00E+00	9.34E-03	1.87E-02	3.5000	5.983E+01
I-129	7.3684E-07	24.34	48.68	0.00E+00	1.79E-05	3.59E-05	5.0000	2.519E+01
Kr-85	5.2316E-03	24.34	48.68	0.00E+00	1.27E-01	2.55E-01	7.0000	2.842E+00
Np-237	1.3232E-06	24.34	48.68	0.00E+00	3.22E-05	6.44E-05	11.0000	3.231E-01
Pa-231	1.8722E-08	24.34	48.68	0.00E+00	4.56E-07	9.11E-07		
Pb-210	1.2620E-12	24.34	48.68	0.00E+00	3.07E-11	6.14E-11		
Pm-147	2.7714E-07	24.34	48.68	0.00E+00	6.75E-06	1.35E-05		
Pu-238	6.4707E-04	24.34	48.68	0.00E+00	1.58E-02	3.15E-02		
Pu-239	5.5203E-03	24.34	48.68	0.00E+00	1.34E-01	2.69E-01		
Pu-240	2.1143E-03	24.34	48.68	0.00E+00	5.15E-02	1.03E-01		
Pu-241	5.6872E-03	24.34	48.68	0.00E+00	1.38E-01	2.77E-01		
Pu-242	2.3128E-07	24.34	48.68	0.00E+00	5.63E-06	1.13E-05		
Ra-226	2.8466E-12	24.34	48.68	0.00E+00	6.44E-11	1.29E-10		
Ra-228	2.5278E-10	24.34	48.68	0.00E+00	6.15E-09	1.23E-08		
Ru-106	1.1377E-19	24.34	48.68	0.00E+00	2.77E-18	5.54E-18		
Se-79	1.3009E-05	24.34	48.68	0.00E+00	3.17E-04	6.33E-04		
Sn-126	1.2162E-05	24.34	48.68	0.00E+00	2.96E-04	5.92E-04		
Sr-90	6.2511E-01	24.34	48.68	0.00E+00	1.52E+01	3.04E+01		
Tc-99	4.4241E-04	24.34	48.68	0.00E+00	1.08E-02	2.15E-02		
Th-229	9.4105E-10	24.34	48.68	0.00E+00	2.29E-08	4.58E-08		
Th-230	1.7098E-10	24.34	48.68	0.00E+00	4.16E-09	8.32E-09		
Th-232	2.5278E-10	24.34	48.68	0.00E+00	6.15E-09	1.23E-08		
Ti-208	1.0305E-08	24.34	48.68	0.00E+00	2.51E-07	5.02E-07		
U-232	2.7669E-08	24.34	48.68	0.00E+00	6.74E-07	1.35E-06		
U-233	1.2239E-07	24.34	48.68	0.00E+00	2.98E-06	5.96E-06		
U-234	3.1278E-07	24.34	48.68	0.00E+00	7.61E-06	1.52E-05		
U-235	2.6179E-06	24.34	0.00	2.10E-04	1.46E-04	2.10E-04		
U-236	1.2696E-05	24.34	48.68	0.00E+00	3.09E-04	6.18E-04		
U-238	3.6331E-08	24.34	0.00	1.30E-04	1.29E-04	1.30E-04		
Y-90	6.2541E-01	24.34	48.68	0.00E+00	1.52E+01	3.04E+01		
Other Radionuclides					1.73E+01	3.45E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.04130579	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	16.51	24.34
Bounding:		48.68

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:	1.48	1.47
Bounding:	2.95	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR MNRC
SNF ID #: 703
Fuel Units & Descr: 5 - ELEMENT
Heavy Metal Mass: BOL=0.801kg; EOL=0.761kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LWA/J-Zn, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	39.14	78.28	0.00E+00	3.33E-08	6.67E-08	Avg. MeV	
Am-241	1.8331E-03	39.14	78.28	0.00E+00	7.17E-02	1.43E-01	0.0150	1.265E+13
Am-242m	1.4129E-06	39.14	78.28	0.00E+00	5.53E-05	1.11E-04	0.0250	2.784E+12
Am-243	1.4774E-07	39.14	78.28	0.00E+00	5.78E-06	1.16E-05	0.0375	2.371E+12
C-14	1.2871E-04	39.14	78.28	0.00E+00	5.04E-03	1.01E-02	0.0575	2.433E+12
Cl-36	2.8120E-06	39.14	78.28	0.00E+00	1.10E-04	2.20E-04	0.0850	1.508E+12
Cm-243	1.7940E-07	39.14	78.28	0.00E+00	7.02E-06	1.40E-05	0.1250	1.095E+12
Cm-244	1.6962E-06	39.14	78.28	0.00E+00	6.64E-05	1.33E-04	0.2250	1.273E+12
Co-60	1.2839E+00	39.14	78.28	0.00E+00	5.03E+01	1.01E+02	0.3750	6.490E+11
Cs-134	9.0541E-02	39.14	78.28	0.00E+00	3.54E+00	7.09E+00	0.5750	8.628E+12
Cs-135	3.2195E-05	39.14	78.28	0.00E+00	1.26E-03	2.52E-03	0.8500	3.703E+11
Cs-137	2.7564E+00	39.14	78.28	0.00E+00	1.08E+02	2.16E+02	1.2500	7.520E+12
Eu-154	1.5368E-02	39.14	78.28	0.00E+00	6.02E-01	1.20E+00	1.7500	5.013E+09
Eu-155	2.9293E-02	39.14	78.28	0.00E+00	1.15E+00	2.29E+00	2.2500	8.080E+09
Fe-55	7.7158E-01	39.14	78.28	0.00E+00	3.02E+01	6.04E+01	2.7500	6.412E+07
H-3	1.1111E-02	39.14	78.28	0.00E+00	4.35E-01	8.70E-01	3.5000	7.462E+06
I-129	7.3684E-07	39.14	78.28	0.00E+00	2.88E-05	5.77E-05	5.0000	4.153E-01
Kr-85	2.5263E-01	39.14	78.28	0.00E+00	9.89E+00	1.98E+01	7.0000	4.701E+00
Np-237	1.2427E-08	39.14	78.28	0.00E+00	4.86E-05	9.73E-05	11.0000	5.355E-01
Pa-231	3.8511E-09	39.14	78.28	0.00E+00	1.51E-07	3.01E-07		
Pb-210	7.3880E-15	39.14	78.28	0.00E+00	2.89E-13	5.78E-13		
Pm-147	2.1023E+00	39.14	78.28	0.00E+00	8.23E+01	1.65E+02		
Pu-238	1.0383E-03	39.14	78.28	0.00E+00	4.06E-02	8.13E-02		
Pu-239	5.5293E-03	39.14	78.28	0.00E+00	2.16E-01	4.33E-01		
Pu-240	2.1278E-03	39.14	78.28	0.00E+00	8.33E-02	1.67E-01		
Pu-241	1.0195E-01	39.14	78.28	0.00E+00	3.99E+00	7.98E+00		
Pu-242	2.3128E-07	39.14	78.28	0.00E+00	9.05E-06	1.81E-05		
Ra-226	5.2782E-14	39.14	78.28	0.00E+00	2.07E-12	4.13E-12		
Ra-228	1.9338E-10	39.14	78.28	0.00E+00	7.57E-09	1.51E-08		
Ru-106	9.1684E-02	39.14	78.28	0.00E+00	3.59E+00	7.18E+00		
Se-79	1.3018E-05	39.14	78.28	0.00E+00	5.10E-04	1.02E-03		
Sn-126	1.2167E-05	39.14	78.28	0.00E+00	4.76E-04	9.52E-04		
Sr-90	2.6045E+00	39.14	78.28	0.00E+00	1.02E+02	2.04E+02		
Tc-99	4.4241E-04	39.14	78.28	0.00E+00	1.73E-02	3.46E-02		
Th-229	1.3713E-10	39.14	78.28	0.00E+00	5.37E-09	1.07E-08		
Th-230	1.8090E-11	39.14	78.28	0.00E+00	7.08E-10	1.42E-09		
Th-232	2.5278E-10	39.14	78.28	0.00E+00	9.89E-09	1.98E-08		
Ti-208	1.6947E-08	39.14	78.28	0.00E+00	6.63E-07	1.33E-06		
U-232	4.8737E-08	39.14	78.28	0.00E+00	1.91E-06	3.82E-06		
U-233	1.2203E-07	39.14	78.28	0.00E+00	4.78E-06	9.55E-06		
U-234	1.5925E-07	39.14	78.28	0.00E+00	6.23E-06	1.25E-05		
U-235	-2.6194E-06	39.14	0.00	3.35E-04	2.32E-04	3.35E-04		
U-236	1.2693E-05	39.14	78.28	0.00E+00	4.97E-04	9.94E-04		
U-238	-3.6331E-08	39.14	0.00	2.17E-04	2.16E-04	2.17E-04		
Y-90	2.6060E+00	39.14	78.28	0.00E+00	1.02E+02	2.04E+02		
Other Radionuclides					1.41E+02	2.82E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	LW AND U ZIRC HYDRIDE	Used	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.34235977	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	27.34	39.14	
Bounding:		78.28	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.43	1.43	
Bounding:	2.86		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel Units & Descr: 2 - ELEMENT

Heavy Metal Mass: BOL=0.392kg; EOL=0.37kg

ROD Storage Site: INEEL

Fuel decay start date: 2025

Estimates as of: 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"

0.02

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	2.8488E-10	20.91	41.82	0.00E+00	5.96E-09	1.19E-08	Avg. MeV	
Am-241	7.5767E-03	20.91	41.82	0.00E+00	1.58E-01	3.17E-01	0.0150	6.747E+12
Am-242m	2.4459E-05	20.91	41.82	0.00E+00	5.11E-04	1.02E-03	0.0250	1.481E+12
Am-243	3.0983E-05	20.91	41.82	0.00E+00	6.48E-04	1.30E-03	0.0375	1.310E+12
C-14	1.2590E-04	20.91	41.82	0.00E+00	2.63E-03	5.27E-03	0.0575	1.307E+12
Cl-36	2.6624E-06	20.91	41.82	0.00E+00	5.57E-05	1.11E-04	0.0850	8.134E+11
Cm-243	3.8244E-05	20.91	41.82	0.00E+00	8.00E-04	1.60E-03	0.1250	6.531E+11
Cm-244	4.1010E-03	20.91	41.82	0.00E+00	8.57E-02	1.71E-01	0.2250	6.913E+11
Co-60	1.2410E+00	20.91	41.82	0.00E+00	2.59E+01	5.18E+01	0.3750	3.449E+11
Cs-134	6.5454E-01	20.91	41.82	0.00E+00	1.37E+01	2.74E+01	0.5750	5.709E+12
Cs-135	1.9753E-05	20.91	41.82	0.00E+00	4.13E-04	8.26E-04	0.8500	1.047E+12
Cs-137	2.7375E+00	20.91	41.82	0.00E+00	5.72E+01	1.14E+02	1.2500	4.023E+12
Eu-154	1.2324E-01	20.91	41.82	0.00E+00	2.58E+00	5.15E+00	1.7500	5.380E+09
Eu-155	5.3037E-02	20.91	41.82	0.00E+00	1.11E+00	2.22E+00	2.2500	4.217E+09
Fe-55	7.9555E-01	20.91	41.82	0.00E+00	1.66E+01	3.33E+01	2.7500	3.823E+07
H-3	1.0531E-02	20.91	41.82	0.00E+00	2.20E-01	4.40E-01	3.5000	4.499E+06
I-129	7.1287E-07	20.91	41.82	0.00E+00	1.49E-05	2.98E-05	5.0000	1.078E+03
Kr-85	2.4955E-01	20.91	41.82	0.00E+00	5.22E+00	1.04E+01	7.0000	1.241E+02
Np-237	1.2121E-05	20.91	41.82	0.00E+00	2.53E-04	5.07E-04	11.0000	1.424E+01
Pa-231	1.1230E-09	20.91	41.82	0.00E+00	2.35E-08	4.70E-08		
Pb-210	6.1636E-14	20.91	41.82	0.00E+00	1.29E-12	2.58E-12		
Pm-147	1.1302E+00	20.91	41.82	0.00E+00	2.36E+01	4.73E+01		
Pu-238	5.4826E-02	20.91	41.82	0.00E+00	1.15E+00	2.29E+00		
Pu-239	1.4056E-03	20.91	41.82	0.00E+00	2.94E-02	5.88E-02		
Pu-240	1.1536E-03	20.91	41.82	0.00E+00	2.41E-02	4.82E-02		
Pu-241	4.2995E-01	20.91	41.82	0.00E+00	8.99E+00	1.80E+01		
Pu-242	4.9910E-06	20.91	41.82	0.00E+00	1.04E-04	2.09E-04		
Ra-226	2.4008E-13	20.91	41.82	0.00E+00	5.02E-12	1.00E-11		
Ra-228	1.8220E-11	20.91	41.82	0.00E+00	3.81E-10	7.62E-10		
Ru-106	1.0343E-01	20.91	41.82	0.00E+00	2.16E+00	4.33E+00		
Se-79	1.2832E-05	20.91	41.82	0.00E+00	2.68E-04	5.37E-04		
Sn-126	1.2090E-05	20.91	41.82	0.00E+00	2.53E-04	5.06E-04		
Sr-90	2.5646E+00	20.91	41.82	0.00E+00	5.36E+01	1.07E+02		
Tc-99	4.0319E-04	20.91	41.82	0.00E+00	8.43E-03	1.69E-02		
Th-229	7.7375E-11	20.91	41.82	0.00E+00	1.62E-09	3.24E-09		
Th-230	1.2211E-10	20.91	41.82	0.00E+00	2.55E-09	5.11E-09		
Th-232	2.3842E-11	20.91	41.82	0.00E+00	4.99E-10	9.97E-10		
Ti-208	1.4313E-07	20.91	41.82	0.00E+00	2.99E-06	5.99E-06		
U-232	4.1827E-07	20.91	41.82	0.00E+00	8.77E-06	1.75E-05		
U-233	6.8491E-08	20.91	41.82	0.00E+00	1.43E-06	2.86E-06		
U-234	2.0189E-06	20.91	41.82	0.00E+00	4.22E-05	8.44E-05		
U-235	-2.6572E-06	20.91	0.00	5.92E-04	5.37E-04	5.92E-04		
U-236	1.3575E-05	20.91	41.82	0.00E+00	2.84E-04	5.68E-04		
U-238	-2.2698E-08	20.91	0.00	3.97E-05	3.92E-05	3.97E-05		
Y-90	2.5646E+00	20.91	41.82	0.00E+00	5.36E+01	1.07E+02		
Other Radionuclides					7.45E+01	1.49E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:	5.73	20.91
Bounding:		41.82

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:	0.16	3.65
Bounding:	0.31	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: TRIGA 6.5/20 FOR PENN. STATE UNIV.
 Site ID #: 815
 Fuel Units & Dates: 7 - ELEMENT
 Heavy Metal Mass: BOL=1.573kg; EOL=1.316kg
 ROD Storage Size: NEEL

Fuel decay start date: 2005
 Estimates as of: 2000
 Template: TRIGA-SS (LW/U-235, SST, 10 to 20%, U)
 Template Burnup (MWd/g): 6.65
 Heavy Metal Mass (MTT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister Usage:
 18 "11"
 0.09

Radionuclide	CLWd From Template	Nominal Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources
Am-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07	Photon Energy Group Avg. MeV
Am-241	1.8391E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01	1.94E+13
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-06	1.70E-04	0.0250
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05	0.0075
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.56E-02	0.0075
C-36	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04	0.0050
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05	0.1250
Cm-244	1.6862E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04	0.2250
Cm-134	8.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01	0.5750
Cm-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03	0.8500
Cm-137	2.7564E-06	60.14	120.28	0.00E+00	1.68E-02	3.32E+02	1.2500
Eu-154	1.5369E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00	1.7500
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.78E+00	3.52E+00	2.2500
Fe-55	7.7159E-01	60.14	120.28	0.00E+00	4.84E+01	9.28E+01	2.7500
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.69E-01	1.34E+00	3.5000
K-40	7.3694E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05	5.0000
K-86	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01	7.0000
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04	11.0000
Np-231	3.8511E-09	60.14	120.28	0.00E+00	2.32E-07	4.63E-07	
Pm-147	7.3890E-16	60.14	120.28	0.00E+00	4.44E-13	8.89E-13	
Pm-210	2.1023E+00	60.14	120.28	0.00E+00	1.29E+02	2.53E+02	
Pu-238	1.0383E+03	60.14	120.28	0.00E+00	6.24E+02	1.25E+01	
Pu-239	5.5293E+03	60.14	120.28	0.00E+00	3.33E+01	6.65E-01	
Pu-240	2.1279E+03	60.14	120.28	0.00E+00	1.28E+01	2.56E-01	
Pu-241	1.0195E-01	60.14	120.28	0.00E+00	6.13E+00	1.23E+01	
Pu-242	2.3128E-07	60.14	120.28	0.00E+00	1.39E-05	2.78E-05	
Pu-246	5.2782E-14	60.14	120.28	0.00E+00	3.17E-12	6.35E-12	
Ra-226	8.1684E-02	60.14	120.28	0.00E+00	5.51E+00	1.10E+01	
Ra-228	1.8338E-10	60.14	120.28	0.00E+00	1.16E-08	2.33E-08	
Rn-108	1.3018E-06	60.14	120.28	0.00E+00	7.83E-04	1.57E-03	
Sr-126	1.2676E-05	60.14	120.28	0.00E+00	7.32E-04	1.46E-03	
Sr-90	2.6045E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02	
Tc-99	4.4241E-04	60.14	120.28	0.00E+00	2.66E-02	5.32E-02	
Th-229	1.3713E-10	60.14	120.28	0.00E+00	8.25E-09	1.65E-08	
Th-230	1.8090E-11	60.14	120.28	0.00E+00	1.09E-08	2.18E-09	
Th-232	2.5278E-10	60.14	120.28	0.00E+00	1.52E-08	3.04E-08	
Th-234	1.6947E-08	60.14	120.28	0.00E+00	1.02E-06	2.04E-06	
U-232	4.8737E-08	60.14	120.28	0.00E+00	2.93E-06	5.86E-06	
U-233	1.2203E-07	60.14	120.28	0.00E+00	7.34E-08	1.47E-06	
U-234	1.5825E-07	60.14	120.28	0.00E+00	9.59E-08	1.92E-05	
U-235	-2.6194E-06	60.14	0.00	5.90E-04	4.32E-04	5.90E-04	
U-236	1.2693E-05	60.14	120.28	0.00E+00	7.63E-04	1.53E-03	
U-238	-3.6331E-08	60.14	0.00	3.72E-04	3.70E-04	3.72E-04	
Y-90	2.6090E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	3.50E+08	7.00E+08

II. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LW AND U238C HYDROIDE	LW AND U238C HYDROIDE
Fuel Cladding: SST	SST
BOL H18 Constituents: U	U
BOL Enrichment %:	10 to 20.1

Basic for Parameter Differences:

Burnup Summary (MWd/g)

From SFD	Estimated	Basic for burnup used in estimate:
Nominal: 40.32	60.14	Nominal burnup calculated from the heavy metal mass destroyed.
Boundings: 120.28	120.28	Boundings burnup assumed to be twice nominal burnup.

Checks

Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup
2.26	1.28	1.63
Boundings	2.26	Estimated EOL H18 Given EOL H18 1.00

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR SLOVENIA
SNF ID #: 941
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.473kg: EOL=0.457kg
ROD Storage Site: INEEL

Fuel decay start date: 1959
Estimates as of: 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: 65 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2442E-08	16.14	32.28	0.00E+00	2.01E-07	4.02E-07	Avg. MeV	
Am-241	4.0120E-03	16.14	32.28	0.00E+00	8.47E-02	1.29E-01	0.0150	1.104E+12
Am-242m	1.0749E-06	16.14	32.28	0.00E+00	1.73E-05	3.47E-05	0.0250	2.291E+11
Am-243	1.4692E-07	16.14	32.28	0.00E+00	2.37E-06	4.74E-06	0.0375	1.969E+11
C-14	1.2777E-04	16.14	32.28	0.00E+00	2.06E-03	4.12E-03	0.0675	2.153E+11
Ci-36	2.8120E-06	16.14	32.28	0.00E+00	4.54E-05	9.08E-05	0.0850	1.290E+11
Cm-243	4.1759E-08	16.14	32.28	0.00E+00	6.74E-07	1.35E-06	0.1250	8.366E+10
Cm-244	1.7098E-07	16.14	32.28	0.00E+00	2.76E-06	5.52E-06	0.2250	1.111E+11
Co-60	4.8241E-04	16.14	32.28	0.00E+00	7.79E-03	1.56E-02	0.3750	4.847E+10
Cs-134	1.5970E-10	16.14	32.28	0.00E+00	2.58E-09	5.15E-09	0.5750	8.280E+11
Cs-136	3.2195E-05	16.14	32.28	0.00E+00	5.20E-04	1.04E-03	0.8500	7.964E+09
Cs-137	6.8977E-01	16.14	32.28	0.00E+00	1.11E+01	2.23E+01	1.2500	3.863E+09
Eu-154	1.2238E-04	16.14	32.28	0.00E+00	1.97E-03	3.95E-03	1.7500	2.049E+08
Eu-155	8.7158E-06	16.14	32.28	0.00E+00	1.08E-04	2.17E-04	2.2500	2.844E+04
Fe-55	8.8165E-08	16.14	32.28	0.00E+00	1.42E-06	2.85E-06	2.7500	1.174E+04
H-3	3.8376E-04	16.14	32.28	0.00E+00	6.19E-03	1.24E-02	3.5000	3.988E+01
I-129	7.3684E-07	16.14	32.28	0.00E+00	1.19E-05	2.38E-05	5.0000	1.679E+01
Kr-85	5.2316E-03	16.14	32.28	0.00E+00	8.44E-02	1.69E-01	7.0000	1.895E+00
Np-237	1.3232E-06	16.14	32.28	0.00E+00	2.14E-05	4.27E-05	11.0000	2.154E-01
Pa-231	1.8722E-08	16.14	32.28	0.00E+00	3.02E-07	6.04E-07		
Pb-210	1.2620E-12	16.14	32.28	0.00E+00	2.04E-11	4.07E-11		
Pm-147	2.7714E-07	16.14	32.28	0.00E+00	4.47E-06	8.95E-06		
Pu-238	6.4707E-04	16.14	32.28	0.00E+00	1.04E-02	2.09E-02		
Pu-239	5.5203E-03	16.14	32.28	0.00E+00	8.91E-02	1.78E-01		
Pu-240	2.1143E-03	16.14	32.28	0.00E+00	3.41E-02	6.82E-02		
Pu-241	5.6872E-03	16.14	32.28	0.00E+00	9.18E-02	1.84E-01		
Pu-242	2.3128E-07	16.14	32.28	0.00E+00	3.73E-06	7.46E-06		
Ra-226	2.6466E-12	16.14	32.28	0.00E+00	4.27E-11	8.54E-11		
Ra-228	2.5278E-10	16.14	32.28	0.00E+00	4.08E-09	8.16E-09		
Ru-106	1.1377E-19	16.14	32.28	0.00E+00	1.84E-18	3.67E-18		
Se-79	1.3009E-05	16.14	32.28	0.00E+00	2.10E-04	4.20E-04		
Sn-126	1.2162E-05	16.14	32.28	0.00E+00	1.96E-04	3.93E-04		
Sr-90	6.2511E-01	16.14	32.28	0.00E+00	1.01E+01	2.02E+01		
Tc-99	4.4241E-04	16.14	32.28	0.00E+00	7.14E-03	1.43E-02		
Th-229	9.4105E-10	16.14	32.28	0.00E+00	1.52E-08	3.04E-08		
Th-230	1.7098E-10	16.14	32.28	0.00E+00	2.78E-09	5.52E-09		
Th-232	2.5278E-10	16.14	32.28	0.00E+00	4.08E-09	8.16E-09		
Ti-208	1.0305E-08	16.14	32.28	0.00E+00	1.66E-07	3.33E-07		
U-232	2.7669E-08	16.14	32.28	0.00E+00	4.47E-07	8.93E-07		
U-233	1.2239E-07	16.14	32.28	0.00E+00	1.98E-06	3.95E-06	Thermal Power	
U-234	3.1278E-07	16.14	32.28	0.00E+00	5.05E-06	1.01E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6179E-06	16.14	0.00	2.03E-04	1.61E-04	2.03E-04	1.28E-01	2.56E-01
U-236	1.2696E-05	16.14	32.28	0.00E+00	2.05E-04	4.10E-04	Total	Total
U-238	-3.6331E-08	16.14	0.00	1.27E-04	1.27E-04	1.27E-04		
Y-90	6.2541E-01	16.14	32.28	0.00E+00	1.01E+01	2.02E+01		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.87312476	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	16.14	15.46	
Bounding:		32.28	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.00	0.96	
Bounding:	2.00		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR SO. KOREA
SNF ID #: 734
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.43kg; EOL=0.472kg
ROD Storage Site: NEEL

*Fuel decay start date: 1998
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
*Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) 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	4.1459E-09	11.70	23.39	0.00E+00	4.85E-08	9.70E-08	Avg. MeV	
Am-241	3.5850E-03	11.70	23.39	0.00E+00	4.19E-02	8.39E-02	0.0150	2.078E+12
Am-242m	1.2899E-06	11.70	23.39	0.00E+00	1.51E-05	3.02E-05	0.0250	4.316E+11
Am-243	1.4747E-07	11.70	23.39	0.00E+00	1.72E-06	3.45E-06	0.0375	3.745E+11
C-14	1.2839E-04	11.70	23.39	0.00E+00	1.50E-03	3.00E-03	0.0575	4.033E+11
Cf-252	2.8120E-06	11.70	23.39	0.00E+00	3.29E-05	6.58E-05	0.0850	2.431E+11
Cm-243	1.1038E-07	11.70	23.39	0.00E+00	1.29E-06	2.58E-06	0.1250	1.586E+11
Cm-244	7.8917E-07	11.70	23.39	0.00E+00	9.23E-06	1.85E-05	0.2250	2.091E+11
Co-60	9.2647E-02	11.70	23.39	0.00E+00	1.08E+00	2.17E+00	0.3750	9.130E+10
Cs-134	1.0940E-04	11.70	23.39	0.00E+00	1.28E-03	2.56E-03	0.5750	1.514E+12
Cs-135	3.2195E-05	11.70	23.39	0.00E+00	3.77E-04	7.53E-04	0.8500	1.625E+10
Cs-137	1.7368E+00	11.70	23.39	0.00E+00	2.03E+01	4.06E+01	1.2500	1.669E+11
Eu-154	3.0677E-03	11.70	23.39	0.00E+00	3.59E-02	7.18E-02	1.7500	4.230E+08
Eu-155	1.7925E-03	11.70	23.39	0.00E+00	2.10E-02	4.19E-02	2.2500	8.919E+06
Fe-55	3.7444E-03	11.70	23.39	0.00E+00	4.38E-02	8.76E-02	2.7500	1.508E+04
H-3	3.6180E-03	11.70	23.39	0.00E+00	4.23E-02	8.46E-02	3.5000	3.190E+01
I-129	7.3684E-07	11.70	23.39	0.00E+00	8.62E-06	1.72E-05	5.0000	1.243E+01
Kr-85	6.9368E-02	11.70	23.39	0.00E+00	8.11E-01	1.62E+00	7.0000	1.403E+09
Np-237	1.2662E-06	11.70	23.39	0.00E+00	1.48E-05	2.96E-05	11.0000	1.596E-01
Pa-231	9.1654E-09	11.70	23.39	0.00E+00	1.07E-07	2.14E-07		
Pb-210	1.3728E-13	11.70	23.39	0.00E+00	1.61E-12	3.21E-12		
Pm-147	1.0702E-02	11.70	23.39	0.00E+00	1.25E-01	2.50E-01		
Pu-238	8.8692E-04	11.70	23.39	0.00E+00	1.04E-02	2.07E-02		
Pu-239	5.5263E-03	11.70	23.39	0.00E+00	6.46E-02	1.29E-01		
Pu-240	2.1233E-03	11.70	23.39	0.00E+00	2.48E-02	4.97E-02		
Pu-241	3.8962E-02	11.70	23.39	0.00E+00	4.56E-01	9.11E-01		
Pu-242	2.3128E-07	11.70	23.39	0.00E+00	2.70E-06	5.41E-06		
Ra-226	4.6752E-13	11.70	23.39	0.00E+00	5.47E-12	1.09E-11		
Ra-228	2.4827E-10	11.70	23.39	0.00E+00	2.90E-09	5.81E-09		
Ru-106	9.8526E-08	11.70	23.39	0.00E+00	1.15E-06	2.30E-06		
Se-79	1.3015E-05	11.70	23.39	0.00E+00	1.52E-04	3.04E-04		
Sn-126	1.2165E-05	11.70	23.39	0.00E+00	1.42E-04	2.85E-04		
Sr-90	1.6195E+00	11.70	23.39	0.00E+00	1.89E+01	3.79E+01		
Tc-99	4.4241E-04	11.70	23.39	0.00E+00	5.17E-03	1.03E-02		
Th-229	4.2451E-10	11.70	23.39	0.00E+00	4.96E-09	9.93E-09		
Th-230	6.1398E-11	11.70	23.39	0.00E+00	7.18E-10	1.44E-09		
Th-232	2.5278E-10	11.70	23.39	0.00E+00	2.96E-09	5.91E-09		
Th-208	1.5098E-08	11.70	23.39	0.00E+00	1.77E-07	3.53E-07		
U-232	4.0662E-08	11.70	23.39	0.00E+00	4.76E-07	9.51E-07		
U-233	1.2217E-07	11.70	23.39	0.00E+00	1.43E-06	2.86E-06	Thermal Power	
U-234	2.2391E-07	11.70	23.39	0.00E+00	2.62E-06	5.24E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6194E-06	11.70	0.00	2.07E-04	1.77E-04	2.07E-04	2.48E-01	4.96E-01
U-236	1.2695E-05	11.70	23.39	0.00E+00	1.48E-04	2.97E-04		
U-238	-3.6331E-08	11.70	0.00	1.29E-04	1.29E-04	1.29E-04	Total	Total
Y-90	1.6195E+00	11.70	23.39	0.00E+00	1.89E+01	3.79E+01		
Other Radionuclides					2.01E+01	4.02E+01		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	11.70	7.45	
Bounding:		23.39	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.71	0.64	
Bounding:	1.43		0.59

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: TRIGA 8.5/20 FFCR U OF AZ
SNF ID #: 974
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.32kg; EOL=0.319kg
ROD Storage Site: INEEL

*Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
*Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.03

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.95	1.91	0.00E+00	8.13E-10	1.63E-09	0.0150
Am-241	1.8331E-03	0.95	1.91	0.00E+00	1.75E-03	3.50E-03	0.0250
Am-242m	1.4129E-06	0.95	1.91	0.00E+00	1.35E-06	2.70E-06	0.0375
Am-243	1.4774E-07	0.95	1.91	0.00E+00	1.41E-07	2.82E-07	0.0575
C-14	1.2871E-04	0.95	1.91	0.00E+00	1.23E-04	2.46E-04	0.0850
Cl-36	2.8120E-06	0.95	1.91	0.00E+00	2.68E-06	5.37E-06	0.1250
Cm-243	1.7940E-07	0.95	1.91	0.00E+00	1.71E-07	3.43E-07	0.2250
Cm-244	1.6962E-06	0.95	1.91	0.00E+00	1.62E-06	3.24E-06	0.3750
Co-60	1.2839E+00	0.95	1.91	0.00E+00	1.23E+00	2.45E+00	0.5750
Cs-134	9.0541E-02	0.95	1.91	0.00E+00	8.64E-02	1.73E-01	0.8500
Cs-135	3.2195E-06	0.95	1.91	0.00E+00	3.07E-06	6.15E-06	1.2500
Cs-137	2.7564E+00	0.95	1.91	0.00E+00	2.63E+00	5.26E+00	1.7500
Eu-154	1.5368E-02	0.95	1.91	0.00E+00	1.47E-02	2.93E-02	1.223E+08
Eu-155	2.9293E-02	0.95	1.91	0.00E+00	2.80E-02	5.59E-02	2.2500
Fe-55	7.7158E-01	0.95	1.91	0.00E+00	7.37E-01	1.47E+00	2.7500
H-3	1.1111E-02	0.95	1.91	0.00E+00	1.06E-02	2.12E-02	3.5000
I-129	7.3684E-07	0.95	1.91	0.00E+00	7.03E-07	1.41E-06	8.0000
Kr-85	2.5263E-01	0.95	1.91	0.00E+00	2.41E-01	4.82E-01	7.0000
Np-237	1.2427E-06	0.95	1.91	0.00E+00	1.19E-06	2.37E-06	11.0000
Pa-231	3.8511E-09	0.95	1.91	0.00E+00	3.68E-09	7.35E-09	
Pb-210	7.3880E-15	0.95	1.91	0.00E+00	7.05E-15	1.41E-14	
Pm-147	2.1023E+00	0.95	1.91	0.00E+00	2.01E+00	4.01E+00	
Pu-238	1.0383E-03	0.95	1.91	0.00E+00	9.91E-04	1.98E-03	
Pu-239	5.5293E-03	0.95	1.91	0.00E+00	5.28E-03	1.06E-02	
Pu-240	2.1278E-03	0.95	1.91	0.00E+00	2.03E-03	4.06E-03	
Pu-241	1.0195E-01	0.95	1.91	0.00E+00	9.73E-02	1.95E-01	
Pu-242	2.3128E-07	0.95	1.91	0.00E+00	2.21E-07	4.42E-07	
Ra-226	5.2782E-14	0.95	1.91	0.00E+00	5.04E-14	1.01E-13	
Ra-228	1.9338E-10	0.95	1.91	0.00E+00	1.85E-10	3.69E-10	
Ru-106	9.1684E-02	0.95	1.91	0.00E+00	8.75E-02	1.75E-01	
Se-79	1.3018E-05	0.95	1.91	0.00E+00	1.24E-05	2.49E-05	
Sn-126	1.2167E-05	0.95	1.91	0.00E+00	1.16E-05	2.32E-05	
Sr-90	2.6045E+00	0.95	1.91	0.00E+00	2.49E+00	4.97E+00	
Tc-99	4.4241E-04	0.95	1.91	0.00E+00	4.22E-04	8.45E-04	
Th-229	1.3713E-10	0.95	1.91	0.00E+00	1.31E-10	2.62E-10	
Th-230	1.8090E-11	0.95	1.91	0.00E+00	1.73E-11	3.45E-11	
Th-232	2.5278E-10	0.95	1.91	0.00E+00	2.41E-10	4.83E-10	
Ti-208	1.6947E-08	0.95	1.91	0.00E+00	1.62E-08	3.24E-08	
U-232	4.8737E-08	0.95	1.91	0.00E+00	4.65E-08	9.30E-08	
U-233	1.2203E-07	0.95	1.91	0.00E+00	1.16E-07	2.33E-07	
U-234	1.5825E-07	0.95	1.91	0.00E+00	1.52E-07	3.04E-07	
U-235	-2.6194E-06	0.95	0.00	1.37E-04	1.35E-04	1.37E-04	
U-236	1.2693E-05	0.95	1.91	0.00E+00	1.21E-05	2.42E-05	
U-238	-3.6331E-08	0.95	0.00	8.62E-05	8.61E-05	8.62E-05	
Y-90	2.6060E+00	0.95	1.91	0.00E+00	2.49E+00	4.98E+00	
Other Radionuclides					3.44E+00	6.88E+00	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.875	10 to 20.1	

Burnup Summary (MWd) ²	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	0.78	0.95	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1.91	Bounding burnup assumed to be twice nominal burnup.

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.09	1.22	1.00
Bounding:	0.17		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR U OF IL

SNF ID #: 448

Fuel Units & Descr: 4 - ELEMENT

Heavy Metal Mass: BOL=0.8kg; EOL=0.751kg

ROD Storage Shc: INEEL

¹Fuel decay start date: 2035

Estimates as of: 2030

Template: TRIGA-SS (LWAJ-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"x19"

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) 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	8.5173E-10	46.58	93.17	0.00E+00	3.97E-08	7.94E-08	Avg. MeV	
Am-241	1.8331E-03	46.58	93.17	0.00E+00	8.54E-02	1.71E-01	0.0150	1.506E+13
Am-242m	1.4129E-06	46.58	93.17	0.00E+00	6.58E-05	1.32E-04	0.0250	3.313E+12
Am-243	1.4774E-07	46.58	93.17	0.00E+00	6.88E-06	1.38E-05	0.0375	2.822E+12
C-14	1.2871E-04	46.58	93.17	0.00E+00	6.00E-03	1.20E-02	0.0575	2.896E+12
Cl-36	2.8120E-06	46.58	93.17	0.00E+00	1.31E-04	2.62E-04	0.0850	1.794E+12
Cm-243	1.7940E-07	46.58	93.17	0.00E+00	8.36E-06	1.67E-05	0.1250	1.303E+12
Cm-244	1.6962E-06	46.58	93.17	0.00E+00	7.90E-05	1.58E-04	0.2250	1.522E+12
Co-60	1.2839E+00	46.58	93.17	0.00E+00	5.98E+01	1.20E+02	0.3750	7.724E+11
Cs-134	9.0541E-02	46.58	93.17	0.00E+00	4.22E+00	8.44E+00	0.5750	1.027E+13
Cs-135	3.2195E-05	46.58	93.17	0.00E+00	1.50E-03	3.00E-03	0.8500	4.407E+11
Cs-137	2.7564E+00	46.58	93.17	0.00E+00	1.28E+02	2.57E+02	1.2500	8.950E+12
Eu-154	1.5368E-02	46.58	93.17	0.00E+00	7.16E-01	1.43E+00	1.7500	5.966E+09
Eu-155	2.9293E-02	46.58	93.17	0.00E+00	1.36E+00	2.73E+00	2.2500	9.617E+09
Fe-55	7.7158E-01	46.58	93.17	0.00E+00	3.59E+01	7.19E+01	2.7500	7.631E+07
H-3	1.1111E-02	46.58	93.17	0.00E+00	5.18E-01	1.04E+00	3.5000	8.881E+06
I-129	7.3684E-07	46.58	93.17	0.00E+00	3.43E-05	6.87E-05	5.0000	4.932E+01
Kr-85	2.5263E-01	46.58	93.17	0.00E+00	1.18E+01	2.35E+01	7.0000	5.583E+00
Np-237	1.2427E-06	46.58	93.17	0.00E+00	5.79E-05	1.16E-04	11.0000	6.360E-01
Pa-231	3.8511E-09	46.58	93.17	0.00E+00	1.79E-07	3.59E-07		
Pb-210	7.3880E-15	46.58	93.17	0.00E+00	3.44E-13	6.88E-13		
Pm-147	2.1023E+00	46.58	93.17	0.00E+00	9.70E+01	1.96E+02		
Pu-238	1.0383E-03	46.58	93.17	0.00E+00	4.84E-02	9.67E-02		
Pu-239	5.5293E-03	46.58	93.17	0.00E+00	2.58E-01	5.15E-01		
Pu-240	2.1278E-03	46.58	93.17	0.00E+00	9.91E-02	1.98E-01		
Pu-241	1.0195E-01	46.58	93.17	0.00E+00	4.75E+00	9.50E+00		
Pu-242	2.3128E-07	46.58	93.17	0.00E+00	1.08E-05	2.15E-05		
Ra-226	5.2782E-14	46.58	93.17	0.00E+00	2.46E-12	4.92E-12		
Ra-228	1.9338E-10	46.58	93.17	0.00E+00	9.01E-09	1.80E-08		
Ru-106	9.1684E-02	46.58	93.17	0.00E+00	4.27E+00	8.54E+00		
Sa-79	1.3018E-05	46.58	93.17	0.00E+00	6.06E-04	1.21E-03		
Sn-126	1.2167E-05	46.58	93.17	0.00E+00	5.67E-04	1.13E-03		
Sr-90	2.6045E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02		
Tc-99	4.4241E-04	46.58	93.17	0.00E+00	2.06E-02	4.12E-02		
Th-229	1.3713E-10	46.58	93.17	0.00E+00	6.39E-09	1.28E-08		
Th-230	1.8090E-11	46.58	93.17	0.00E+00	8.43E-10	1.69E-09		
Th-232	2.5278E-10	46.58	93.17	0.00E+00	1.18E-08	2.36E-08		
Ti-208	1.6947E-08	46.58	93.17	0.00E+00	7.89E-07	1.58E-06		
U-232	4.8737E-08	46.58	93.17	0.00E+00	2.27E-06	4.54E-06		
U-233	1.2203E-07	46.58	93.17	0.00E+00	5.68E-06	1.14E-05		
U-234	1.5925E-07	46.58	93.17	0.00E+00	7.42E-06	1.48E-05		
U-235	-2.6194E-06	46.58	0.00	3.46E-04	2.24E-04	3.46E-04		
U-236	1.2693E-05	46.58	93.17	0.00E+00	5.91E-04	1.18E-03		
U-238	-3.6331E-06	46.58	0.00	2.15E-04	2.13E-04	2.15E-04		
Y-90	2.6060E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02		
Other Radionuclides					1.68E+02	3.36E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.71E+08	5.42E+08
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 %:	20.00000115	10 to 20.1	

Burnup Summary (MWd) ⁴			Basis for burnup used in estimate:
Nominal:	From SFD 19.49	Estimated 46.58	
Bounding:		93.17	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR U OF TX AUSTIN
SNF ID #: 825
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg; EOL=0.48kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	z _m	z _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	9.16	18.33	0.00E+00	7.81E-09	1.56E-08	Avg. MeV	
Am-241	1.8331E-03	9.16	18.33	0.00E+00	1.68E-02	3.36E-02	0.0150	2.962E+12
Am-242m	1.4129E-06	9.16	18.33	0.00E+00	1.29E-05	2.59E-05	0.0250	6.518E+11
Am-243	1.4774E-07	9.16	18.33	0.00E+00	1.35E-06	2.71E-06	0.0375	5.551E+11
C-14	1.2871E-04	9.16	18.33	0.00E+00	1.18E-03	2.36E-03	0.0575	5.698E+11
Cl-36	2.8120E-06	9.16	18.33	0.00E+00	2.68E-05	5.36E-05	0.0850	3.530E+11
Cm-243	1.7940E-07	9.16	18.33	0.00E+00	1.64E-06	3.29E-06	0.1250	2.563E+11
Cm-244	1.6962E-06	9.16	18.33	0.00E+00	1.55E-05	3.11E-05	0.2250	2.994E+11
Co-60	1.2839E+00	9.16	18.33	0.00E+00	1.18E+01	2.35E+01	0.3750	1.520E+11
Cs-134	9.0541E-02	9.16	18.33	0.00E+00	8.30E-01	1.66E+00	0.5750	2.020E+12
Cs-135	3.2195E-05	9.16	18.33	0.00E+00	2.95E-04	5.90E-04	0.8500	8.670E+10
Cs-137	2.7564E+00	9.16	18.33	0.00E+00	2.53E+01	5.05E+01	1.2500	1.761E+12
Eu-154	1.5368E-02	9.16	18.33	0.00E+00	1.41E-01	2.82E-01	1.7500	1.174E+09
Eu-155	2.9293E-02	9.16	18.33	0.00E+00	2.68E-01	5.37E-01	2.2500	1.892E+09
Fe-55	7.7158E-01	9.16	18.33	0.00E+00	7.07E+00	1.41E+01	2.7500	1.501E+07
H-3	1.1111E-02	9.16	18.33	0.00E+00	1.02E-01	2.04E-01	3.5000	1.747E+06
I-129	7.3684E-07	9.16	18.33	0.00E+00	6.75E-06	1.35E-05	5.0000	9.905E+00
Kr-85	2.5263E-01	9.16	18.33	0.00E+00	2.32E+00	4.63E+00	7.0000	1.122E+00
Np-237	1.2427E-06	9.16	18.33	0.00E+00	1.14E-05	2.28E-05	11.0000	1.278E-01
Pa-231	3.8511E-09	9.16	18.33	0.00E+00	3.53E-08	7.06E-08		
Pb-210	7.3880E-15	9.16	18.33	0.00E+00	6.77E-14	1.35E-13		
Pm-147	2.1023E+00	9.16	18.33	0.00E+00	1.93E+01	3.85E+01		
Pu-238	1.0383E-03	9.16	18.33	0.00E+00	9.52E-03	1.90E-02		
Pu-239	5.5293E-03	9.16	18.33	0.00E+00	5.07E-02	1.01E-01		
Pu-240	2.1278E-03	9.16	18.33	0.00E+00	1.95E-02	3.90E-02		
Pu-241	1.0195E-01	9.16	18.33	0.00E+00	9.34E-01	1.87E+00		
Pu-242	2.3128E-07	9.16	18.33	0.00E+00	2.12E-06	4.24E-06		
Ra-226	5.2782E-14	9.16	18.33	0.00E+00	4.84E-13	9.67E-13		
Ra-228	1.9338E-10	9.16	18.33	0.00E+00	1.77E-09	3.54E-09		
Ru-106	9.1684E-02	9.16	18.33	0.00E+00	8.40E-01	1.68E+00		
Se-79	1.3018E-05	9.16	18.33	0.00E+00	1.19E-04	2.39E-04		
Sn-126	1.2167E-05	9.16	18.33	0.00E+00	1.12E-04	2.23E-04		
Sr-90	2.6045E+00	9.16	18.33	0.00E+00	2.39E+01	4.77E+01		
Tc-99	4.4241E-04	9.16	18.33	0.00E+00	4.05E-03	8.11E-03		
Th-229	1.3713E-10	9.16	18.33	0.00E+00	1.26E-09	2.51E-09		
Th-230	1.8090E-11	9.16	18.33	0.00E+00	1.66E-10	3.32E-10		
Th-232	2.5278E-10	9.16	18.33	0.00E+00	2.32E-09	4.63E-09		
Ti-208	1.6947E-08	9.16	18.33	0.00E+00	1.55E-07	3.11E-07		
U-232	4.8737E-08	9.16	18.33	0.00E+00	4.47E-07	8.93E-07		
U-233	1.2203E-07	9.16	18.33	0.00E+00	1.12E-06	2.24E-06		
U-234	1.5925E-07	9.16	18.33	0.00E+00	1.46E-06	2.92E-06		
U-235	-2.6194E-06	9.16	0.00	2.05E-04	1.81E-04	2.05E-04		
U-236	1.2693E-05	9.16	18.33	0.00E+00	1.16E-04	2.33E-04		
U-238	-3.6331E-08	9.16	0.00	1.29E-04	1.29E-04	1.29E-04		
Y-90	2.6060E+00	9.16	18.33	0.00E+00	2.39E+01	4.78E+01		
Other Radionuclides					3.30E+01	6.61E+01		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		9.16	
Bounding:		18.33	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR ZAIRE

SNF ID #: 735

Fuel Units & Descr: 4 - ELEMENT

Heavy Metal Mass: BOL=0.638kg; EOL=0.638kg

ROD Storage Site: INEEL

Fuel decay start date: 2010

Estimates as of: 2030

Template: TRIGA-SS (LWAU-Zn, 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"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	6.22	12.44	0.00E+00	1.64E-08	3.29E-08	Avg. MeV	
Am-241	3.1429E-03	6.22	12.44	0.00E+00	1.95E-02	3.91E-02	0.0150	1.248E+12
Am-242m	1.3195E-06	6.22	12.44	0.00E+00	8.20E-06	1.64E-05	0.0250	2.594E+11
Am-243	1.4753E-07	6.22	12.44	0.00E+00	9.17E-07	1.83E-06	0.0375	2.247E+11
C-14	1.2847E-04	6.22	12.44	0.00E+00	7.99E-04	1.60E-03	0.0575	2.418E+11
Cl-36	2.8120E-06	6.22	12.44	0.00E+00	1.75E-05	3.50E-05	0.0850	1.460E+11
Cm-243	1.2465E-07	6.22	12.44	0.00E+00	7.75E-07	1.55E-06	0.1250	9.540E+10
Cm-244	9.5564E-07	6.22	12.44	0.00E+00	5.94E-06	1.19E-05	0.2250	1.253E+11
Co-60	1.7880E-01	6.22	12.44	0.00E+00	1.11E+00	2.22E+00	0.3750	5.493E+10
Cs-134	5.8692E-04	6.22	12.44	0.00E+00	3.65E-03	7.30E-03	0.5750	9.034E+11
Cs-135	3.2195E-05	6.22	12.44	0.00E+00	2.00E-04	4.00E-04	0.8500	1.018E+10
Cs-137	1.9489E+00	6.22	12.44	0.00E+00	1.21E+01	2.42E+01	1.2500	1.687E+11
Eu-154	4.5895E-03	6.22	12.44	0.00E+00	2.85E-02	5.71E-02	1.7500	2.616E+08
Eu-155	3.6045E-03	6.22	12.44	0.00E+00	2.24E-02	4.48E-02	2.2500	9.011E+05
Fe-55	1.4185E-02	6.22	12.44	0.00E+00	8.82E-02	1.76E-01	2.7500	9.929E+03
H-3	4.7895E-03	6.22	12.44	0.00E+00	2.98E-02	5.96E-02	3.5000	6.582E+01
I-129	7.3684E-07	6.22	12.44	0.00E+00	4.58E-06	9.16E-06	5.0000	6.857E+00
Kr-85	9.5820E-02	6.22	12.44	0.00E+00	5.96E-01	1.19E+00	7.0000	7.753E-01
Np-237	1.2552E-06	6.22	12.44	0.00E+00	7.80E-06	1.56E-05	11.0000	8.825E-02
Pa-231	7.0406E-09	6.22	12.44	0.00E+00	4.38E-08	8.76E-08		
Pb-210	5.8000E-14	6.22	12.44	0.00E+00	3.61E-13	7.21E-13		
Pm-147	4.0075E-02	6.22	12.44	0.00E+00	2.49E-01	4.98E-01		
Pu-238	9.2256E-04	6.22	12.44	0.00E+00	5.74E-03	1.15E-02		
Pu-239	5.5278E-03	6.22	12.44	0.00E+00	3.44E-02	6.87E-02		
Pu-240	2.1248E-03	6.22	12.44	0.00E+00	1.32E-02	2.64E-02		
Pu-241	4.9549E-02	6.22	12.44	0.00E+00	3.08E-01	6.16E-01		
Pu-242	2.3128E-07	6.22	12.44	0.00E+00	1.44E-06	2.88E-06		
Ra-226	2.4526E-13	6.22	12.44	0.00E+00	1.53E-12	3.05E-12		
Ra-228	2.4015E-10	6.22	12.44	0.00E+00	1.49E-09	2.99E-09		
Ru-106	3.0602E-06	6.22	12.44	0.00E+00	1.90E-05	3.81E-05		
Se-79	1.3015E-05	6.22	12.44	0.00E+00	8.09E-05	1.62E-04		
Sn-126	1.2165E-05	6.22	12.44	0.00E+00	7.56E-05	1.51E-04		
Sr-90	1.8226E+00	6.22	12.44	0.00E+00	1.13E+01	2.27E+01		
Tc-99	4.4241E-04	6.22	12.44	0.00E+00	2.75E-03	5.50E-03		
Th-229	3.0962E-10	6.22	12.44	0.00E+00	1.93E-09	3.85E-09		
Th-230	4.2346E-11	6.22	12.44	0.00E+00	2.63E-10	5.27E-10		
Th-232	2.5278E-10	6.22	12.44	0.00E+00	1.57E-09	3.14E-09		
Th-208	1.5820E-08	6.22	12.44	0.00E+00	9.84E-08	1.97E-07		
U-232	4.2647E-08	6.22	12.44	0.00E+00	2.65E-07	5.30E-07		
U-233	1.2211E-07	6.22	12.44	0.00E+00	7.59E-07	1.52E-06		
U-234	1.9955E-07	6.22	12.44	0.00E+00	1.24E-06	2.48E-06		
U-235	-2.6194E-06	6.22	0.00	2.76E-04	2.59E-04	2.76E-04		
U-238	1.2693E-05	6.22	12.44	0.00E+00	7.89E-05	1.58E-04		
U-238	-3.6331E-08	6.22	0.00	1.72E-04	1.71E-04	1.72E-04		
Y-90	1.8241E+00	6.22	12.44	0.00E+00	1.13E+01	2.27E+01		
Other Radionuclides					1.20E+01	2.39E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	6.22	
Bounding:		12.44

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	0.00
Bounding:	0.57	

Estimated EOL HM/Given EOL HM
0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ACPR)
SNF ID #: 895
Fuel Units & Descr: 182 - ELEMENT
Heavy Metal Mass: BOL=48.357kg; EOL=48.357kg
ROO 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): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.64

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	5.162E+08
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	7.043E+05
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	4.276E+05
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	6.017E+07
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	1.188E+08
Cm-244	1.8962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	4.204E+08
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.049E+06
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	5.161E+04
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	8.046E+03
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	4.756E+02
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	2.327E+02
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	1.348E+02
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	7.832E+01
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	7.002E+01
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	6.0000	3.008E+01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	3.463E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	3.981E-01
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	1.8947E-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	1.5825E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	2.08E-02	2.08E-02	2.08E-02		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	1.30E-02	1.30E-02	1.30E-02		
Y-80	2.8060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
Nominal:	From SFD: 0.00 Estimated:	
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
Nominal:	Burnup Multiplier: 0.00 Estimated Burnup/ Given Burnup:	
Bounding:	0.00	1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ARRR

SNF ID #: 238

Fuel Units & Descr: 71 - ELEMENT

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

ROD Storage Site: INEL

Fuel decay start date: 2035

Estimates as of: 2030

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

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.64

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	3,869.71	7,739.43	0.00E+00	3.12E-06	6.24E-06	Avg. MeV	
Am-241	2.2586E-03	3,869.71	7,739.43	0.00E+00	8.74E+00	1.75E+01	0.0150	1.310E+15
Am-242m	1.9925E-06	3,869.71	7,739.43	0.00E+00	7.71E-03	1.54E-02	0.0250	2.843E+14
Am-243	2.3323E-07	3,869.71	7,739.43	0.00E+00	9.03E-04	1.81E-03	0.0375	3.541E+14
C-14	4.3308E-05	3,869.71	7,739.43	0.00E+00	1.68E-01	3.35E-01	0.0575	2.715E+14
Cl-36	4.3023E-08	3,869.71	7,739.43	0.00E+00	1.66E-04	3.33E-04	0.0850	1.900E+14
Cm-243	2.7429E-07	3,869.71	7,739.43	0.00E+00	1.06E-03	2.12E-03	0.1250	2.842E+14
Cm-244	3.1504E-06	3,869.71	7,739.43	0.00E+00	1.22E-02	2.44E-02	0.2250	1.586E+14
Co-60	3.1008E-02	3,869.71	7,739.43	0.00E+00	1.20E+02	2.40E+02	0.3750	7.061E+13
Cs-134	1.0367E-01	3,869.71	7,739.43	0.00E+00	4.01E+02	8.02E+02	0.5750	8.952E+14
Cs-135	3.1549E-05	3,869.71	7,739.43	0.00E+00	1.22E-01	2.44E-01	0.8500	2.204E+14
Cs-137	2.7564E+00	3,869.71	7,739.43	0.00E+00	1.07E+04	2.13E+04	1.2500	2.284E+14
Eu-154	1.3490E+00	3,869.71	7,739.43	0.00E+00	5.22E+03	1.04E+04	1.7500	6.537E+12
Eu-155	4.3880E-01	3,869.71	7,739.43	0.00E+00	1.70E+03	3.40E+03	2.2500	7.946E+11
Fe-55	8.6782E-03	3,869.71	7,739.43	0.00E+00	3.36E+01	6.72E+01	2.7500	6.454E+09
H-3	1.0805E-02	3,869.71	7,739.43	0.00E+00	4.18E+01	8.36E+01	3.5000	7.543E+08
I-129	7.3805E-07	3,869.71	7,739.43	0.00E+00	2.86E-03	5.71E-03	5.0000	4.423E+03
Kr-85	2.5218E-01	3,869.71	7,739.43	0.00E+00	9.76E+02	1.95E+03	7.0000	5.006E+02
Np-237	1.4463E-06	3,869.71	7,739.43	0.00E+00	5.60E-03	1.12E-02	11.0000	5.701E+01
Pa-231	3.5970E-09	3,869.71	7,739.43	0.00E+00	1.39E-06	2.78E-06		
Pb-210	8.2511E-15	3,869.71	7,739.43	0.00E+00	3.19E-11	6.39E-11		
Pm-147	2.0767E+00	3,869.71	7,739.43	0.00E+00	8.04E+03	1.61E+04		
Pu-238	1.3514E-03	3,869.71	7,739.43	0.00E+00	5.23E+00	1.05E+01		
Pu-239	5.6947E-03	3,869.71	7,739.43	0.00E+00	2.20E+01	4.41E+01		
Pu-240	2.2647E-03	3,869.71	7,739.43	0.00E+00	8.76E+00	1.75E+01		
Pu-241	1.2574E-01	3,869.71	7,739.43	0.00E+00	4.87E+02	9.73E+02		
Pu-242	3.0602E-07	3,869.71	7,739.43	0.00E+00	1.18E-03	2.37E-03		
Ra-226	5.7353E-14	3,869.71	7,739.43	0.00E+00	2.22E-10	4.44E-10		
Ra-228	1.8150E-10	3,869.71	7,739.43	0.00E+00	7.02E-07	1.40E-06		
Ru-106	9.3744E-02	3,869.71	7,739.43	0.00E+00	3.63E+02	7.26E+02		
Se-79	1.2938E-05	3,869.71	7,739.43	0.00E+00	5.01E-02	1.00E-01		
Sn-126	1.2239E-05	3,869.71	7,739.43	0.00E+00	4.74E-02	9.47E-02		
Sr-90	2.6000E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04		
Tc-99	4.4120E-04	3,869.71	7,739.43	0.00E+00	1.71E+00	3.41E+00		
Th-229	1.4749E-10	3,869.71	7,739.43	0.00E+00	5.71E-07	1.14E-06		
Th-230	1.9549E-11	3,869.71	7,739.43	0.00E+00	7.56E-08	1.51E-07		
Th-232	2.3744E-10	3,869.71	7,739.43	0.00E+00	9.19E-07	1.84E-06		
Ti-208	1.9459E-08	3,869.71	7,739.43	0.00E+00	7.53E-05	1.51E-04		
U-232	5.6015E-06	3,869.71	7,739.43	0.00E+00	2.17E-04	4.34E-04		
U-233	1.3132E-07	3,869.71	7,739.43	0.00E+00	5.08E-04	1.02E-03		
U-234	1.7323E-07	3,869.71	7,739.43	0.00E+00	6.70E-04	1.34E-03		
U-235	-2.6159E-06	3,869.71	0.00	5.67E-03	0.00E+00	5.67E-03		
U-236	1.2717E-05	3,869.71	7,739.43	0.00E+00	4.92E-02	9.84E-02		
U-238	-3.8857E-06	3,869.71	0.00	3.61E-03	3.46E-03	3.61E-03		
Y-90	2.8015E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04		
Other Radionuclides					1.47E+04	2.94E+04		
							Thermal Power	
							Nominal Heat	Bounding
							Output	Heat Output
							(Watts)	(Watts)
							1.94E+02	3.89E+02
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basic for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	494.30	3,869.71
Bounding:		7,739.43

Basic for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM
1.23

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.59

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.4556E-09	63.00	126.00	0.00E+00	1.55E-07	3.09E-07	Avg. MeV	
Am-241	3.8752E-03	63.00	126.00	0.00E+00	2.44E-01	4.88E-01	0.0150	1.293E+13
Am-242m	1.8617E-06	63.00	126.00	0.00E+00	1.17E-04	2.35E-04	0.0250	2.670E+12
Am-243	2.3293E-07	63.00	126.00	0.00E+00	1.47E-05	2.93E-05	0.0375	2.795E+12
C-14	4.3233E-05	63.00	126.00	0.00E+00	2.72E-03	5.45E-03	0.0575	2.583E+12
Cl-36	4.3023E-08	63.00	126.00	0.00E+00	2.71E-06	5.42E-06	0.0850	1.573E+12
Cm-243	1.9053E-07	63.00	126.00	0.00E+00	1.20E-05	2.40E-05	0.1250	1.765E+12
Cm-244	1.7744E-06	63.00	126.00	0.00E+00	1.12E-04	2.24E-04	0.2250	1.425E+12
Co-60	4.3188E-03	63.00	126.00	0.00E+00	2.72E-01	5.44E-01	0.3750	5.856E+11
Cs-134	6.7188E-04	63.00	126.00	0.00E+00	4.23E-02	8.47E-02	0.5750	9.330E+12
Cs-135	3.1549E-05	63.00	126.00	0.00E+00	1.99E-03	3.98E-03	0.8500	9.926E+11
Cs-137	1.9489E+00	63.00	126.00	0.00E+00	1.23E+02	2.46E+02	1.2500	1.069E+12
Eu-154	4.0301E-01	63.00	126.00	0.00E+00	2.54E+01	5.08E+01	1.7500	3.203E+10
Eu-155	5.4000E-02	63.00	126.00	0.00E+00	3.40E+00	6.80E+00	2.2500	5.078E+05
Fe-55	1.5955E-04	63.00	126.00	0.00E+00	1.01E-02	2.01E-02	2.7500	8.452E+04
H-3	4.8571E-03	63.00	126.00	0.00E+00	2.93E-01	5.87E-01	3.5000	5.953E+02
I-129	7.3805E-07	63.00	126.00	0.00E+00	4.85E-05	9.90E-05	5.0000	7.820E+01
Kr-85	9.5684E-02	63.00	126.00	0.00E+00	6.03E+00	1.21E+01	7.0000	8.843E+00
Np-237	1.4618E-06	63.00	126.00	0.00E+00	9.21E-05	1.84E-04	11.0000	1.007E+00
Pa-231	6.4782E-09	63.00	126.00	0.00E+00	4.08E-07	8.16E-07		
Pb-210	6.3158E-14	63.00	126.00	0.00E+00	3.98E-12	7.96E-12		
Pm-147	3.9564E-02	63.00	126.00	0.00E+00	2.49E+00	4.98E+00		
Pu-238	1.2008E-03	63.00	126.00	0.00E+00	7.56E-02	1.51E-01		
Pu-239	5.6917E-03	63.00	126.00	0.00E+00	3.59E-01	7.17E-01		
Pu-240	2.2617E-03	63.00	126.00	0.00E+00	1.42E-01	2.85E-01		
Pu-241	6.1113E-02	63.00	126.00	0.00E+00	3.85E+00	7.70E+00		
Pu-242	3.0602E-07	63.00	126.00	0.00E+00	1.93E-05	3.86E-05		
Ra-226	2.6707E-13	63.00	126.00	0.00E+00	1.68E-11	3.36E-11		
Ra-228	2.2556E-10	63.00	126.00	0.00E+00	1.42E-08	2.84E-08		
Ru-106	3.1293E-06	63.00	126.00	0.00E+00	1.97E-04	3.94E-04		
Se-79	1.2935E-05	63.00	126.00	0.00E+00	8.15E-04	1.63E-03		
Sn-126	1.2238E-05	63.00	126.00	0.00E+00	7.71E-04	1.54E-03		
Sr-90	1.8195E+00	63.00	126.00	0.00E+00	1.15E+02	2.29E+02		
Tc-99	4.4120E-04	63.00	126.00	0.00E+00	2.78E-02	5.56E-02		
Th-229	3.3308E-10	63.00	126.00	0.00E+00	2.10E-08	4.20E-08		
Th-230	4.8526E-11	63.00	126.00	0.00E+00	2.93E-09	5.86E-09		
Th-232	2.3744E-10	63.00	126.00	0.00E+00	1.50E-08	2.99E-08		
Ti-208	1.8195E-08	63.00	126.00	0.00E+00	1.15E-06	2.29E-06		
U-232	4.9098E-08	63.00	126.00	0.00E+00	3.09E-06	6.19E-06		
U-233	1.3140E-07	63.00	126.00	0.00E+00	8.28E-06	1.66E-05		
U-234	2.2571E-07	63.00	126.00	0.00E+00	1.42E-05	2.84E-05		
U-235	-2.6159E-06	63.00	0.00	5.13E-03	4.97E-03	5.13E-03		
U-236	1.2719E-05	63.00	126.00	0.00E+00	8.01E-04	1.60E-03		
U-238	-3.8857E-08	63.00	0.00	3.19E-03	3.19E-03	3.19E-03		
Y-90	1.8211E+00	63.00	126.00	0.00E+00	1.15E+02	2.29E+02		
Other Radionuclides					1.32E+02	2.64E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	57.89	63.00
Bounding:		126.00

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) BRAZIL
SNF ID #: 471
Fuel Units & Descr: 59 - ELEMENT
Heavy Metal Mass: BOL=11.086kg; EOL=10.585kg
ROD Storage Site: INEEL

*Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
*Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.53

II. Estimates	m	x ₀	x ₁	b	y ₁	y ₂	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	2.4556E-09	478.69	957.38	0.00E+00	1.18E-08	2.35E-08	Avg. MeV	
Am-241	3.8752E-03	478.69	957.38	0.00E+00	1.86E+00	3.71E+00	0.0150	9.825E+13
Am-242m	1.8617E-06	478.69	957.38	0.00E+00	8.91E-04	1.78E-03	0.0250	2.029E+13
Am-243	2.3293E-07	478.69	957.38	0.00E+00	1.12E-04	2.23E-04	0.0375	2.123E+13
C-14	4.3233E-05	478.69	957.38	0.00E+00	2.07E-02	4.14E-02	0.0575	1.983E+13
Cl-38	4.3023E-08	478.69	957.38	0.00E+00	2.06E-05	4.12E-05	0.0850	1.195E+13
Cm-243	1.9053E-07	478.69	957.38	0.00E+00	9.12E-05	1.82E-04	0.1250	1.341E+13
Cm-244	1.7744E-08	478.69	957.38	0.00E+00	8.49E-04	1.70E-03	0.2250	1.063E+13
Co-60	4.3188E-03	478.69	957.38	0.00E+00	2.07E+00	4.13E+00	0.3750	4.450E+12
Cs-134	6.7188E-04	478.69	957.38	0.00E+00	3.22E-01	6.43E-01	0.5750	7.089E+13
Cs-135	3.1549E-05	478.69	957.38	0.00E+00	1.51E-02	3.02E-02	0.8500	7.543E+12
Cs-137	1.9489E+00	478.69	957.38	0.00E+00	9.33E+02	1.87E+03	1.2500	8.125E+12
Eu-154	4.0301E-01	478.69	957.38	0.00E+00	1.93E+02	3.86E+02	1.7500	2.434E+11
Eu-155	5.4000E-02	478.69	957.38	0.00E+00	2.58E+01	5.17E+01	2.2500	3.858E+08
Fe-55	1.5955E-04	478.69	957.38	0.00E+00	7.64E-02	1.53E-01	2.7500	6.421E+05
H-3	4.6571E-03	478.69	957.38	0.00E+00	2.23E+00	4.46E+00	3.5000	4.408E+03
I-129	7.3805E-07	478.69	957.38	0.00E+00	3.53E-04	7.07E-04	5.0000	5.450E-02
Kr-85	9.5684E-02	478.69	957.38	0.00E+00	4.58E+01	9.16E+01	7.0000	6.153E+01
Np-237	1.4618E-06	478.69	957.38	0.00E+00	7.00E-04	1.40E-03	11.0000	6.998E+00
Pa-231	6.4782E-09	478.69	957.38	0.00E+00	3.10E-06	6.20E-06		
Pb-210	6.3158E-14	478.69	957.38	0.00E+00	3.02E-11	6.05E-11		
Pm-147	3.9564E-02	478.69	957.38	0.00E+00	1.89E+01	3.79E+01		
Pu-238	1.2008E-03	478.69	957.38	0.00E+00	5.75E-01	1.15E+00		
Pu-239	5.6917E-03	478.69	957.38	0.00E+00	2.72E+00	5.45E+00		
Pu-240	2.2617E-03	478.69	957.38	0.00E+00	1.08E+00	2.17E+00		
Pu-241	6.1113E-02	478.69	957.38	0.00E+00	2.93E+01	5.85E+01		
Pu-242	3.0602E-07	478.69	957.38	0.00E+00	1.46E-04	2.93E-04		
Ra-226	2.6707E-13	478.69	957.38	0.00E+00	1.28E-10	2.56E-10		
Ra-228	2.2556E-10	478.69	957.38	0.00E+00	1.08E-07	2.16E-07		
Ru-106	3.1293E-06	478.69	957.38	0.00E+00	1.50E-03	3.00E-03		
Se-79	1.2935E-05	478.69	957.38	0.00E+00	6.19E-03	1.24E-02		
Sn-126	1.2238E-06	478.69	957.38	0.00E+00	5.86E-03	1.17E-02		
Sr-90	1.8195E+00	478.69	957.38	0.00E+00	8.71E+02	1.74E+03		
Tc-99	4.4120E-04	478.69	957.38	0.00E+00	2.11E-01	4.22E-01		
Th-229	3.3308E-10	478.69	957.38	0.00E+00	1.59E-07	3.19E-07		
Th-230	4.6526E-11	478.69	957.38	0.00E+00	2.23E-08	4.45E-08		
Th-232	2.3744E-10	478.69	957.38	0.00E+00	1.14E-07	2.27E-07		
Ti-208	1.8195E-08	478.69	957.38	0.00E+00	8.71E-06	1.74E-05		
U-232	4.9098E-08	478.69	957.38	0.00E+00	2.35E-05	4.70E-05		
U-233	1.3140E-07	478.69	957.38	0.00E+00	6.29E-05	1.26E-04		
U-234	2.2571E-07	478.69	957.38	0.00E+00	1.08E-04	2.16E-04		
U-235	2.6159E-08	478.69	0.00	4.75E-03	3.49E-03	4.75E-03		
U-236	1.2719E-05	478.69	957.38	0.00E+00	6.09E-03	1.22E-02		
U-238	3.8857E-08	478.69	0.00	2.99E-03	2.97E-03	2.99E-03		
Y-90	1.8211E+00	478.69	957.38	0.00E+00	8.72E+02	1.74E+03		
Other Radionuclides					1.00E+03	2.00E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	108.05	478.69
Bounding:		957.38

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:	1.17	4.43
Bounding:	2.34	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 2002
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.06

II. Estimates							Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.8271E-09	30.07	60.13	0.00E+00	1.15E-07	2.30E-07	Avg. MeV	
Am-241	4.4195E-03	30.07	60.13	0.00E+00	1.33E-01	2.66E-01	0.0150	5.435E+12
Am-242m	1.8195E-06	30.07	60.13	0.00E+00	5.47E-05	1.09E-04	0.0250	1.123E+12
Am-243	2.3278E-07	30.07	60.13	0.00E+00	7.00E-06	1.40E-05	0.0375	1.124E+12
C-14	4.3203E-05	30.07	60.13	0.00E+00	1.30E-03	2.60E-03	0.0575	1.078E+12
Cl-36	4.3023E-08	30.07	60.13	0.00E+00	1.29E-06	2.59E-06	0.0850	6.486E+11
Cm-243	1.6872E-07	30.07	60.13	0.00E+00	5.07E-06	1.01E-05	0.1250	6.594E+11
Cm-244	1.4660E-06	30.07	60.13	0.00E+00	4.41E-05	8.82E-05	0.2250	5.868E+11
Co-60	2.2376E-03	30.07	60.13	0.00E+00	6.73E-02	1.35E-01	0.3750	2.441E+11
Cs-134	1.2525E-04	30.07	60.13	0.00E+00	3.77E-03	7.53E-03	0.5750	3.947E+12
Cs-135	3.1549E-05	30.07	60.13	0.00E+00	9.49E-04	1.90E-03	0.8500	3.258E+11
Cs-137	1.7368E+00	30.07	60.13	0.00E+00	5.22E+01	1.04E+02	1.2500	3.419E+11
Eu-154	2.6947E-01	30.07	60.13	0.00E+00	8.10E+00	1.62E+01	1.7500	1.047E+10
Eu-155	2.6857E-02	30.07	60.13	0.00E+00	8.08E-01	1.62E+00	2.2500	1.806E+05
Fe-55	4.2105E-05	30.07	60.13	0.00E+00	1.27E-03	2.53E-03	2.7500	3.698E+04
H-3	3.5173E-03	30.07	60.13	0.00E+00	1.06E-01	2.12E-01	3.5000	8.825E+01
I-129	7.3805E-07	30.07	60.13	0.00E+00	2.22E-05	4.44E-05	5.0000	3.451E+01
Kr-85	6.9263E-02	30.07	60.13	0.00E+00	2.08E+00	4.17E+00	7.0000	3.893E+00
Np-237	1.4752E-06	30.07	60.13	0.00E+00	4.44E-05	8.87E-05	11.0000	4.427E-01
Pa-231	8.3970E-09	30.07	60.13	0.00E+00	2.52E-07	5.05E-07		
Pb-210	1.4995E-13	30.07	60.13	0.00E+00	4.51E-12	9.02E-12		
Pm-147	1.0567E-02	30.07	60.13	0.00E+00	3.18E-01	6.36E-01		
Pu-238	1.1543E-03	30.07	60.13	0.00E+00	3.47E-02	6.94E-02		
Pu-239	5.6917E-03	30.07	60.13	0.00E+00	1.71E-01	3.42E-01		
Pu-240	2.2602E-03	30.07	60.13	0.00E+00	6.80E-02	1.36E-01		
Pu-241	4.8045E-02	30.07	60.13	0.00E+00	1.44E+00	2.89E+00		
Pu-242	3.0602E-07	30.07	60.13	0.00E+00	9.20E-06	1.84E-05		
Ra-226	5.1293E-13	30.07	60.13	0.00E+00	1.54E-11	3.08E-11		
Ra-228	2.3323E-10	30.07	60.13	0.00E+00	7.01E-09	1.40E-08		
Ru-106	1.0075E-07	30.07	60.13	0.00E+00	3.03E-06	6.06E-06		
Se-79	1.2935E-05	30.07	60.13	0.00E+00	3.89E-04	7.78E-04		
Sn-126	1.2238E-05	30.07	60.13	0.00E+00	3.68E-04	7.36E-04		
Sr-90	1.6165E+00	30.07	60.13	0.00E+00	4.86E+01	9.72E+01		
Tc-99	4.4120E-04	30.07	60.13	0.00E+00	1.33E-02	2.65E-02		
Th-229	4.5684E-10	30.07	60.13	0.00E+00	1.37E-08	2.75E-08		
Th-230	6.8271E-11	30.07	60.13	0.00E+00	2.05E-09	4.11E-09		
Th-232	2.3744E-10	30.07	60.13	0.00E+00	7.14E-09	1.43E-08		
Tl-208	1.7368E-08	30.07	60.13	0.00E+00	5.22E-07	1.04E-06		
U-232	4.6797E-08	30.07	60.13	0.00E+00	1.41E-06	2.81E-06		
U-233	1.3146E-07	30.07	60.13	0.00E+00	3.95E-06	7.91E-06		
U-234	2.5729E-07	30.07	60.13	0.00E+00	7.74E-06	1.55E-05		
U-235	2.6159E-06	30.07	0.00	5.60E-04	4.81E-04	5.60E-04		
U-236	1.2719E-05	30.07	60.13	0.00E+00	3.82E-04	7.65E-04		
U-238	3.8857E-08	30.07	0.00	3.48E-04	3.47E-04	3.48E-04		
Y-90	1.6165E+00	30.07	60.13	0.00E+00	4.86E+01	9.72E+01		
Other Radionuclides								
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							8.70E+01	1.34E+00
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

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

Checks			Estimated EOL NM/Given EOL NM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.63	4.76	
Bounding:	1.20		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 STD (ALUM) CORNELL UNIV.

SNF ID #: 235

Fuel Units & Descr: 65 - ELEMENT

Heavy Metal Mass: BOL=12.025kg; EOL=11.94kg

ROD Storage Site: INEEL

*Fuel decay start date: 1973

Estimates as of: 2030

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

*Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 50 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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.6842E-09	80.66	161.31	0.00E+00	7.00E-07	1.40E-06	Avg. MeV	
Am-241	4.9459E-03	80.66	161.31	0.00E+00	3.99E-01	7.98E-01	0.0150	7.910E+12
Am-242m	1.6241E-06	80.66	161.31	0.00E+00	1.31E-04	2.62E-04	0.0250	1.640E+12
Am-243	2.3233E-07	80.66	161.31	0.00E+00	1.87E-05	3.75E-05	0.0375	1.480E+12
C-14	4.3083E-05	80.66	161.31	0.00E+00	3.47E-03	6.95E-03	0.0575	1.549E+12
Cl-36	4.3023E-08	80.66	161.31	0.00E+00	3.47E-06	6.94E-06	0.0850	9.239E+11
Cm-243	9.1880E-08	80.66	161.31	0.00E+00	7.41E-08	1.48E-05	0.1250	6.856E+11
Cm-244	5.6346E-07	80.66	161.31	0.00E+00	4.54E-05	9.09E-05	0.2250	8.108E+11
Co-60	8.3699E-05	80.66	161.31	0.00E+00	6.75E-03	1.35E-02	0.3750	3.498E+11
Cs-134	2.8211E-08	80.66	161.31	0.00E+00	2.28E-06	4.55E-06	0.5750	5.873E+12
Cs-135	3.1549E-05	80.66	161.31	0.00E+00	2.54E-03	5.09E-03	0.8500	1.599E+11
Cs-137	9.7519E-01	80.66	161.31	0.00E+00	7.87E+01	1.57E+02	1.2500	1.352E+11
Eu-154	3.5970E-02	80.66	161.31	0.00E+00	2.90E+00	5.80E+00	1.7500	4.848E+09
Eu-155	8.1774E-04	80.66	161.31	0.00E+00	6.80E-02	1.32E-01	2.2500	1.644E+06
Fe-55	5.3940E-08	80.66	161.31	0.00E+00	4.35E-08	8.70E-08	2.7500	7.769E+04
H-3	8.6571E-04	80.66	161.31	0.00E+00	6.98E-02	1.40E-01	3.5000	2.293E+02
I-129	7.3805E-07	80.66	161.31	0.00E+00	5.95E-05	1.19E-04	5.0000	9.860E+01
Kr-85	1.3771E-02	80.66	161.31	0.00E+00	1.11E+00	2.22E+00	7.0000	1.090E+01
Np-237	1.5218E-06	80.66	161.31	0.00E+00	1.23E-04	2.45E-04	11.0000	1.240E+00
Pa-231	1.4152E-08	80.66	161.31	0.00E+00	1.14E-08	2.28E-08		
Pb-210	7.9774E-13	80.66	161.31	0.00E+00	6.43E-11	1.29E-10		
Pm-147	1.4382E-05	80.66	161.31	0.00E+00	1.16E-03	2.32E-03		
Pu-238	9.4782E-04	80.66	161.31	0.00E+00	7.64E-02	1.53E-01		
Pu-239	5.6872E-03	80.66	161.31	0.00E+00	4.59E-01	9.17E-01		
Pu-240	2.2541E-03	80.66	161.31	0.00E+00	1.82E-01	3.64E-01		
Pu-241	1.4433E-02	80.66	161.31	0.00E+00	1.16E+00	2.33E+00		
Pu-242	3.0802E-07	80.66	161.31	0.00E+00	2.47E-05	4.94E-05		
Ra-226	1.8857E-12	80.66	161.31	0.00E+00	1.52E-10	3.04E-10		
Ra-228	2.3729E-10	80.66	161.31	0.00E+00	1.91E-08	3.83E-08		
Ru-106	3.4857E-15	80.66	161.31	0.00E+00	2.81E-13	5.62E-13		
Se-79	1.2931E-05	80.66	161.31	0.00E+00	1.04E-03	2.09E-03		
Sn-126	1.2235E-05	80.66	161.31	0.00E+00	9.87E-04	1.97E-03		
Sr-90	8.9173E-01	80.66	161.31	0.00E+00	7.19E+01	1.44E+02		
Tc-99	4.4120E-04	80.66	161.31	0.00E+00	3.56E-02	7.12E-02		
Th-229	8.2752E-10	80.66	161.31	0.00E+00	6.67E-08	1.33E-07		
Th-230	1.4908E-10	80.66	161.31	0.00E+00	1.20E-08	2.40E-08		
Th-232	2.3744E-10	80.66	161.31	0.00E+00	1.92E-08	3.83E-08		
Ti-206	1.3668E-08	80.66	161.31	0.00E+00	1.10E-06	2.20E-06		
U-232	3.6797E-08	80.66	161.31	0.00E+00	2.97E-06	5.94E-06		
U-233	1.3164E-07	80.66	161.31	0.00E+00	1.06E-05	2.12E-05		
U-234	3.3865E-07	80.66	161.31	0.00E+00	2.73E-05	5.46E-05		
U-235	2.6144E-06	80.66	0.00	5.20E-03	4.99E-03	5.20E-03		
U-236	1.2722E-05	80.66	161.31	0.00E+00	1.03E-03	2.05E-03		
U-238	3.8857E-08	80.66	0.00	3.23E-03	3.23E-03	3.23E-03		
Y-90	8.9203E-01	80.66	161.31	0.00E+00	7.19E+01	1.44E+02		
Other Radionuclides					9.01E+01	1.80E+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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20.1	

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

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) DOW

SNF ID #: 970

Fuel Units & Descr: 1 - ELEMENT

Heavy Metal Mass: BOL=0.19kg; EOL=0.18kg

ROD Storage Site: INEEL

*Fuel decay start date: 2035

Estimates as of: 2030

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

*Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 5 years

Estimated

Canister usage:

18"x10"

0.01

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	9.55	19.09	0.00E+00	7.70E-09	1.54E-08	Avg. MeV	
Am-241	2.2586E-03	9.55	19.09	0.00E+00	2.18E-02	4.31E-02	0.0150	3.230E+12
Am-242m	1.9925E-06	9.55	19.09	0.00E+00	1.90E-05	3.80E-05	0.0250	7.013E+11
Am-243	2.3323E-07	9.55	19.09	0.00E+00	2.23E-06	4.45E-06	0.0375	8.735E+11
C-14	4.3308E-05	9.55	19.09	0.00E+00	4.13E-04	8.27E-04	0.0575	6.897E+11
Cl-36	4.3023E-08	9.55	19.09	0.00E+00	4.11E-07	8.21E-07	0.0850	4.687E+11
Cm-243	2.7429E-07	9.55	19.09	0.00E+00	2.62E-06	5.24E-06	0.1250	7.011E+11
Cm-244	3.1504E-06	9.55	19.09	0.00E+00	3.01E-05	6.01E-05	0.2250	3.913E+11
Co-60	3.1008E-02	9.55	19.09	0.00E+00	2.96E-01	5.92E-01	0.3750	1.742E+11
Cs-134	1.0367E-01	9.55	19.09	0.00E+00	9.90E-01	1.98E+00	0.5750	2.208E+12
Cs-135	3.1549E-05	9.55	19.09	0.00E+00	3.01E-04	6.02E-04	0.8500	5.435E+11
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01	1.2500	5.834E+11
Eu-154	1.3490E+00	9.55	19.09	0.00E+00	1.29E+01	2.58E+01	1.7500	1.612E+10
Eu-155	4.3880E-01	9.55	19.09	0.00E+00	4.19E+00	8.38E+00	2.2500	1.960E+09
Fe-55	8.6782E-03	9.55	19.09	0.00E+00	8.28E-02	1.66E-01	2.7500	1.592E+07
H-3	1.0805E-02	9.55	19.09	0.00E+00	1.03E-01	2.06E-01	3.5000	1.861E+06
I-129	7.3805E-07	9.55	19.09	0.00E+00	7.04E-06	1.41E-05	5.0000	1.101E+01
Kr-85	2.5218E-01	9.55	19.09	0.00E+00	2.41E+00	4.81E+00	7.0000	1.246E+00
Np-237	1.4463E-06	9.55	19.09	0.00E+00	1.38E-05	2.76E-05	11.0000	1.419E-01
Pa-231	3.5970E-09	9.55	19.09	0.00E+00	3.43E-08	6.87E-08		
Pb-210	8.2511E-15	9.55	19.09	0.00E+00	7.88E-14	1.58E-13		
Pm-147	2.0767E+00	9.55	19.09	0.00E+00	1.98E+01	3.96E+01		
Pu-238	1.3514E-03	9.55	19.09	0.00E+00	1.29E-02	2.58E-02		
Pu-239	5.6947E-03	9.55	19.09	0.00E+00	5.44E-02	1.09E-01		
Pu-240	2.2647E-03	9.55	19.09	0.00E+00	2.18E-02	4.32E-02		
Pu-241	1.2574E-01	9.55	19.09	0.00E+00	1.20E+00	2.40E+00		
Pu-242	3.0602E-07	9.55	19.09	0.00E+00	2.92E-06	5.84E-06		
Ra-226	5.7353E-14	9.55	19.09	0.00E+00	5.47E-13	1.09E-12		
Ra-228	1.8150E-10	9.55	19.09	0.00E+00	1.73E-09	3.46E-09		
Ru-106	9.3744E-02	9.55	19.09	0.00E+00	8.95E-01	1.79E+00		
Se-79	1.2938E-05	9.55	19.09	0.00E+00	1.23E-04	2.47E-04		
Sn-126	1.2239E-05	9.55	19.09	0.00E+00	1.17E-04	2.34E-04		
Sr-90	2.6000E+00	9.55	19.09	0.00E+00	2.48E+01	4.96E+01		
Tc-99	4.4120E-04	9.55	19.09	0.00E+00	4.21E-03	8.42E-03		
Th-229	1.4749E-10	9.55	19.09	0.00E+00	1.41E-09	2.82E-09		
Th-230	1.8549E-11	9.55	19.09	0.00E+00	1.87E-10	3.73E-10		
Th-232	2.3744E-10	9.55	19.09	0.00E+00	2.27E-09	4.53E-09		
Ti-208	1.9459E-08	9.55	19.09	0.00E+00	1.86E-07	3.71E-07		
U-232	5.6015E-08	9.55	19.09	0.00E+00	5.35E-07	1.07E-06		
U-233	1.3132E-07	9.55	19.09	0.00E+00	1.25E-06	2.51E-06		
U-234	1.7323E-07	9.55	19.09	0.00E+00	1.65E-06	3.31E-06		
U-235	-2.6159E-06	9.55	0.00	8.21E-05	5.71E-05	8.21E-05		
U-236	1.2717E-05	9.55	19.09	0.00E+00	1.21E-04	2.43E-04		
U-238	-3.8857E-08	9.55	0.00	5.11E-05	5.07E-05	5.11E-05		
Y-90	2.6015E+00	9.55	19.09	0.00E+00	2.48E+01	4.97E+01		
Other Radionuclides					3.63E+01	7.26E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	1.85	9.55
Bounding:		19.09

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.36	5.15
Bounding:	2.72	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) FUEL AND
SNF ID #: 483
Fuel Units & Decay: 69 ELEMENT
Heavy Metal Mass: BOL=12.42kg EOL=12.344kg
ROD Storage Site: MUEL

Fuel decay start date:
Estimates as of:

2010
2000

Template: TRIGA-M (LW/ALUM, 10 to 20%, U)

Template BOL Heavy Metal Mass (LW):
Template Decay Time:

6.85
0.00018
20 years

Estimated
Canister usage:
18710⁶
0.82

Radionuclide	CLAIMED From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Photon Source Total (Bouding)
Ac-227	2.4556E-09	72.45	144.90	0.00E+00	1.79E-07	3.56E-07	Avg. MeV	1.487E+13
Am-241	3.8732E-03	72.45	144.90	0.00E+00	2.81E-01	5.61E-01	0.0150	3.070E+12
Am-242m	1.8617E-08	72.45	144.90	0.00E+00	1.35E-04	2.70E-04	0.0250	3.214E+12
Am-243	2.3293E-07	72.45	144.90	0.00E+00	1.69E-05	3.38E-05	0.0375	2.971E+12
C-14	4.3233E-05	72.45	144.90	0.00E+00	3.13E-03	6.26E-03	0.0575	1.809E+12
C-36	4.3023E-08	72.45	144.90	0.00E+00	3.12E-06	6.23E-06	0.1250	2.000E+12
Co-243	1.9053E-07	72.45	144.90	0.00E+00	1.38E-05	2.76E-05	0.2250	1.639E+12
Co-244	1.7744E-06	72.45	144.90	0.00E+00	1.29E-04	2.57E-04	0.3750	6.75E+11
Co-60	4.3188E-03	72.45	144.90	0.00E+00	3.13E-01	6.26E-01	0.5750	1.075E+13
Ce-134	3.1549E-05	72.45	144.90	0.00E+00	4.87E-02	9.74E-02	0.8500	1.142E+12
Ce-137	1.9489E-04	72.45	144.90	0.00E+00	1.41E-02	2.82E-02	1.2500	1.200E+12
Eu-154	4.0301E-01	72.45	144.90	0.00E+00	2.82E-01	5.64E-01	1.7500	3.684E+10
Eu-155	5.4000E-02	72.45	144.90	0.00E+00	3.81E-03	7.62E-03	2.2500	5.840E+05
Fe-55	1.5955E-04	72.45	144.90	0.00E+00	1.16E-02	2.31E-02	2.7500	8.720E+04
I-131	4.6571E-03	72.45	144.90	0.00E+00	3.97E-01	6.75E-01	3.5000	6.827E+02
I-129	7.3805E-07	72.45	144.90	0.00E+00	5.35E-05	1.07E-04	5.0000	8.916E-01
K-46	9.5684E-02	72.45	144.90	0.00E+00	6.83E-03	1.36E-01	7.0000	1.008E+01
Nd-237	1.4618E-08	72.45	144.90	0.00E+00	1.05E-04	2.10E-04	11.0000	1.147E+00
Pb-210	6.4782E-08	72.45	144.90	0.00E+00	4.69E-07	9.39E-07		
Pb-214	6.3158E-14	72.45	144.90	0.00E+00	4.59E-12	9.15E-12		
Pm-147	3.9584E-02	72.45	144.90	0.00E+00	2.87E-03	5.73E-03		
Pu-238	1.2008E-03	72.45	144.90	0.00E+00	4.12E-01	8.25E-01		
Pu-239	5.5897E-03	72.45	144.90	0.00E+00	8.70E-02	1.74E-01		
Pu-240	2.2817E-03	72.45	144.90	0.00E+00	1.64E-01	3.28E-01		
Pu-241	6.1113E-02	72.45	144.90	0.00E+00	4.43E-03	8.85E-03		
Pu-242	3.0602E-07	72.45	144.90	0.00E+00	2.22E-05	4.43E-05		
Ra-226	2.6707E-13	72.45	144.90	0.00E+00	1.83E-11	3.67E-11		
Rn-226	2.2556E-10	72.45	144.90	0.00E+00	1.63E-08	3.27E-08		
Rn-106	3.1293E-08	72.45	144.90	0.00E+00	2.27E-04	4.53E-04		
Se-79	1.2835E-05	72.45	144.90	0.00E+00	9.37E-04	1.87E-03		
Se-128	1.2288E-05	72.45	144.90	0.00E+00	8.87E-04	1.77E-03		
Sr-90	1.8195E+00	72.45	144.90	0.00E+00	1.32E-02	2.64E-02		
Tc-99	4.4120E-04	72.45	144.90	0.00E+00	3.20E-02	6.39E-02		
Th-229	3.3308E-10	72.45	144.90	0.00E+00	2.41E-08	4.83E-08		
Th-230	4.6526E-11	72.45	144.90	0.00E+00	3.37E-09	6.74E-09		
Th-232	2.3744E-10	72.45	144.90	0.00E+00	1.72E-08	3.44E-08		
Th-234	1.8185E-08	72.45	144.90	0.00E+00	1.32E-08	2.64E-08		
U-232	4.3038E-08	72.45	144.90	0.00E+00	3.56E-05	7.11E-05		
U-233	1.3140E-07	72.45	144.90	0.00E+00	9.52E-06	1.90E-05		
U-234	2.2571E-07	72.45	144.90	0.00E+00	1.64E-05	3.27E-05		
U-235	4.26159E-08	72.45	144.90	5.37E-03	5.18E-03	5.37E-03		
U-236	1.2719E-05	72.45	144.90	0.00E+00	9.21E-04	1.84E-03		
U-238	3.8857E-08	72.45	144.90	0.00E+00	3.34E-03	3.34E-03		
Y-90	1.8211E+00	72.45	144.90	0.00E+00	1.32E-02	2.64E-02		

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	1.58E+00	3.78E+00

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	LW AND U ZINC HYDROIDE	Used
Fuel Cladding	ALUM	ALUM
BOL H/M Concentration	U	U
BOL Enrichment %	20	10 to 20.1

Basic for Parameter Differences:

Burnup Summary (MWd/g)

Nominal	From SFD	Estimated
Bounding	60.52	72.45

Basic for burnup used in estimate:

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

Checks

Nominal	Burnup Multiplier	Estimated Burnup ¹ Given Burnup
Bounding	0.16	1.20

Estimated EOL H/M/Chen EOL H/M
1.00

¹Reactor shutdown, core removal, storage, shipping or other data 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/HM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:

Fuel Name: TRIGA STD (ALUM) GA
 SNF ID #: 726
 Fuel Units & Descr: 82 - ELEMENT
 Heavy Metal Mass: BOL-9-4123G; EOL-9-3259G
 ROD Storage Site: NREL

Fuel decay start date:
 Estimates as of:

2005
 2030

Template: TRIGA-M (LW/U-Zr, Ann., 10 to 20%, U)

Template BOL Heavy Metal Mass (MT):
 Template Decay Time:

6.65
 0.00018
 5 years

Estimated
 Canister Usage:
 18 "110"
 0.47

Radionuclide	CLAWD From Template	Monhal Fuel Burnup (MW/G)	Bounding Fuel Burnup (MW/G)	Initial Activity (Ci)	Monhal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Total Photons/sec (Bouding)
Ac-227	8.0632E-10	91.73	183.46	0.00E+00	7.40E-08	1.48E-07	Avg. BEV	3.104E+13
Am-241	2.2686E-08	91.73	183.46	0.00E+00	2.07E-01	4.14E-01	0.0150	6.739E+12
Am-243m	1.9825E-06	91.73	183.46	0.00E+00	1.83E-04	3.66E-04	0.0250	8.395E+12
Am-243	2.3332E-07	91.73	183.46	0.00E+00	2.14E-05	4.28E-05	0.0075	8.395E+12
C-14	4.3308E-05	91.73	183.46	0.00E+00	3.97E-03	7.95E-03	0.0675	8.335E+12
Ci-36	4.3023E-08	91.73	183.46	0.00E+00	3.65E-06	7.69E-06	0.0650	4.605E+12
Cm-243	2.7429E-07	91.73	183.46	0.00E+00	2.52E-05	5.03E-05	0.1250	6.137E+12
Cm-244	3.1604E-06	91.73	183.46	0.00E+00	2.89E-04	5.78E-04	0.2250	3.781E+12
Cs-134	3.1008E-02	91.73	183.46	0.00E+00	2.84E+00	5.69E+00	0.5750	1.674E+12
Cs-135	1.0567E-01	91.73	183.46	0.00E+00	8.51E+00	1.90E+01	0.5750	2.122E+12
Cs-137	3.1648E-05	91.73	183.46	0.00E+00	2.89E-03	5.79E-03	0.8500	5.223E+12
Eu-154	2.7648E+00	91.73	183.46	0.00E+00	2.53E+02	5.06E+02	1.2500	5.414E+12
Eu-155	1.3400E+00	91.73	183.46	0.00E+00	1.24E+02	2.47E+02	1.7500	1.565E+11
Eu-156	4.3800E-01	91.73	183.46	0.00E+00	4.03E+01	8.05E+01	2.2500	1.895E+10
Fe-55	8.6782E-03	91.73	183.46	0.00E+00	7.96E-01	1.59E+00	2.7500	1.535E+08
H-3	1.0805E-02	91.73	183.46	0.00E+00	9.91E-01	1.98E+00	3.5000	1.788E+07
H-129	7.3055E-07	91.73	183.46	0.00E+00	6.77E-05	1.35E-04	5.0000	1.105E+02
K-40	2.3218E-01	91.73	183.46	0.00E+00	2.31E+01	4.63E+01	7.0000	1.282E+01
Np-237	1.4463E-06	91.73	183.46	0.00E+00	1.33E-04	2.65E-04	11.0000	1.426E+00
Pa-231	3.5970E-09	91.73	183.46	0.00E+00	3.30E-07	6.60E-07		
Pb-210	8.2511E-15	91.73	183.46	0.00E+00	7.57E-13	1.51E-12		
Pb-214	2.0707E+00	91.73	183.46	0.00E+00	1.90E+02	3.81E+02		
Pu-238	1.3514E-03	91.73	183.46	0.00E+00	1.24E-01	2.48E-01		
Pu-239	5.6947E-03	91.73	183.46	0.00E+00	5.22E-01	1.04E+00		
Pu-240	2.2647E-03	91.73	183.46	0.00E+00	2.08E-01	4.15E-01		
Pu-241	1.2674E-01	91.73	183.46	0.00E+00	1.15E+01	2.31E+01		
Pu-242	3.0602E-07	91.73	183.46	0.00E+00	2.81E-05	5.61E-05		
Re-226	5.7353E-14	91.73	183.46	0.00E+00	5.26E-12	1.05E-11		
Ra-226	1.8150E-10	91.73	183.46	0.00E+00	1.66E-08	3.33E-08		
Ru-106	8.3744E-02	91.73	183.46	0.00E+00	8.60E+00	1.72E+01		
Se-78	1.2838E-05	91.73	183.46	0.00E+00	1.18E-03	2.37E-03		
Si-28	1.2239E-05	91.73	183.46	0.00E+00	1.12E-03	2.25E-03		
Si-40	2.6000E+00	91.73	183.46	0.00E+00	2.38E+02	4.77E+02		
Th-229	4.4120E-10	91.73	183.46	0.00E+00	4.05E-02	8.09E-02		
Th-229	1.4748E-10	91.73	183.46	0.00E+00	1.35E-08	2.71E-08		
Th-230	1.8548E-11	91.73	183.46	0.00E+00	1.79E-09	3.59E-09		
Th-232	2.3744E-10	91.73	183.46	0.00E+00	2.18E-08	4.36E-08		
Th-230	1.8458E-08	91.73	183.46	0.00E+00	1.76E-06	3.57E-06		
U-232	5.6015E-08	91.73	183.46	0.00E+00	5.14E-06	1.03E-05		
U-233	1.3132E-07	91.73	183.46	0.00E+00	1.20E-05	2.41E-05		
U-234	1.7323E-07	91.73	183.46	0.00E+00	1.59E-05	3.18E-05		
U-235	-2.6158E-06	91.73	0.00	4.03E-03	3.79E-03	4.03E-03		
U-236	1.2717E-05	91.73	183.46	0.00E+00	1.17E-03	2.33E-03		
U-238	-3.8657E-08	91.73	0.00	2.54E-03	2.53E-03	2.54E-03		
Y-90	2.6015E+00	91.73	183.46	0.00E+00	2.39E+02	4.77E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	from STD	used
Reactor Moderator:	LW AND U ZIRC HYDROGE	LW AND U ZIRC HYDROGE
Fuel Cladding:	ALUM	ALUM
BOL HML Constituents:	U	U
BOL Enrichment %:	18.8100242	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MW/G)

Monhal:	From BFD	Estimated
Bounding:	81.73	79.42
		Monhal burnup taken directly from BFD (converted to MW/G).
		183.46 Bounding Burnup assumed to be twice monhal burnup.

Checks

Monhal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	0.26	0.87
	0.53	
		Estimated EOL HML/Given EOL HML
		1.00

Reactor shutdown, core removal, shipping or other date confirming fuel 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 (MW/GMT).

Thermal Power	Heat Output (Watts)	Bounding Heat Output (Watts)
Monhal	4.41E+00	8.82E+00
Total		

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GA
SNF ID #: 870

Fuel Units & Descr: 246 - ELEMENT

Heavy Metal Mass: BOL=46.74kg; EOL=45.19kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1973

Estimate as of: 2030

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

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 50 years

Estimated

Canister usage:

18"x10"

2.22

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.6842E-09	1,479.31	2,958.63	0.00E+00	1.28E-05	2.57E-05	Avg. MeV	
Am-241	4.9459E-03	1,479.31	2,958.63	0.00E+00	7.32E+00	1.46E+01	0.0150	1.451E+14
Am-242m	1.6241E-08	1,479.31	2,958.63	0.00E+00	2.40E-03	4.80E-03	0.0250	3.008E+13
Am-243	2.3233E-07	1,479.31	2,958.63	0.00E+00	3.44E-04	6.87E-04	0.0375	2.714E+13
C-14	4.3083E-05	1,479.31	2,958.63	0.00E+00	6.37E-02	1.27E-01	0.0575	2.840E+13
Cl-36	4.3023E-08	1,479.31	2,958.63	0.00E+00	8.36E-05	1.27E-04	0.0850	1.694E+13
Cm-243	9.1880E-08	1,479.31	2,958.63	0.00E+00	1.36E-04	2.72E-04	0.1250	1.257E+13
Cm-244	5.6346E-07	1,479.31	2,958.63	0.00E+00	8.34E-04	1.67E-03	0.2250	1.487E+13
Co-60	8.3699E-05	1,479.31	2,958.63	0.00E+00	1.24E-01	2.48E-01	0.3750	6.418E+12
Cs-134	2.8211E-08	1,479.31	2,958.63	0.00E+00	4.17E-05	8.35E-05	0.5750	1.077E+14
Cs-135	3.1549E-05	1,479.31	2,958.63	0.00E+00	4.67E-02	9.33E-02	0.8500	2.934E+12
Cs-137	9.7519E-01	1,479.31	2,958.63	0.00E+00	1.44E+03	2.89E+03	1.2500	2.480E+12
Eu-154	3.5970E-02	1,479.31	2,958.63	0.00E+00	5.32E+01	1.06E+02	1.7500	8.892E+10
Eu-155	8.1774E-04	1,479.31	2,958.63	0.00E+00	1.21E+00	2.42E+00	2.2500	3.015E+08
Fe-55	5.3940E-08	1,479.31	2,958.63	0.00E+00	7.98E-05	1.60E-04	2.7500	1.425E+08
H-3	8.6571E-04	1,479.31	2,958.63	0.00E+00	1.28E+00	2.56E+00	3.5000	3.954E+03
I-129	7.3805E-07	1,479.31	2,958.63	0.00E+00	1.09E-03	2.18E-03	5.0000	1.664E+03
Kr-85	1.3771E-02	1,479.31	2,958.63	0.00E+00	2.04E+01	4.07E+01	7.0000	1.875E+02
Np-237	1.5218E-08	1,479.31	2,958.63	0.00E+00	2.25E-03	4.50E-03	11.0000	2.131E+01
Pa-231	1.4152E-08	1,479.31	2,958.63	0.00E+00	2.09E-05	4.19E-05		
Pb-210	7.9774E-13	1,479.31	2,958.63	0.00E+00	1.18E-09	2.36E-09		
Pm-147	1.4362E-06	1,479.31	2,958.63	0.00E+00	2.12E-02	4.25E-02		
Pu-238	9.4782E-04	1,479.31	2,958.63	0.00E+00	1.40E+00	2.80E+00		
Pu-239	5.6872E-03	1,479.31	2,958.63	0.00E+00	8.41E+00	1.68E+01		
Pu-240	2.2541E-03	1,479.31	2,958.63	0.00E+00	3.33E+00	6.67E+00		
Pu-241	1.4433E-02	1,479.31	2,958.63	0.00E+00	2.14E+01	4.27E+01		
Pu-242	3.0602E-07	1,479.31	2,958.63	0.00E+00	4.53E-04	9.05E-04		
Ra-226	1.8857E-12	1,479.31	2,958.63	0.00E+00	2.79E-09	5.58E-09		
Ra-228	2.3729E-10	1,479.31	2,958.63	0.00E+00	3.51E-07	7.02E-07		
Ru-106	3.4857E-15	1,479.31	2,958.63	0.00E+00	5.16E-12	1.03E-11		
Se-79	1.2931E-05	1,479.31	2,958.63	0.00E+00	1.91E-02	3.83E-02		
Sn-126	1.2235E-05	1,479.31	2,958.63	0.00E+00	1.81E-02	3.62E-02		
Sr-90	8.9173E-01	1,479.31	2,958.63	0.00E+00	1.32E+03	2.64E+03		
Tc-99	4.4120E-04	1,479.31	2,958.63	0.00E+00	6.53E-01	1.31E+00		
Th-229	8.2752E-10	1,479.31	2,958.63	0.00E+00	1.22E-06	2.45E-06		
Th-230	1.4908E-10	1,479.31	2,958.63	0.00E+00	2.21E-07	4.41E-07		
Th-232	2.3744E-10	1,479.31	2,958.63	0.00E+00	3.51E-07	7.03E-07		
Ti-208	1.3668E-08	1,479.31	2,958.63	0.00E+00	2.02E-05	4.04E-05		
U-232	3.6797E-08	1,479.31	2,958.63	0.00E+00	5.44E-05	1.09E-04		
U-233	1.3164E-07	1,479.31	2,958.63	0.00E+00	1.95E-04	3.89E-04		
U-234	3.3865E-07	1,479.31	2,958.63	0.00E+00	5.01E-04	1.00E-03		
U-235	-2.6144E-06	1,479.31	0.00	2.01E-02	1.62E-02	2.01E-02		
U-236	1.2722E-05	1,479.31	2,958.63	0.00E+00	1.88E-02	3.76E-02		
U-238	-3.8857E-08	1,479.31	0.00	1.26E-02	1.25E-02	1.26E-02		
Y-90	8.9203E-01	1,479.31	2,958.63	0.00E+00	1.32E+03	2.64E+03		
Other Radionuclides					1.65E+03	3.30E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	455.53	1,479.31	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,958.63	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.98	3.25	1.00
Bounding:	1.71		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GERMANY
SNF ID #: 465
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=11.7kg; EOL=11.635kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.59

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources
Radionuclide	CUMWd 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 Avg. MeV Total Photons/sec (bounding)
Ac-227	2.4556E-09	62.04	124.09	0.00E+00	1.52E-07	3.05E-07	0.0150 1.273E+13
Am-241	3.6752E-03	62.04	124.09	0.00E+00	2.40E-01	4.81E-01	0.0250 2.630E+12
Am-242m	1.8617E-06	62.04	124.09	0.00E+00	1.16E-04	2.31E-04	0.0375 2.752E+12
Am-243	2.3293E-07	62.04	124.09	0.00E+00	1.45E-05	2.89E-05	0.0575 2.544E+12
C-14	4.3233E-05	62.04	124.09	0.00E+00	2.68E-03	5.36E-03	0.0850 1.549E+12
Cl-36	4.3023E-08	62.04	124.09	0.00E+00	2.67E-06	5.34E-06	0.1250 1.739E+12
Cm-243	1.9053E-07	62.04	124.09	0.00E+00	1.18E-05	2.36E-05	0.2250 1.404E+12
Cm-244	1.7744E-06	62.04	124.09	0.00E+00	1.10E-04	2.20E-04	0.3750 5.768E+11
Co-60	4.3188E-03	62.04	124.09	0.00E+00	2.68E-01	5.36E-01	0.5750 9.188E+12
Cs-134	6.7188E-04	62.04	124.09	0.00E+00	4.17E-02	8.34E-02	0.8500 9.776E+11
Cs-135	3.1549E-05	62.04	124.09	0.00E+00	1.96E-03	3.91E-03	1.2500 1.053E+12
Cs-137	1.8489E+00	62.04	124.09	0.00E+00	1.21E+02	2.42E+02	1.7500 3.155E+10
Eu-154	4.0301E-01	62.04	124.09	0.00E+00	2.50E+01	5.00E+01	2.2500 5.001E+05
Eu-155	5.4000E-02	62.04	124.09	0.00E+00	3.35E+00	6.70E+00	2.7500 8.324E+04
Fe-55	1.5955E-04	62.04	124.09	0.00E+00	9.90E-03	1.98E-02	3.5000 5.862E+02
H-3	4.6571E-03	62.04	124.09	0.00E+00	2.89E-01	5.78E-01	5.0000 7.701E+01
I-129	7.3805E-07	62.04	124.09	0.00E+00	4.58E-05	9.16E-05	7.0000 8.708E+00
Kr-85	9.5684E-02	62.04	124.09	0.00E+00	5.94E+00	1.19E+01	11.0000 9.914E-01
Np-237	1.4618E-06	62.04	124.09	0.00E+00	9.07E-05	1.81E-04	
Pa-231	6.4782E-09	62.04	124.09	0.00E+00	4.02E-07	8.04E-07	
Pb-210	6.3158E-14	62.04	124.09	0.00E+00	3.92E-12	7.84E-12	
Pm-147	3.9564E-02	62.04	124.09	0.00E+00	2.45E+00	4.91E+00	
Pu-238	1.2008E-03	62.04	124.09	0.00E+00	7.45E-02	1.49E-01	
Pu-239	5.6917E-03	62.04	124.09	0.00E+00	3.53E-01	7.06E-01	
Pu-240	2.2617E-03	62.04	124.09	0.00E+00	1.40E-01	2.81E-01	
Pu-241	6.1113E-02	62.04	124.09	0.00E+00	3.79E+00	7.58E+00	
Pu-242	3.0602E-07	62.04	124.09	0.00E+00	1.90E-05	3.80E-05	
Ra-226	2.6707E-13	62.04	124.09	0.00E+00	1.66E-11	3.31E-11	
Ra-228	2.2556E-10	62.04	124.09	0.00E+00	1.40E-08	2.80E-08	
Ru-106	3.1293E-06	62.04	124.09	0.00E+00	1.94E-04	3.88E-04	
Se-79	1.2935E-05	62.04	124.09	0.00E+00	8.03E-04	1.61E-03	
Sn-126	1.2238E-05	62.04	124.09	0.00E+00	7.59E-04	1.52E-03	
Sr-90	1.8195E+00	62.04	124.09	0.00E+00	1.13E+02	2.26E+02	
Tc-99	4.4120E-04	62.04	124.09	0.00E+00	2.74E-02	5.47E-02	
Th-229	3.3308E-10	62.04	124.09	0.00E+00	2.07E-08	4.13E-08	
Th-230	4.6526E-11	62.04	124.09	0.00E+00	2.89E-09	5.77E-09	
Th-232	2.3744E-10	62.04	124.09	0.00E+00	1.47E-08	2.95E-08	
Ti-208	1.8195E-08	62.04	124.09	0.00E+00	1.13E-06	2.26E-06	
U-232	4.9098E-08	62.04	124.09	0.00E+00	3.05E-06	6.09E-06	
U-233	1.3140E-07	62.04	124.09	0.00E+00	8.15E-06	1.63E-05	
U-234	2.2571E-07	62.04	124.09	0.00E+00	1.40E-05	2.80E-05	
U-235	-2.6159E-06	62.04	0.00	5.06E-03	4.89E-03	5.06E-03	
U-236	1.2719E-06	62.04	124.09	0.00E+00	7.89E-04	1.58E-03	
U-238	-3.8857E-08	62.04	0.00	3.15E-03	3.14E-03	3.15E-03	
Y-90	1.8211E+00	62.04	124.09	0.00E+00	1.13E+02	2.26E+02	
Other Radionuclides					1.30E+02	2.60E+02	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	57.01	62.04
Bounding:		124.09

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) HANFORD
 SWF ID #: 876
 Fuel Units & Desert: 59 - ELEMENT
 Heavy Metal Mass: BOL=10.915kg; EOL=10.853kg
 ROD Storage Site: NEEEL

Fuel decay start date: 1973
 Estimate as of: 2003
 Template: TRIGA-4 (LWAL-Zn, Alum, 10 to 20%, U)
 Template Burnup (MWd/g): 6.65
 Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 50 years

Estimated
 Canister Usage:
 18.710
 0.53

II. Estimates	m	%	%	b	Y _a	Y _b	Gamma Sources
Radionuclide	CLAWD From	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	8.684E-08	73.21	148.42	0.00E+00	6.38E-07	1.27E-06	0.0150
Am-241	4.9459E-03	73.21	148.42	0.00E+00	3.62E-01	7.24E-01	0.0150
Am-242m	1.6241E-06	73.21	148.42	0.00E+00	1.19E-04	2.38E-04	0.0250
Am-243	2.3233E-07	73.21	148.42	0.00E+00	1.70E-05	3.40E-05	0.0250
C-14	4.3083E-05	73.21	148.42	0.00E+00	3.15E-03	6.31E-03	0.0575
C-36	4.3023E-08	73.21	148.42	0.00E+00	3.15E-08	6.30E-08	0.0850
Cm-243	8.1890E-08	73.21	148.42	0.00E+00	6.73E-08	1.35E-05	0.1250
Cm-244	5.6348E-07	73.21	148.42	0.00E+00	4.13E-05	8.25E-05	0.2250
Co-60	8.3699E-05	73.21	148.42	0.00E+00	6.13E-03	1.23E-02	0.3750
Co-134	2.8211E-08	73.21	148.42	0.00E+00	2.07E-08	4.13E-08	0.5750
Co-136	3.1549E-05	73.21	148.42	0.00E+00	2.31E-03	4.62E-03	0.8500
Co-157	8.7519E-01	73.21	148.42	0.00E+00	7.14E-01	1.43E-02	1.2500
Eu-154	3.5970E-02	73.21	148.42	0.00E+00	2.63E-00	5.27E-00	1.7500
Eu-155	8.1774E-04	73.21	148.42	0.00E+00	6.99E-02	1.20E-01	2.2500
Fe-55	5.5940E-08	73.21	148.42	0.00E+00	3.95E-08	7.90E-08	2.7500
H-3	8.6571E-04	73.21	148.42	0.00E+00	6.34E-02	1.27E-01	3.5000
H-129	7.3805E-07	73.21	148.42	0.00E+00	5.40E-05	1.08E-04	5.0000
K-45	1.3771E-02	73.21	148.42	0.00E+00	1.01E-00	2.02E+00	7.0000
Np-237	1.5218E-08	73.21	148.42	0.00E+00	1.11E-04	2.23E-04	11.0000
Pa-231	1.4152E-08	73.21	148.42	0.00E+00	1.04E-08	2.07E-08	
Pb-210	7.8774E-13	73.21	148.42	0.00E+00	5.84E-11	1.17E-10	
Pm-147	1.4382E-05	73.21	148.42	0.00E+00	1.05E-03	2.10E-03	
Pu-238	8.4782E-04	73.21	148.42	0.00E+00	6.94E-02	1.39E-01	
Pu-239	5.6872E-03	73.21	148.42	0.00E+00	4.18E-01	8.33E-01	
Pu-240	2.2541E-03	73.21	148.42	0.00E+00	1.65E-01	3.30E-01	
Pu-241	1.4433E-02	73.21	148.42	0.00E+00	1.06E+00	2.11E+00	
Pu-242	3.0602E-07	73.21	148.42	0.00E+00	2.24E-05	4.48E-05	
Pa-226	1.8857E-12	73.21	148.42	0.00E+00	1.38E-10	2.78E-10	
Pa-228	2.3729E-10	73.21	148.42	0.00E+00	1.74E-08	3.47E-08	
Pa-106	3.4857E-15	73.21	148.42	0.00E+00	2.55E-13	5.10E-13	
Se-78	1.2801E-05	73.21	148.42	0.00E+00	9.47E-04	1.89E-03	
Sm-126	1.2235E-05	73.21	148.42	0.00E+00	8.95E-04	1.79E-03	
Sm-140	8.9173E-01	73.21	148.42	0.00E+00	6.53E-01	1.31E+02	
Tc-99	4.4120E-04	73.21	148.42	0.00E+00	3.23E-02	6.48E-02	
Th-229	8.2752E-10	73.21	148.42	0.00E+00	8.08E-08	1.21E-07	
Th-230	1.4808E-10	73.21	148.42	0.00E+00	1.09E-08	2.18E-08	
Th-232	2.3744E-10	73.21	148.42	0.00E+00	1.74E-08	3.48E-08	
Th-230	1.3688E-08	73.21	148.42	0.00E+00	1.00E-06	2.00E-06	
U-232	3.6787E-08	73.21	148.42	0.00E+00	2.68E-08	5.39E-08	
U-233	1.3164E-07	73.21	148.42	0.00E+00	8.64E-08	1.93E-05	
U-234	3.3865E-07	73.21	148.42	0.00E+00	2.48E-05	4.98E-05	
U-235	2.6144E-06	73.21	148.42	0.00E+00	4.72E-03	9.31E-04	
U-236	1.2722E-05	73.21	148.42	0.00E+00	9.31E-04	1.85E-03	
U-238	3.8857E-08	73.21	148.42	0.00E+00	2.83E-03	2.83E-03	
Y-90	8.3203E-01	73.21	148.42	0.00E+00	6.53E-01	1.31E+02	
Other Radionuclides					8.17E+01	1.63E+02	
Thermal Power							
Nominal Heat Output (Watts)							8.42E-01
Bounding Heat Output (Watts)							1.58E+00
Total							Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator:	From SFD	Used
Fuel Cladding:	ALUM	ALUM
BOL H/M Constituents:	U	U
BOL Enrichment %:	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd/g)

From SFD	Estimated
Nominal: 63.19	73.21
Bounding: 148.42	Nominal burnup calculated from the heavy metal mass destroyed.

Basis for burnup used in estimate:

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.38	

Estimated EOL H/M/Chen EOL H/M

1.00

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: TRIGA STD (ALUM) HANNOVER
 SNF ID #: 303
 Fuel Units & Descr: 71 - ELEMENT
 Heavy Metal Mass: BOL-13.561kg, EOL-13.418kg
 ROD Storage Str: WEEI

II. Estimates

Fuel decay start date: 1996
 Estimates as of: 2030
 Template: TRIGA-M (LW/U-Zr, Alum., 10 to 20%, U)
 Heavy Metal Mass (M/T): 0.00018
 Template Decay Time: 25 years

Estimated
 Canister Usage:
 18" x 10"
 0.64

Radionuclide	QMWd From Template	Nominal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Total Photons/sec (Bouding)
Ac-227	3.827E-09	135.54	271.08	0.00E+00	5.19E-07	1.04E-06	Avg. MGV	2.450E+13
Am-241	4.419E-08	135.54	271.08	0.00E+00	5.99E-01	1.20E+00	0.0150	5.061E+12
Am-240m	1.119E-06	135.54	271.08	0.00E+00	2.47E-04	4.93E-04	0.0250	5.061E+12
Am-243	2.327E-07	135.54	271.08	0.00E+00	3.16E-05	6.31E-05	0.0375	4.981E+12
C-14	4.3203E-05	135.54	271.08	0.00E+00	5.96E-03	1.17E-02	0.0650	2.924E+12
Ca-36	4.3023E-08	135.54	271.08	0.00E+00	5.83E-06	1.17E-05	0.0850	2.924E+12
Co-243	1.6072E-07	135.54	271.08	0.00E+00	2.29E-05	4.57E-05	0.1250	2.924E+12
Co-244	1.4600E-08	135.54	271.08	0.00E+00	1.99E-04	3.97E-04	0.2250	2.924E+12
Co-60	2.237E-03	135.54	271.08	0.00E+00	3.03E-01	6.07E-01	0.3750	1.100E+12
Co-134	1.2625E-04	135.54	271.08	0.00E+00	1.70E-02	3.40E-02	0.5750	1.779E+13
Co-137	3.1549E-05	135.54	271.08	0.00E+00	4.28E-03	8.55E-03	0.6500	1.469E+12
Eu-154	1.7368E-00	135.54	271.08	0.00E+00	2.35E-02	4.71E-02	1.7500	4.718E+10
Eu-155	2.6857E-02	135.54	271.08	0.00E+00	3.65E-01	7.30E-01	1.7500	1.469E+12
Eu-156	4.2105E-05	135.54	271.08	0.00E+00	5.71E-03	1.14E-02	2.2500	7.228E+05
Fe-56	4.2105E-05	135.54	271.08	0.00E+00	3.64E-00	7.28E+00	2.7500	1.967E+05
H-3	3.5173E-03	135.54	271.08	0.00E+00	4.77E-01	9.53E-01	3.5000	4.090E+02
H-129	7.3805E-07	135.54	271.08	0.00E+00	1.00E-04	2.00E-04	6.0000	1.803E+02
K-45	6.323E-02	135.54	271.08	0.00E+00	9.39E+00	1.88E+01	7.0000	1.810E+01
Nb-237	1.4752E-06	135.54	271.08	0.00E+00	2.00E-04	4.00E-04	11.0000	2.056E+00
Pa-231	8.3070E-09	135.54	271.08	0.00E+00	1.14E-06	2.28E-06		
Pb-210	1.9936E-13	135.54	271.08	0.00E+00	2.03E-11	4.07E-11		
Pm-147	1.0657E-02	135.54	271.08	0.00E+00	1.43E+00	2.86E+00		
Pu-238	1.1543E-03	135.54	271.08	0.00E+00	1.56E-01	3.13E-01		
Pu-239	5.6917E-03	135.54	271.08	0.00E+00	7.71E-01	1.54E+00		
Pu-240	2.2602E-03	135.54	271.08	0.00E+00	3.06E-01	6.13E-01		
Pu-241	4.8045E-02	135.54	271.08	0.00E+00	6.51E+00	1.30E+01		
Pu-242	3.0602E-07	135.54	271.08	0.00E+00	4.15E-05	8.30E-05		
Re-226	5.1293E-13	135.54	271.08	0.00E+00	6.95E-11	1.39E-10		
Ra-228	2.3323E-10	135.54	271.08	0.00E+00	3.16E-08	6.32E-08		
Ru-106	1.0075E-07	135.54	271.08	0.00E+00	1.57E-05	2.73E-05		
Se-79	1.2935E-05	135.54	271.08	0.00E+00	1.75E-03	3.51E-03		
Sn-126	1.2238E-05	135.54	271.08	0.00E+00	1.66E-03	3.32E-03		
Te-98	1.6165E+00	135.54	271.08	0.00E+00	2.19E+02	4.38E+02		
Th-229	4.5684E-10	135.54	271.08	0.00E+00	6.98E-02	1.20E-01		
Th-230	6.8271E-11	135.54	271.08	0.00E+00	9.19E-08	1.85E-08		
Th-232	2.3744E-10	135.54	271.08	0.00E+00	3.22E-08	6.44E-08		
Th-230	2.3744E-10	135.54	271.08	0.00E+00	2.35E-06	4.71E-06		
U-232	4.6797E-08	135.54	271.08	0.00E+00	6.34E-06	1.27E-05		
U-233	1.3146E-07	135.54	271.08	0.00E+00	1.78E-05	3.56E-05		
U-234	2.5729E-07	135.54	271.08	0.00E+00	3.49E-05	6.97E-05		
U-235	2.6159E-06	135.54	271.08	0.00E+00	5.86E-03	1.17E-02		
U-236	1.2719E-05	135.54	271.08	0.00E+00	1.72E-03	3.45E-03		
U-238	3.8857E-08	135.54	271.08	0.00E+00	3.65E-03	7.30E-03		
Y-90	1.6165E+00	135.54	271.08	0.00E+00	2.19E+02	4.38E+02		

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	3.02E+00	6.04E+00

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From STD	Used	Based for Parameter Differences:
Reactor Moderator:	LW AND U ZIRCONIUM HYDROXIDE	LW AND U ZIRCONIUM HYDROXIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HMI Constituents:	U	U	
BOL Enrichment %:	20.0291594	10 to 20.1	

Burnup Summary (MWd/t)	From STD	Estimated	Based for burnup used in estimate:
Nominal:	132.17	135.54	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		271.08	Bounding burnup assumed to be twice nominal burnup.

Checks	Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL Inventory EOL HMI
Nominal:	0.27	0.54	1.03	1.03
Bounding:				

Reactor shutdown, core removal, storage, shipping or other data 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/MHT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) HEIDELBERG
 SNF ID #: 464
 Fuel Units & Descr: 65 - ELEMENT
 Heavy Metal Mass: BOL=11.649kg; EOL=11.401kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2030
 Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
²Template Burnup (MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 0.59

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	2.4556E-09	283.80	567.61	0.00E+00	6.97E-07	1.39E-06	Avg. MeV	
Am-241	3.8752E-03	283.80	567.61	0.00E+00	1.10E+00	2.20E+00	0.0150	5.825E+13
Am-242m	1.8617E-06	283.80	567.61	0.00E+00	5.28E-04	1.06E-03	0.0250	1.203E+13
Am-243	2.3293E-07	283.80	567.61	0.00E+00	6.61E-05	1.32E-04	0.0375	1.259E+13
C-14	4.3233E-05	283.80	567.61	0.00E+00	1.23E-02	2.45E-02	0.0575	1.164E+13
Cl-36	4.3023E-08	283.80	567.61	0.00E+00	1.22E-05	2.44E-05	0.0850	7.085E+12
Cm-243	1.9053E-07	283.80	567.61	0.00E+00	5.41E-05	1.08E-04	0.1250	7.953E+12
Cm-244	1.7744E-08	283.80	567.61	0.00E+00	5.04E-04	1.01E-03	0.2250	6.420E+12
Co-60	4.3188E-03	283.80	567.61	0.00E+00	1.23E+00	2.45E+00	0.3750	2.638E+12
Cs-134	6.7188E-04	283.80	567.61	0.00E+00	1.91E-01	3.81E-01	0.5750	4.203E+13
Cs-135	3.1549E-05	283.80	567.61	0.00E+00	8.95E-03	1.79E-02	0.8500	4.472E+12
Cs-137	1.9489E+00	283.80	567.61	0.00E+00	5.53E+02	1.11E+03	1.2500	4.817E+12
Eu-154	4.0301E-01	283.80	567.61	0.00E+00	1.14E+02	2.29E+02	1.7500	1.443E+11
Eu-155	5.4000E-02	283.80	567.61	0.00E+00	1.53E+01	3.07E+01	2.2500	2.287E+06
Fe-55	1.5955E-04	283.80	567.61	0.00E+00	4.53E-02	9.06E-02	2.7500	3.807E+05
H-3	4.6571E-03	283.80	567.61	0.00E+00	1.32E+00	2.64E+00	3.5000	2.621E+03
I-129	7.3805E-07	283.80	567.61	0.00E+00	2.09E-04	4.19E-04	5.0000	3.262E+02
Kr-85	9.5684E-02	283.80	567.61	0.00E+00	2.72E+01	5.43E+01	7.0000	3.684E+01
Np-237	1.4618E-06	283.80	567.61	0.00E+00	4.15E-04	8.30E-04	11.0000	4.191E+00
Pa-231	6.4782E-08	283.80	567.61	0.00E+00	1.84E-06	3.68E-06		
Pb-210	6.3158E-14	283.80	567.61	0.00E+00	1.79E-11	3.58E-11		
Pm-147	3.0564E-02	283.80	567.61	0.00E+00	1.12E+01	2.25E+01		
Pu-238	1.2008E-03	283.80	567.61	0.00E+00	3.41E-01	6.82E-01		
Pu-239	5.6917E-03	283.80	567.61	0.00E+00	1.62E+00	3.23E+00		
Pu-240	2.2617E-03	283.80	567.61	0.00E+00	6.42E-01	1.28E+00		
Pu-241	6.1113E-02	283.80	567.61	0.00E+00	1.73E+01	3.47E+01		
Pu-242	3.0602E-07	283.80	567.61	0.00E+00	8.68E-05	1.74E-04		
Ra-226	2.6707E-13	283.80	567.61	0.00E+00	7.58E-11	1.52E-10		
Ra-228	2.2556E-10	283.80	567.61	0.00E+00	6.40E-08	1.28E-07		
Ru-106	3.1293E-06	283.80	567.61	0.00E+00	8.88E-04	1.78E-03		
Se-79	1.2935E-05	283.80	567.61	0.00E+00	3.67E-03	7.34E-03		
Sn-126	1.2238E-05	283.80	567.61	0.00E+00	3.47E-03	6.95E-03		
Sr-90	1.8195E+00	283.80	567.61	0.00E+00	5.16E+02	1.03E+03		
Tc-99	4.4120E-04	283.80	567.61	0.00E+00	1.25E-01	2.50E-01		
Th-229	3.3308E-10	283.80	567.61	0.00E+00	9.45E-08	1.89E-07		
Th-230	4.6526E-11	283.80	567.61	0.00E+00	1.32E-08	2.64E-08		
Th-232	2.3744E-10	283.80	567.61	0.00E+00	6.74E-08	1.35E-07		
Ti-208	1.8195E-08	283.80	567.61	0.00E+00	5.16E-06	1.03E-05		
U-232	4.9098E-08	283.80	567.61	0.00E+00	1.39E-05	2.79E-05		
U-233	1.3140E-07	283.80	567.61	0.00E+00	3.73E-05	7.46E-05		
U-234	2.2571E-07	283.80	567.61	0.00E+00	6.41E-05	1.28E-04		
U-235	-2.6159E-08	283.80	0.00	5.06E-03	4.31E-03	5.06E-03		
U-236	1.2719E-05	283.80	567.61	0.00E+00	3.61E-03	7.22E-03		
U-238	-3.8857E-08	283.80	0.00	3.13E-03	3.12E-03	3.13E-03		
Y-90	1.8211E+00	283.80	567.61	0.00E+00	5.17E+02	1.03E+03		
Other Radionuclides					5.94E+02	1.19E+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 %:	20.08410778	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimates:
	From SFD	Estimated	
Nominal:	283.80	235.77	
Bounding:		567.61	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.86	0.83	
Bounding:	1.32		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ITALY

SNF ID #: 466

Fuel Units & Descr: 60 - ELEMENT

Heavy Metal Mass: BOL=10.8kg; EOL=10.74kg

ROD Storage Site: INEEL

*Fuel decay start date: 2010

Estimates as of: 2030

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

*Template Burnup(MWd): 6.85

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

0.54

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.4556E-09	57.27	114.54	0.00E+00	1.41E-07	2.81E-07	Avg. MeV	
Am-241	3.8752E-03	57.27	114.54	0.00E+00	2.22E-01	4.44E-01	0.0150	1.176E+13
Am-242m	1.8617E-06	57.27	114.54	0.00E+00	1.07E-04	2.13E-04	0.0250	2.427E+12
Am-243	2.3293E-07	57.27	114.54	0.00E+00	1.33E-05	2.67E-05	0.0375	2.541E+12
C-14	4.3233E-05	57.27	114.54	0.00E+00	2.48E-03	4.95E-03	0.0575	2.348E+12
Cl-36	4.3023E-08	57.27	114.54	0.00E+00	2.46E-06	4.93E-06	0.0850	1.430E+12
Cm-243	1.9053E-07	57.27	114.54	0.00E+00	1.09E-05	2.18E-05	0.1250	1.805E+12
Cm-244	1.7744E-06	57.27	114.54	0.00E+00	1.02E-04	2.03E-04	0.2250	1.296E+12
Co-60	4.3188E-03	57.27	114.54	0.00E+00	2.47E-01	4.95E-01	0.3750	5.324E+11
Cs-134	6.7188E-04	57.27	114.54	0.00E+00	3.85E-02	7.70E-02	0.6750	8.481E+12
Cs-135	3.1549E-05	57.27	114.54	0.00E+00	1.81E-03	3.61E-03	0.8500	9.024E+11
Cs-137	1.9489E+00	57.27	114.54	0.00E+00	1.12E+02	2.23E+02	1.2500	9.721E+11
Eu-154	4.0301E-01	57.27	114.54	0.00E+00	2.31E+01	4.62E+01	1.7500	2.912E+10
Eu-155	5.4000E-02	57.27	114.54	0.00E+00	3.09E+00	6.19E+00	2.2500	4.616E+05
Fe-55	1.5855E-04	57.27	114.54	0.00E+00	9.14E-03	1.83E-02	2.7500	7.684E+04
H-3	4.8571E-03	57.27	114.54	0.00E+00	2.67E-01	5.33E-01	3.5000	5.411E+02
I-129	7.3805E-07	57.27	114.54	0.00E+00	4.23E-05	8.45E-05	5.0000	7.106E+01
Kr-85	9.5684E-02	57.27	114.54	0.00E+00	5.48E+00	1.10E+01	7.0000	8.039E+00
Np-237	1.4618E-06	57.27	114.54	0.00E+00	8.37E-05	1.67E-04	11.0000	9.152E-01
Pa-231	6.4782E-09	57.27	114.54	0.00E+00	3.71E-07	7.42E-07		
Pb-210	6.3158E-14	57.27	114.54	0.00E+00	3.62E-12	7.23E-12		
Pm-147	3.9564E-02	57.27	114.54	0.00E+00	2.27E+00	4.53E+00		
Pu-238	1.2008E-03	57.27	114.54	0.00E+00	6.88E-02	1.38E-01		
Pu-239	5.6917E-03	57.27	114.54	0.00E+00	3.26E-01	6.52E-01		
Pu-240	2.2617E-03	57.27	114.54	0.00E+00	1.30E-01	2.59E-01		
Pu-241	6.1113E-02	57.27	114.54	0.00E+00	3.50E+00	7.00E+00		
Pu-242	3.0602E-07	57.27	114.54	0.00E+00	1.75E-05	3.51E-05		
Ra-226	2.6707E-13	57.27	114.54	0.00E+00	1.53E-11	3.06E-11		
Ra-228	2.2556E-10	57.27	114.54	0.00E+00	1.29E-08	2.58E-08		
Ru-106	3.1293E-06	57.27	114.54	0.00E+00	1.79E-04	3.58E-04		
Se-79	1.2935E-05	57.27	114.54	0.00E+00	7.41E-04	1.48E-03		
Sn-126	1.2238E-05	57.27	114.54	0.00E+00	7.01E-04	1.40E-03		
Sr-90	1.8195E+00	57.27	114.54	0.00E+00	1.04E+02	2.08E+02		
Tc-99	4.4120E-04	57.27	114.54	0.00E+00	2.53E-02	5.05E-02		
Th-229	3.3308E-10	57.27	114.54	0.00E+00	1.91E-08	3.82E-08		
Th-230	4.6526E-11	57.27	114.54	0.00E+00	2.66E-09	5.33E-09		
Th-232	2.3744E-10	57.27	114.54	0.00E+00	1.36E-08	2.72E-08		
Ti-208	1.8195E-08	57.27	114.54	0.00E+00	1.04E-06	2.08E-06		
U-232	4.9098E-08	57.27	114.54	0.00E+00	2.81E-06	5.62E-06		
U-233	1.3140E-07	57.27	114.54	0.00E+00	7.53E-06	1.51E-05		
U-234	2.2571E-07	57.27	114.54	0.00E+00	1.29E-05	2.59E-05		
U-235	2.8159E-06	57.27	0.00	4.67E-03	4.52E-03	4.67E-03		
U-236	1.2719E-05	57.27	114.54	0.00E+00	7.28E-04	1.46E-03		
U-238	3.8857E-08	57.27	0.00	2.90E-03	2.90E-03	2.90E-03		
Y-90	1.8211E+00	57.27	114.54	0.00E+00	1.04E+02	2.08E+02		
Other Radionuclides					1.20E+02	2.40E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	62.63	57.27
Bounding:		114.54

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ITALY
 SNF ID #: 467
 Fuel Units & Descr: 64 - ELEMENT
 Heavy Metal Mass: BOL=11.83kg; EOL=11.904kg
 ROD Storage Site: INEL

Fuel decay start date: 1997 2030
 Estimates as of: TRIGA-AI (LW/U-Zr, Al, 10 to 20%, U)
 Template: 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 25 years

Estimated
 Canister usage:
 19" x 10" 0.58

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources
							Photon Energy Group
Ac-227	3.8271E-08	58.13	116.27	0.00E+00	2.22E-07	4.45E-07	Avg. MeV
Am-241	4.4195E-03	58.13	116.27	0.00E+00	2.57E-01	5.14E-01	0.0150
Am-242m	1.8195E-06	58.13	116.27	0.00E+00	1.06E-04	2.12E-04	0.0250
Am-243	2.3278E-07	58.13	116.27	0.00E+00	1.35E-05	2.71E-05	0.0375
C-14	4.3203E-05	58.13	116.27	0.00E+00	2.51E-03	5.02E-03	0.0575
Cl-38	4.3023E-08	58.13	116.27	0.00E+00	2.50E-08	5.00E-08	0.0850
Cr-243	1.6872E-07	58.13	116.27	0.00E+00	9.81E-06	1.96E-05	0.1250
Cr-244	1.6690E-08	58.13	116.27	0.00E+00	8.52E-05	1.70E-04	0.2250
Co-60	2.2378E-03	58.13	116.27	0.00E+00	1.30E-01	2.60E-01	0.3750
Co-134	1.2525E-04	58.13	116.27	0.00E+00	7.28E-03	1.46E-02	0.5750
Co-136	3.1549E-05	58.13	116.27	0.00E+00	1.83E-03	3.67E-03	0.8500
Co-137	1.7368E+00	58.13	116.27	0.00E+00	1.01E+02	2.02E+02	1.2500
Eu-154	2.6947E-01	58.13	116.27	0.00E+00	1.57E+01	3.13E+01	1.7500
Eu-155	2.6867E-02	58.13	116.27	0.00E+00	1.56E+00	3.12E+00	2.2500
Fe-55	4.2105E-05	58.13	116.27	0.00E+00	2.45E-03	4.90E-03	2.7500
H-3	3.5173E-03	58.13	116.27	0.00E+00	2.04E-01	4.09E-01	3.5000
I-129	7.3805E-07	58.13	116.27	0.00E+00	4.29E-05	8.58E-05	5.0000
K-85	6.9263E-02	58.13	116.27	0.00E+00	4.03E+00	8.05E+00	7.0000
Np-237	1.4752E-08	58.13	116.27	0.00E+00	8.58E-05	1.72E-04	11.0000
Pu-231	8.3970E-09	58.13	116.27	0.00E+00	4.88E-07	9.76E-07	
Pu-210	1.4995E-13	58.13	116.27	0.00E+00	8.72E-12	1.74E-11	
Pm-147	1.0567E-02	58.13	116.27	0.00E+00	6.14E-01	1.23E+00	
Pu-238	1.1543E-03	58.13	116.27	0.00E+00	6.71E-02	1.34E-01	
Pu-239	5.6917E-03	58.13	116.27	0.00E+00	3.31E-01	6.62E-01	
Pu-240	2.2602E-03	58.13	116.27	0.00E+00	1.31E-01	2.63E-01	
Pu-241	4.8045E-02	58.13	116.27	0.00E+00	2.79E+00	5.59E+00	
Pu-242	3.0602E-07	58.13	116.27	0.00E+00	1.78E-05	3.56E-05	
Ra-226	5.1263E-13	58.13	116.27	0.00E+00	2.98E-11	5.96E-11	
Ra-228	2.3323E-10	58.13	116.27	0.00E+00	1.36E-08	2.71E-08	
Ru-106	1.0075E-07	58.13	116.27	0.00E+00	5.86E-06	1.17E-05	
Se-70	1.2935E-05	58.13	116.27	0.00E+00	7.52E-04	1.50E-03	
Si-126	1.2238E-05	58.13	116.27	0.00E+00	7.11E-04	1.42E-03	
Sn-90	1.6168E+00	58.13	116.27	0.00E+00	9.40E+01	1.89E+02	
Tc-99	4.4150E-04	58.13	116.27	0.00E+00	2.56E-02	5.13E-02	
Th-229	4.5694E-10	58.13	116.27	0.00E+00	2.66E-08	5.31E-08	
Th-230	8.8271E-11	58.13	116.27	0.00E+00	3.97E-09	7.94E-09	
Th-232	2.3744E-10	58.13	116.27	0.00E+00	1.38E-08	2.76E-08	
Th-208	1.7368E-06	58.13	116.27	0.00E+00	1.01E-06	2.02E-06	
U-232	4.6797E-08	58.13	116.27	0.00E+00	2.72E-06	5.44E-06	
U-233	1.3146E-07	58.13	116.27	0.00E+00	7.64E-06	1.53E-05	
U-234	2.5729E-07	58.13	116.27	0.00E+00	1.50E-06	2.99E-06	
U-235	-2.6159E-06	58.13	0.00	5.10E-03	4.94E-03	5.10E-03	
U-236	1.2719E-05	58.13	116.27	0.00E+00	7.39E-04	1.49E-03	
U-238	-3.6857E-08	58.13	0.00	3.22E-03	3.21E-03	3.22E-03	
Y-90	1.6765E+00	58.13	116.27	0.00E+00	9.40E+01	1.89E+02	
Other Radionuclides					1.09E+02	2.19E+02	

Thermal Power	
Nominal Heat Output (Watts)	1.23E+00
Bounding Heat Output (Watts)	2.53E+00
Total	

Template Selection Summary			
Reactor Moderator:	From SFD	Used	Basics for Parameter Differences:
LW AND U238C HYDROGE			
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.76449407	10 to 20.1	

Burnup Summary (MWd) ²	
Nominal:	From SFD
24.43	Estimated
Bounding:	From SFD
116.27	Estimated

Checks	
Nominal:	Estimated
Bounding:	Estimated
Burnup Multiplier:	1.00
Estimated Burnup/ Given Burnup	0.42

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) JAPAN
SNF ID #: 481
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.845kg; EOL=13.774kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.64

II. Estimates	m	X ₁	X ₂	b	Y ₁	Y ₂	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.4556E-09	134.93	269.87	0.00E+00	3.31E-07	6.63E-07	Avg. MeV	
Am-241	3.8752E-03	134.93	269.87	0.00E+00	5.23E-01	1.05E+00	0.0150	2.770E+13
Am-242m	1.8617E-06	134.93	269.87	0.00E+00	2.51E-04	5.02E-04	0.0250	5.719E+12
Am-243	2.3293E-07	134.93	269.87	0.00E+00	3.14E-05	6.29E-05	0.0375	5.896E+12
C-14	4.3233E-05	134.93	269.87	0.00E+00	5.83E-03	1.17E-02	0.0575	5.533E+12
Cl-36	4.3023E-08	134.93	269.87	0.00E+00	5.81E-06	1.16E-05	0.0850	3.368E+12
Cm-243	1.9053E-07	134.93	269.87	0.00E+00	2.57E-05	5.14E-05	0.1250	3.781E+12
Cm-244	1.7744E-06	134.93	269.87	0.00E+00	2.39E-04	4.79E-04	0.2250	3.052E+12
Co-60	4.3188E-03	134.93	269.87	0.00E+00	5.83E-01	1.17E+00	0.3750	1.254E+12
Cs-134	6.7188E-04	134.93	269.87	0.00E+00	9.07E-02	1.81E-01	0.5750	1.998E+13
Cs-135	3.1549E-05	134.93	269.87	0.00E+00	4.28E-03	8.51E-03	0.8500	2.126E+12
Cs-137	1.9489E+00	134.93	269.87	0.00E+00	2.63E+02	5.26E+02	1.2500	2.290E+12
Eu-154	4.0301E-01	134.93	269.87	0.00E+00	5.44E+01	1.09E+02	1.7500	6.861E+10
Eu-155	5.4000E-02	134.93	269.87	0.00E+00	7.29E+00	1.46E+01	2.2500	1.088E+06
Fe-55	1.5955E-04	134.93	269.87	0.00E+00	2.15E-02	4.31E-02	2.7500	1.810E+05
H-3	4.6571E-03	134.93	269.87	0.00E+00	6.28E-01	1.26E+00	3.5000	1.258E+03
I-129	7.3805E-07	134.93	269.87	0.00E+00	9.96E-05	1.99E-04	5.0000	1.803E+02
Kr-85	9.5684E-02	134.93	269.87	0.00E+00	1.29E+01	2.58E+01	7.0000	1.811E+01
Np-237	1.4618E-06	134.93	269.87	0.00E+00	1.97E-04	3.94E-04	11.0000	2.061E+00
Pa-231	6.4782E-09	134.93	269.87	0.00E+00	8.74E-07	1.75E-06		
Pb-210	6.3158E-14	134.93	269.87	0.00E+00	8.52E-12	1.70E-11		
Pm-147	3.9564E-02	134.93	269.87	0.00E+00	5.34E+00	1.07E+01		
Pu-238	1.2008E-03	134.93	269.87	0.00E+00	1.62E-01	3.24E-01		
Pu-239	5.6917E-03	134.93	269.87	0.00E+00	7.68E-01	1.54E+00		
Pu-240	2.2617E-03	134.93	269.87	0.00E+00	3.05E-01	6.10E-01		
Pu-241	6.1113E-02	134.93	269.87	0.00E+00	8.25E+00	1.65E+01		
Pu-242	3.0602E-07	134.93	269.87	0.00E+00	4.13E-05	8.26E-05		
Ra-226	2.6707E-13	134.93	269.87	0.00E+00	3.60E-11	7.21E-11		
Ra-228	2.2556E-10	134.93	269.87	0.00E+00	3.04E-08	6.09E-08		
Ru-106	3.1293E-06	134.93	269.87	0.00E+00	4.22E-04	8.45E-04		
Se-79	1.2935E-05	134.93	269.87	0.00E+00	1.75E-03	3.49E-03		
Sn-126	1.2238E-05	134.93	269.87	0.00E+00	1.65E-03	3.30E-03		
Sr-90	1.8195E+00	134.93	269.87	0.00E+00	2.46E+02	4.91E+02		
Tc-99	4.4120E-04	134.93	269.87	0.00E+00	5.95E-02	1.19E-01		
Th-229	3.3308E-10	134.93	269.87	0.00E+00	4.49E-08	8.99E-08		
Th-230	4.6526E-11	134.93	269.87	0.00E+00	6.28E-09	1.26E-08		
Th-232	2.3744E-10	134.93	269.87	0.00E+00	3.20E-08	6.41E-08		
Ti-208	1.8195E-08	134.93	269.87	0.00E+00	2.46E-06	4.91E-06		
U-232	4.9098E-08	134.93	269.87	0.00E+00	6.62E-06	1.32E-05		
U-233	1.3140E-07	134.93	269.87	0.00E+00	1.77E-05	3.55E-05		
U-234	2.2571E-07	134.93	269.87	0.00E+00	3.05E-05	6.09E-05		
U-235	2.6159E-06	134.93	0.00	5.98E-03	5.63E-03	5.98E-03		
U-236	1.2719E-05	134.93	269.87	0.00E+00	1.72E-03	3.43E-03		
U-238	3.8857E-08	134.93	0.00	3.72E-03	3.72E-03	3.72E-03		
Y-90	1.8211E+00	134.93	269.87	0.00E+00	2.46E+02	4.91E+02		
Other Radionuclides					2.83E+02	5.65E+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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000073	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	134.93	67.77	
Bounding:		269.87	
			Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.26	0.50	
Bounding:	0.53		
			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)
*Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.03

II. Estimates

	m	x_a	x_b	b	y_a	y_b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	25.77	51.54	0.00E+00	2.08E-08	4.16E-08	Avg. MeV	
Am-241	2.2586E-03	25.77	51.54	0.00E+00	5.82E-02	1.16E-01	0.0150	8.721E+12
Am-242m	1.9925E-06	25.77	51.54	0.00E+00	5.14E-05	1.03E-04	0.0250	1.893E+12
Am-243	2.3323E-07	25.77	51.54	0.00E+00	6.01E-06	1.20E-05	0.0375	2.359E+12
C-14	4.3308E-05	25.77	51.54	0.00E+00	1.12E-03	2.23E-03	0.0575	1.808E+12
Cl-38	4.3023E-08	25.77	51.54	0.00E+00	1.11E-06	2.22E-06	0.0850	1.268E+12
Cm-243	2.7429E-07	25.77	51.54	0.00E+00	7.07E-06	1.41E-05	0.1250	1.893E+12
Cm-244	3.1504E-06	25.77	51.54	0.00E+00	8.12E-05	1.62E-04	0.2250	1.057E+12
Co-60	3.1008E-02	25.77	51.54	0.00E+00	7.99E-01	1.60E+00	0.3750	4.702E+11
Cs-134	1.0367E-01	25.77	51.54	0.00E+00	2.67E+00	5.34E+00	0.5750	5.902E+12
Cs-135	3.1549E-05	25.77	51.54	0.00E+00	8.13E-04	1.63E-03	0.8500	1.468E+12
Cs-137	2.7564E+00	25.77	51.54	0.00E+00	7.10E+01	1.42E+02	1.2500	1.521E+12
Eu-154	1.3490E+00	25.77	51.54	0.00E+00	3.48E+01	6.95E+01	1.7500	4.354E+10
Eu-155	4.3880E-01	25.77	51.54	0.00E+00	1.13E+01	2.26E+01	2.2500	5.292E+08
Fe-55	8.6782E-03	25.77	51.54	0.00E+00	2.24E-01	4.47E-01	2.7500	4.298E+07
H-3	1.0805E-02	25.77	51.54	0.00E+00	2.78E-01	5.57E-01	3.5000	5.024E+06
I-129	7.3805E-07	25.77	51.54	0.00E+00	1.90E-05	3.80E-05	5.0000	2.974E+01
Kr-85	2.5218E-01	25.77	51.54	0.00E+00	6.50E+00	1.30E+01	7.0000	3.366E+00
Np-237	1.4463E-06	25.77	51.54	0.00E+00	3.73E-05	7.45E-05	11.0000	3.834E-01
Pa-231	3.5970E-09	25.77	51.54	0.00E+00	9.27E-08	1.85E-07		
Pb-210	8.2511E-15	25.77	51.54	0.00E+00	2.13E-13	4.25E-13		
Pm-147	2.0767E+00	25.77	51.54	0.00E+00	5.35E+01	1.07E+02		
Pu-238	1.3514E-03	25.77	51.54	0.00E+00	3.48E-02	6.97E-02		
Pu-239	5.6947E-03	25.77	51.54	0.00E+00	1.47E-01	2.94E-01		
Pu-240	2.2647E-03	25.77	51.54	0.00E+00	5.84E-02	1.17E-01		
Pu-241	1.2574E-01	25.77	51.54	0.00E+00	3.24E+00	6.48E+00		
Pu-242	3.0602E-07	25.77	51.54	0.00E+00	7.89E-06	1.58E-05		
Ra-226	5.7353E-14	25.77	51.54	0.00E+00	1.48E-12	2.96E-12		
Ra-228	1.8150E-10	25.77	51.54	0.00E+00	4.68E-09	9.36E-09		
Ru-106	9.3744E-02	25.77	51.54	0.00E+00	2.42E+00	4.83E+00		
Se-79	1.2938E-05	25.77	51.54	0.00E+00	3.33E-04	6.67E-04		
Sn-126	1.2239E-05	25.77	51.54	0.00E+00	3.15E-04	6.31E-04		
Sr-90	2.6000E+00	25.77	51.54	0.00E+00	6.70E+01	1.34E+02		
Tc-99	4.4120E-04	25.77	51.54	0.00E+00	1.14E-02	2.27E-02		
Th-229	1.4749E-10	25.77	51.54	0.00E+00	3.80E-09	7.60E-09		
Th-230	1.9549E-11	25.77	51.54	0.00E+00	5.04E-10	1.01E-09		
Th-232	2.3744E-10	25.77	51.54	0.00E+00	6.12E-09	1.22E-08		
Ti-208	1.9459E-08	25.77	51.54	0.00E+00	5.01E-07	1.00E-06		
U-232	5.6015E-08	25.77	51.54	0.00E+00	1.44E-06	2.89E-06		
U-233	1.3132E-07	25.77	51.54	0.00E+00	3.38E-06	6.77E-06		
U-234	1.7323E-07	25.77	51.54	0.00E+00	4.48E-06	8.93E-06		
U-235	-2.6159E-06	25.77	0.00	2.33E-04	1.66E-04	2.33E-04		
U-236	1.2717E-05	25.77	51.54	0.00E+00	3.28E-04	6.55E-04		
U-238	-3.8857E-08	25.77	0.00	1.45E-04	1.44E-04	1.45E-04		
Y-90	2.6015E+00	25.77	51.54	0.00E+00	6.70E+01	1.34E+02		
Other Radionuclides					9.80E+01	1.96E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SPD	Estimated
Nominal:		25.77
Bounding:		51.54

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:	1.29	
Bounding:	2.58	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) KSU
SNF ID #: 671
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=11.285kg; EOL=11.208kg
ROD Storage Site: NEEL

¹Fuel decay start date: 1973
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: 50 years

Estimated
Canister usage:
18"x10"
0.55

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 Avg. MeV Total Photons/sec (bounding)
Ac-227	8.6842E-09	109.98	219.97	0.00E+00	9.55E-07	1.91E-06	0.0150
Am-241	4.9459E-03	109.98	219.97	0.00E+00	5.44E-01	1.09E+00	0.0250
Am-242m	1.6241E-06	109.98	219.97	0.00E+00	1.79E-04	3.57E-04	0.0375
Am-243	2.3233E-07	109.98	219.97	0.00E+00	2.56E-05	5.11E-05	0.0575
C-14	4.3083E-05	109.98	219.97	0.00E+00	4.74E-03	9.48E-03	0.0850
Cl-36	4.3023E-08	109.98	219.97	0.00E+00	4.73E-06	9.46E-06	0.1250
Cm-243	9.1880E-08	109.98	219.97	0.00E+00	1.01E-05	2.02E-05	0.2250
Cm-244	5.6346E-07	109.98	219.97	0.00E+00	6.20E-05	1.24E-04	0.3750
Co-60	8.3699E-05	109.98	219.97	0.00E+00	9.21E-03	1.84E-02	0.5750
Cs-134	2.8211E-08	109.98	219.97	0.00E+00	3.10E-06	6.21E-06	0.8500
Cs-135	3.1549E-05	109.98	219.97	0.00E+00	3.47E-03	6.94E-03	1.2500
Cs-137	9.7519E-01	109.98	219.97	0.00E+00	1.07E+02	2.15E+02	5.0000
Eu-154	3.5970E-02	109.98	219.97	0.00E+00	3.96E+00	7.91E+00	2.2500
Eu-155	8.1774E-04	109.98	219.97	0.00E+00	8.99E-02	1.80E-01	2.7500
Fe-55	6.3940E-08	109.98	219.97	0.00E+00	5.93E-06	1.19E-05	3.5000
H-3	8.6571E-04	109.98	219.97	0.00E+00	9.52E-02	1.90E-01	5.0000
I-129	7.3805E-07	109.98	219.97	0.00E+00	8.12E-05	1.62E-04	7.0000
Kr-85	1.3771E-02	109.98	219.97	0.00E+00	1.51E+00	3.03E+00	11.0000
Np-237	1.6218E-06	109.98	219.97	0.00E+00	1.67E-04	3.35E-04	
Pa-231	1.4152E-08	109.98	219.97	0.00E+00	1.56E-06	3.11E-06	
Pb-210	7.9774E-13	109.98	219.97	0.00E+00	8.77E-11	1.75E-10	
Pm-147	1.4362E-05	109.98	219.97	0.00E+00	1.58E-03	3.16E-03	
Pu-238	9.4782E-04	109.98	219.97	0.00E+00	1.04E-01	2.08E-01	
Pu-239	5.6872E-03	109.98	219.97	0.00E+00	6.26E-01	1.25E+00	
Pu-240	2.2541E-03	109.98	219.97	0.00E+00	2.48E-01	4.96E-01	
Pu-241	1.4433E-02	109.98	219.97	0.00E+00	1.59E+00	3.17E+00	
Pu-242	3.0602E-07	109.98	219.97	0.00E+00	3.37E-05	6.73E-05	
Ra-226	1.8857E-12	109.98	219.97	0.00E+00	2.07E-10	4.15E-10	
Ra-228	2.3729E-10	109.98	219.97	0.00E+00	2.61E-08	5.22E-08	
Ru-106	3.4857E-15	109.98	219.97	0.00E+00	3.83E-13	7.67E-13	
Se-79	1.2931E-05	109.98	219.97	0.00E+00	1.42E-03	2.84E-03	
Sn-126	1.2235E-05	109.98	219.97	0.00E+00	1.35E-03	2.69E-03	
Sr-90	8.9173E-01	109.98	219.97	0.00E+00	9.81E+01	1.96E+02	
Tc-99	4.4120E-04	109.98	219.97	0.00E+00	4.85E-02	9.71E-02	
Th-229	8.2752E-10	109.98	219.97	0.00E+00	9.10E-08	1.82E-07	
Th-230	1.4908E-10	109.98	219.97	0.00E+00	1.64E-08	3.28E-08	
Th-232	2.3744E-10	109.98	219.97	0.00E+00	2.61E-08	5.22E-08	
Ti-208	1.3668E-08	109.98	219.97	0.00E+00	1.50E-06	3.01E-06	
U-232	3.6797E-08	109.98	219.97	0.00E+00	4.05E-06	8.09E-06	
U-233	1.3164E-07	109.98	219.97	0.00E+00	1.45E-05	2.90E-05	
U-234	3.3865E-07	109.98	219.97	0.00E+00	3.72E-05	7.45E-05	
U-235	-2.6144E-06	109.98	0.00	4.88E-03	4.59E-03	4.88E-03	
U-236	1.2722E-05	109.98	219.97	0.00E+00	1.40E-03	2.80E-03	
U-238	-3.8857E-08	109.98	0.00	3.03E-03	3.03E-03	3.03E-03	
Y-90	8.9203E-01	109.98	219.97	0.00E+00	9.81E+01	1.96E+02	
Other Radionuclides					1.23E+02	2.46E+02	

III. Template Selection Summary, Burnup Summary, and Checks

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

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

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) MSU

SNF ID #: 878

Fuel Units & Descr: 58 - ELEMENT

Heavy Metal Mass: BOL=10.73kg; EOL=10.655kg

ROD Storage Site: INEL

¹Fuel decay start date: 1973

Estimates as of: 2030

Template: TRIGA-AJ (LWA/J-Zn, Alum., 10 to 20%, U)

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00016

Template Decay Time: 50 years

Estimated

Canister usage:

18"x10"

0.52

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CU/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	8.6842E-09	71.97	143.94	0.00E+00	6.25E-07	1.25E-06	Avg. MeV	
Am-241	4.9459E-03	71.97	143.94	0.00E+00	3.56E-01	7.12E-01	0.0150	7.058E+12
Am-242m	1.6241E-06	71.97	143.94	0.00E+00	1.17E-04	2.34E-04	0.0250	1.463E+12
Am-243	2.3233E-07	71.97	143.94	0.00E+00	1.67E-05	3.34E-05	0.0375	1.321E+12
C-14	4.3083E-05	71.97	143.94	0.00E+00	3.10E-03	6.20E-03	0.0575	1.382E+12
Cl-36	4.3023E-06	71.97	143.94	0.00E+00	3.10E-06	6.19E-06	0.0850	8.244E+11
Cm-243	9.1880E-08	71.97	143.94	0.00E+00	6.61E-06	1.32E-05	0.1250	6.117E+11
Cm-244	5.6346E-07	71.97	143.94	0.00E+00	4.06E-05	8.11E-05	0.2250	7.235E+11
Co-60	8.3690E-05	71.97	143.94	0.00E+00	6.02E-03	1.20E-02	0.3750	3.122E+11
Cs-134	2.8211E-08	71.97	143.94	0.00E+00	2.03E-06	4.06E-06	0.5750	5.241E+12
Cs-135	3.1549E-05	71.97	143.94	0.00E+00	2.27E-03	4.54E-03	0.8500	1.427E+11
Cs-137	9.7519E-01	71.97	143.94	0.00E+00	7.02E+01	1.40E+02	1.2500	1.206E+11
Eu-154	3.5970E-02	71.97	143.94	0.00E+00	2.59E+00	5.18E+00	1.7500	4.326E+09
Eu-155	8.1774E-04	71.97	143.94	0.00E+00	5.89E-02	1.18E-01	2.2500	1.467E+06
Fe-55	5.3940E-08	71.97	143.94	0.00E+00	3.88E-06	7.76E-06	2.7500	6.933E+04
H-3	8.6571E-04	71.97	143.94	0.00E+00	6.23E-02	1.25E-01	3.5000	2.046E+02
I-129	7.3805E-07	71.97	143.94	0.00E+00	5.31E-05	1.06E-04	5.0000	8.619E+01
Kr-85	1.3771E-02	71.97	143.94	0.00E+00	9.91E-01	1.98E+00	7.0000	9.729E+00
Np-237	1.5218E-08	71.97	143.94	0.00E+00	1.10E-04	2.19E-04	11.0000	1.106E+00
Pa-231	1.4152E-08	71.97	143.94	0.00E+00	1.02E-06	2.04E-06		
Pb-210	7.9774E-13	71.97	143.94	0.00E+00	5.74E-11	1.15E-10		
Pm-147	1.4362E-05	71.97	143.94	0.00E+00	1.03E-03	2.07E-03		
Pu-238	9.4782E-04	71.97	143.94	0.00E+00	6.82E-02	1.36E-01		
Pu-239	5.6872E-03	71.97	143.94	0.00E+00	4.09E-01	8.19E-01		
Pu-240	2.2541E-03	71.97	143.94	0.00E+00	1.62E-01	3.24E-01		
Pu-241	1.4433E-02	71.97	143.94	0.00E+00	1.04E+00	2.08E+00		
Pu-242	3.0602E-07	71.97	143.94	0.00E+00	2.20E-05	4.40E-05		
Ra-226	1.8857E-12	71.97	143.94	0.00E+00	1.36E-10	2.71E-10		
Ra-228	2.3729E-10	71.97	143.94	0.00E+00	1.71E-08	3.42E-08		
Ru-106	3.4857E-15	71.97	143.94	0.00E+00	2.51E-13	5.02E-13		
Se-78	1.2931E-05	71.97	143.94	0.00E+00	9.31E-04	1.86E-03		
Sn-126	1.2235E-05	71.97	143.94	0.00E+00	8.81E-04	1.76E-03		
Sr-90	8.9173E-01	71.97	143.94	0.00E+00	6.42E+01	1.28E+02		
Tc-99	4.4120E-04	71.97	143.94	0.00E+00	3.18E-02	6.35E-02		
Th-229	8.2752E-10	71.97	143.94	0.00E+00	5.96E-08	1.19E-07		
Th-230	1.4908E-10	71.97	143.94	0.00E+00	1.07E-08	2.15E-08		
Th-232	2.3744E-10	71.97	143.94	0.00E+00	1.71E-08	3.42E-08		
Ti-208	1.3668E-08	71.97	143.94	0.00E+00	9.84E-07	1.97E-06		
U-232	3.6797E-08	71.97	143.94	0.00E+00	2.65E-06	5.30E-06		
U-233	1.3164E-07	71.97	143.94	0.00E+00	9.47E-06	1.89E-05		
U-234	3.3865E-07	71.97	143.94	0.00E+00	2.44E-05	4.87E-05		
U-235	2.6144E-06	71.97	0.00	4.64E-03	4.45E-03	4.64E-03		
U-236	1.2722E-05	71.97	143.94	0.00E+00	9.16E-04	1.83E-03		
U-238	3.8857E-08	71.97	0.00	2.89E-03	2.88E-03	2.89E-03		
Y-90	8.9203E-01	71.97	143.94	0.00E+00	6.42E+01	1.28E+02		
Other Radionuclides					8.04E+01	1.61E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.26E-01	1.55E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	52.29	71.97
Bounding:		143.94

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:	0.18	1.33
Bounding:	0.36	

Estimated EOL HM/ Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: TRIGA STD (ALUM) NEED COLLEGE
 SNF ID #: 256
 Fuel Units & Descr: SS - ELEMENT
 Heavy Metal Mass: BOL:10.827kg; EOL:10.837kg
 ROD Storage Site: NEED

Estimated
 Chatter usage:
 18"x10"
 0.52

Estimated
 Chatter usage:
 18"x10"
 0.52

Template BOL Heavy Metal Mass (MT):
 Template Decay Time:
 5 years

Template Decay Time:
 5 years

II. Estimates	m	z ₁	z ₂	D	y ₁	y ₂	Gamma Sources
Radionuclide	CLM/Wd From Template	Nominal Fuel Burnup (MWd) ^g	Bounding Fuel Burnup (MWd) ^g	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Energy Group
Ac-227	8.0632E-10	53.25	106.50	0.00E+00	4.29E-08	8.59E-08	Avg. Mlev
Am-241	2.2586E-03	53.25	106.50	0.00E+00	1.20E-01	2.41E-01	0.0150
Am-242m	1.9925E-06	53.25	106.50	0.00E+00	1.06E-04	2.12E-04	0.0250
Am-243	2.3323E-07	53.25	106.50	0.00E+00	1.24E-05	2.48E-05	0.0375
C-14	4.3308E-05	53.25	106.50	0.00E+00	2.31E-03	4.61E-03	0.0575
Cl-36	4.3023E-08	53.25	106.50	0.00E+00	2.29E-06	4.58E-06	0.0850
Co-443	2.7429E-07	53.25	106.50	0.00E+00	1.46E-05	2.92E-05	0.1250
Co-244	3.1504E-06	53.25	106.50	0.00E+00	1.68E-04	3.36E-04	0.2250
Co-60	3.1008E-02	53.25	106.50	0.00E+00	1.65E+00	3.30E+00	0.3750
Co-134	1.0367E-01	53.25	106.50	0.00E+00	6.52E+00	1.10E+01	0.5750
Co-135	3.1549E-05	53.25	106.50	0.00E+00	1.68E-03	3.36E-03	0.8500
Eu-154	2.7564E+00	53.25	106.50	0.00E+00	1.47E+02	2.94E+02	1.2500
Eu-155	4.3890E-01	53.25	106.50	0.00E+00	2.34E+01	4.67E+01	1.7500
Fe-55	8.6782E-03	53.25	106.50	0.00E+00	4.62E-01	9.24E-01	2.2500
H-3	1.0805E-02	53.25	106.50	0.00E+00	5.75E-01	1.15E+00	3.5000
I-129	7.3805E-07	53.25	106.50	0.00E+00	3.83E-05	7.66E-05	5.0000
K-45	2.5218E-01	53.25	106.50	0.00E+00	1.34E+01	2.69E+01	7.0000
Np-237	3.5970E-09	53.25	106.50	0.00E+00	1.82E-07	3.63E-07	11.0000
Pa-231	1.4463E-06	53.25	106.50	0.00E+00	7.70E-05	1.54E-04	
Pb-210	8.2511E-15	53.25	106.50	0.00E+00	4.39E-13	8.79E-13	
Pm-147	2.0767E+00	53.25	106.50	0.00E+00	1.11E+02	2.21E+02	
Pu-238	1.3514E-03	53.25	106.50	0.00E+00	7.20E-02	1.44E-01	
Pu-239	5.6647E-03	53.25	106.50	0.00E+00	3.03E-01	6.06E-01	
Pu-240	2.2647E-03	53.25	106.50	0.00E+00	1.21E-01	2.41E-01	
Pu-241	1.2574E-01	53.25	106.50	0.00E+00	6.70E+00	1.34E+01	
Pu-242	3.0602E-07	53.25	106.50	0.00E+00	1.63E-05	3.26E-05	
Pa-226	5.7363E-14	53.25	106.50	0.00E+00	3.05E-12	6.11E-12	
Ra-228	1.8150E-02	53.25	106.50	0.00E+00	9.89E-09	1.98E-08	
Rn-106	9.3744E-02	53.25	106.50	0.00E+00	4.89E+00	9.89E+00	
Se-79	1.2938E-05	53.25	106.50	0.00E+00	6.89E-04	1.38E-03	
Sn-126	1.2239E-05	53.25	106.50	0.00E+00	6.52E-04	1.30E-03	
Sn-90	2.6000E+00	53.25	106.50	0.00E+00	1.38E+02	2.77E+02	
Tb-229	4.4120E-04	53.25	106.50	0.00E+00	2.85E-02	4.70E-02	
Tb-229	1.4749E-10	53.25	106.50	0.00E+00	7.85E-09	1.57E-08	
Tb-230	1.9549E-11	53.25	106.50	0.00E+00	1.04E-09	2.08E-09	
Th-232	2.3744E-07	53.25	106.50	0.00E+00	1.26E-06	2.53E-06	
Th-230	1.9459E-08	53.25	106.50	0.00E+00	1.04E-06	2.07E-06	
U-232	6.6016E-08	53.25	106.50	0.00E+00	2.88E-06	5.87E-06	
U-233	1.3132E-07	53.25	106.50	0.00E+00	6.99E-06	1.40E-05	
U-234	1.7323E-07	53.25	106.50	0.00E+00	9.22E-06	1.84E-05	
U-235	2.6159E-06	53.25	106.50	0.00E+00	4.70E-03	4.70E-03	
U-236	1.2717E-06	53.25	106.50	0.00E+00	6.77E-04	1.35E-03	
U-238	3.8857E-08	53.25	106.50	0.00E+00	2.94E-03	2.94E-03	
Y-90	2.6015E+00	53.25	106.50	0.00E+00	1.39E+02	2.77E+02	

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From STD	Used
Reactor Moderator: LW AND U ZINC HYDROIDE	ALUM
Fuel Cladding: U	U
BOL HMI Constituents: BCL Enrichment %:	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)^g

From STD	Estimated
Nominal: 53.25	38.75
Bounding: 106.50	106.50

Basis for Burnup used in estimate:
 Normal burnup when directly from STD (converted to MWd).
 Bounding burnup assumed to be twice nominal burnup.

Checks

Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	0.26	0.73

Estimated EOL HMI/Given EOL HMI
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) SLOVENIA
SNF ID #: 468
Fuel Units & Descr: 67 - ELEMENT
Heavy Metal Mass: BOL=11.879kg; EOL=11.531kg
RAD Storage Site: NEEL

*Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
*Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.60

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.8271E-09	405.21	810.42	0.00E+00	1.55E-06	3.10E-06	Avg. MeV	
Am-241	4.4195E-03	405.21	810.42	0.00E+00	1.79E+00	3.58E+00	0.0150	7.324E+13
Am-242m	1.8195E-06	405.21	810.42	0.00E+00	7.37E-04	1.47E-03	0.0250	1.513E+13
Am-243	2.3278E-07	405.21	810.42	0.00E+00	9.43E-05	1.89E-04	0.0375	1.515E+13
C-14	4.3203E-05	405.21	810.42	0.00E+00	1.75E-02	3.50E-02	0.0575	1.453E+13
Cl-36	4.3023E-08	405.21	810.42	0.00E+00	1.74E-05	3.49E-05	0.0850	8.741E+12
Cm-243	1.6872E-07	405.21	810.42	0.00E+00	6.84E-05	1.37E-04	0.1250	8.886E+12
Cm-244	1.4680E-08	405.21	810.42	0.00E+00	5.94E-04	1.19E-03	0.2250	7.908E+12
Co-60	2.2378E-03	405.21	810.42	0.00E+00	9.07E-01	1.81E+00	0.3750	3.289E+12
Cs-134	1.2525E-04	405.21	810.42	0.00E+00	5.08E-02	1.02E-01	0.5750	5.320E+13
Cs-135	3.1549E-05	405.21	810.42	0.00E+00	1.28E-02	2.56E-02	0.8500	4.391E+12
Cs-137	1.7368E+00	405.21	810.42	0.00E+00	7.04E+02	1.41E+03	1.2500	4.607E+12
Eu-154	2.6947E-01	405.21	810.42	0.00E+00	1.09E+02	2.18E+02	1.7500	1.410E+11
Eu-155	2.6857E-02	405.21	810.42	0.00E+00	1.09E+01	2.18E+01	2.2500	2.164E+06
Fe-55	4.2105E-05	405.21	810.42	0.00E+00	1.71E-02	3.41E-02	2.7500	4.983E+05
H-3	3.5173E-03	405.21	810.42	0.00E+00	1.43E+00	2.85E+00	3.5000	1.181E+03
I-129	7.3805E-07	405.21	810.42	0.00E+00	2.99E-04	5.98E-04	5.0000	4.616E+02
Kr-85	6.9263E-02	405.21	810.42	0.00E+00	2.81E+01	5.61E+01	7.0000	5.207E+01
Np-237	1.4752E-06	405.21	810.42	0.00E+00	5.98E-04	1.20E-03	11.0000	5.920E+00
Pa-231	8.3970E-09	405.21	810.42	0.00E+00	3.40E-06	6.81E-06		
Pb-210	1.4995E-13	405.21	810.42	0.00E+00	6.08E-11	1.22E-10		
Pm-147	1.0567E-02	405.21	810.42	0.00E+00	4.28E+00	8.56E+00		
Pu-238	1.1543E-03	405.21	810.42	0.00E+00	4.68E-01	9.35E-01		
Pu-239	5.6917E-03	405.21	810.42	0.00E+00	2.31E+00	4.61E+00		
Pu-240	2.2602E-03	405.21	810.42	0.00E+00	9.16E-01	1.83E+00		
Pu-241	4.8045E-02	405.21	810.42	0.00E+00	1.95E+01	3.89E+01		
Pu-242	3.0602E-07	405.21	810.42	0.00E+00	1.24E-04	2.48E-04		
Ra-226	5.1293E-13	405.21	810.42	0.00E+00	2.08E-10	4.16E-10		
Ra-228	2.3323E-10	405.21	810.42	0.00E+00	9.45E-08	1.89E-07		
Ru-106	1.0075E-07	405.21	810.42	0.00E+00	4.08E-05	8.17E-05		
Se-79	1.2935E-05	405.21	810.42	0.00E+00	5.24E-03	1.05E-02		
Sn-126	1.2238E-05	405.21	810.42	0.00E+00	4.96E-03	9.92E-03		
Sr-90	1.6165E+00	405.21	810.42	0.00E+00	6.55E+02	1.31E+03		
Tc-99	4.4120E-04	405.21	810.42	0.00E+00	1.79E-01	3.58E-01		
Th-229	4.5684E-10	405.21	810.42	0.00E+00	1.85E-07	3.70E-07		
Th-230	6.8271E-11	405.21	810.42	0.00E+00	2.77E-08	5.53E-08		
Th-232	2.3744E-10	405.21	810.42	0.00E+00	9.62E-08	1.92E-07		
Ti-208	1.7368E-08	405.21	810.42	0.00E+00	7.04E-06	1.41E-05		
U-232	4.6797E-08	405.21	810.42	0.00E+00	1.90E-05	3.79E-05		
U-233	1.3148E-07	405.21	810.42	0.00E+00	5.33E-05	1.07E-04		
U-234	2.5729E-07	405.21	810.42	0.00E+00	1.04E-04	2.09E-04		
U-235	-2.6159E-06	405.21	0.00	5.14E-03	4.08E-03	5.14E-03		
U-236	1.2719E-05	405.21	810.42	0.00E+00	5.15E-03	1.03E-02		
U-238	-3.8857E-08	405.21	0.00	3.19E-03	3.18E-03	3.19E-03		
Y-90	1.6165E+00	405.21	810.42	0.00E+00	6.55E+02	1.31E+03		
Other Radionuclides					7.63E+02	1.53E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	405.21	332.55
Bounding:		810.42

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

*Fuel decay start date: 1972
 Estimates as of: 2030
 Template: TRIGA-AI (LWA/U-Zr, Alum., 10 to 20%, U)
 *Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.62

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.6842E-09	383.31	766.62	0.00E+00	3.33E-06	6.66E-06	Avg. MeV	
Am-241	4.9459E-03	383.31	766.62	0.00E+00	1.90E+00	3.79E+00	0.0150	3.759E+13
Am-242m	1.6241E-06	383.31	766.62	0.00E+00	6.23E-04	1.25E-03	0.0250	7.793E+12
Am-243	2.3233E-07	383.31	766.62	0.00E+00	8.91E-05	1.78E-04	0.0375	7.033E+12
C-14	4.3083E-05	383.31	766.62	0.00E+00	1.65E-02	3.30E-02	0.0575	7.360E+12
Cl-36	4.3023E-08	383.31	766.62	0.00E+00	1.65E-05	3.30E-05	0.0850	4.391E+12
Cm-243	9.1880E-08	383.31	766.62	0.00E+00	3.52E-05	7.04E-05	0.1250	3.258E+12
Cm-244	5.6346E-07	383.31	766.62	0.00E+00	2.16E-04	4.32E-04	0.2250	3.853E+12
Co-60	8.3699E-05	383.31	766.62	0.00E+00	3.21E-02	6.42E-02	0.3750	1.863E+12
Cs-134	2.8211E-08	383.31	766.62	0.00E+00	1.08E-05	2.16E-05	0.5750	2.791E+13
Cs-135	3.1549E-05	383.31	766.62	0.00E+00	1.21E-02	2.42E-02	0.8500	7.801E+11
Cs-137	9.7519E-01	383.31	766.62	0.00E+00	3.74E+02	7.48E+02	1.2500	6.425E+11
Eu-154	3.5970E-02	383.31	766.62	0.00E+00	1.38E+01	2.76E+01	1.7500	2.304E+10
Eu-155	8.1774E-04	383.31	766.62	0.00E+00	3.13E-01	6.27E-01	2.2500	7.612E+05
Fe-55	5.3940E-08	383.31	766.62	0.00E+00	2.07E-05	4.14E-05	2.7500	3.692E+05
H-3	8.6571E-04	383.31	766.62	0.00E+00	3.32E-01	6.64E-01	3.5000	1.026E+03
I-129	7.3805E-07	383.31	766.62	0.00E+00	2.83E-04	5.66E-04	5.0000	4.317E+02
Kr-85	1.3771E-02	383.31	766.62	0.00E+00	5.28E+00	1.06E+01	7.0000	4.867E+01
Np-237	1.5218E-06	383.31	766.62	0.00E+00	5.83E-04	1.17E-03	11.0000	5.530E+00
Pa-231	1.4152E-08	383.31	766.62	0.00E+00	5.42E-06	1.08E-05		
Pb-210	7.9774E-13	383.31	766.62	0.00E+00	3.06E-10	6.12E-10		
Pm-147	1.4362E-05	383.31	766.62	0.00E+00	5.51E-03	1.10E-02		
Pu-238	9.4782E-04	383.31	766.62	0.00E+00	3.63E-01	7.27E-01		
Pu-239	5.6872E-03	383.31	766.62	0.00E+00	2.18E+00	4.36E+00		
Pu-240	2.2541E-03	383.31	766.62	0.00E+00	8.64E-01	1.73E+00		
Pu-241	1.4433E-02	383.31	766.62	0.00E+00	5.53E+00	1.11E+01		
Pu-242	3.0602E-07	383.31	766.62	0.00E+00	1.17E-04	2.35E-04		
Ra-226	1.8857E-12	383.31	766.62	0.00E+00	7.23E-10	1.45E-09		
Ra-228	2.3729E-10	383.31	766.62	0.00E+00	9.10E-08	1.82E-07		
Ru-106	3.4857E-15	383.31	766.62	0.00E+00	1.34E-12	2.67E-12		
Se-79	1.2931E-05	383.31	766.62	0.00E+00	4.96E-03	9.91E-03		
Sn-126	1.2235E-05	383.31	766.62	0.00E+00	4.69E-03	9.38E-03		
Sr-90	8.9173E-01	383.31	766.62	0.00E+00	3.42E+02	6.84E+02		
Tc-99	4.4120E-04	383.31	766.62	0.00E+00	1.69E-01	3.38E-01		
Th-229	8.2752E-10	383.31	766.62	0.00E+00	3.17E-07	6.34E-07		
Th-230	1.4908E-10	383.31	766.62	0.00E+00	5.71E-08	1.14E-07		
Th-232	2.3744E-10	383.31	766.62	0.00E+00	9.10E-08	1.82E-07		
Th-208	1.3668E-08	383.31	766.62	0.00E+00	5.24E-06	1.05E-05		
U-232	3.6797E-08	383.31	766.62	0.00E+00	1.41E-05	2.82E-05	Thermal Power	
U-233	1.3164E-07	383.31	766.62	0.00E+00	5.05E-05	1.01E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.3865E-07	383.31	766.62	0.00E+00	1.30E-04	2.60E-04	4.41E+00	8.81E+00
U-235	-2.6144E-06	383.31	0.00	5.67E-03	4.66E-03	5.67E-03	Total	Total
U-236	1.2722E-05	383.31	766.62	0.00E+00	4.88E-03	9.75E-03		
U-238	-3.8857E-08	383.31	0.00	3.53E-03	3.51E-03	3.53E-03		
Y-90	8.9203E-01	383.31	766.62	0.00E+00	3.42E+02	6.84E+02		
Other Radionuclides					4.28E+02	8.56E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	383.31	144.90
Bounding:		766.62

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.79	0.36
Bounding:	1.58	

Estimated EOL HM/Given EOL HM
 0.58

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF IL

SNF ID #: 447

Fuel Units & Descr: 58 - ELEMENT

Heavy Metal Mass: BOL=10.44kg; EOL=10.057kg

ROD Storage Site: INEEL

Fuel decay start date: 2035

Estimates as of: 2030

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

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.52

II. Estimates

	m	X _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	8.0632E-10	365.39	730.78	0.00E+00	2.95E-07	5.89E-07	Avg. MeV	
Am-241	2.2586E-03	365.39	730.78	0.00E+00	8.25E-01	1.65E+00	0.0150	1.236E+14
Am-242m	1.9925E-06	365.39	730.78	0.00E+00	7.28E-04	1.46E-03	0.0250	2.684E+13
Am-243	2.3323E-07	365.39	730.78	0.00E+00	8.52E-05	1.70E-04	0.0375	3.344E+13
C-14	4.3308E-05	365.39	730.78	0.00E+00	1.58E-02	3.16E-02	0.0675	2.563E+13
Cl-38	4.3023E-08	365.39	730.78	0.00E+00	1.57E-05	3.14E-05	0.0850	1.794E+13
Cm-243	2.7429E-07	365.39	730.78	0.00E+00	1.00E-04	2.00E-04	0.1250	2.684E+13
Cm-244	3.1504E-08	365.39	730.78	0.00E+00	1.15E-03	2.30E-03	0.2250	1.498E+13
Co-60	3.1008E-02	365.39	730.78	0.00E+00	1.13E+01	2.27E+01	0.3750	6.667E+12
Cs-134	1.0367E-01	365.39	730.78	0.00E+00	3.79E+01	7.58E+01	0.5750	8.452E+13
Cs-135	3.1549E-05	365.39	730.78	0.00E+00	1.15E-02	2.31E-02	0.8500	2.081E+13
Cs-137	2.7564E+00	365.39	730.78	0.00E+00	1.01E+03	2.01E+03	1.2500	2.157E+13
Eu-154	1.3490E+00	365.39	730.78	0.00E+00	4.93E+02	9.86E+02	1.7500	6.172E+11
Eu-155	4.3880E-01	365.39	730.78	0.00E+00	1.60E+02	3.21E+02	2.2500	7.503E+10
Fe-55	8.6782E-03	365.39	730.78	0.00E+00	3.17E+00	6.34E+00	2.7500	6.094E+08
H-3	1.0805E-02	365.39	730.78	0.00E+00	3.95E+00	7.90E+00	3.5000	7.123E+07
I-129	7.3805E-07	365.39	730.78	0.00E+00	2.70E-04	5.39E-04	5.0000	4.234E+02
Kr-85	2.5218E-01	365.39	730.78	0.00E+00	9.21E+01	1.84E+02	7.0000	4.792E+01
Np-237	1.4463E-08	365.39	730.78	0.00E+00	5.28E-04	1.06E-03	11.0000	5.458E+00
Pa-231	3.5970E-09	365.39	730.78	0.00E+00	1.31E-06	2.63E-06		
Pb-210	8.2511E-15	365.39	730.78	0.00E+00	3.01E-12	6.03E-12		
Pm-147	2.0787E+00	365.39	730.78	0.00E+00	7.59E+02	1.52E+03		
Pu-238	1.3514E-03	365.39	730.78	0.00E+00	4.94E-01	9.88E-01		
Pu-239	5.6947E-03	365.39	730.78	0.00E+00	2.08E+00	4.16E+00		
Pu-240	2.2647E-03	365.39	730.78	0.00E+00	8.27E-01	1.65E+00		
Pu-241	1.2574E-01	365.39	730.78	0.00E+00	4.59E+01	9.19E+01		
Pu-242	3.0602E-07	365.39	730.78	0.00E+00	1.12E-04	2.24E-04		
Ra-226	5.7353E-14	365.39	730.78	0.00E+00	2.10E-11	4.19E-11		
Ra-228	1.8150E-10	365.39	730.78	0.00E+00	6.63E-08	1.33E-07		
Ru-106	9.3744E-02	365.39	730.78	0.00E+00	3.43E+01	6.85E+01		
Se-79	1.2938E-05	365.39	730.78	0.00E+00	4.73E-03	9.46E-03		
Sn-126	1.2239E-05	365.39	730.78	0.00E+00	4.47E-03	8.94E-03		
Sr-90	2.6000E+00	365.39	730.78	0.00E+00	9.50E+02	1.90E+03		
Tc-99	4.4120E-04	365.39	730.78	0.00E+00	1.61E-01	3.22E-01		
Th-229	1.4749E-10	365.39	730.78	0.00E+00	5.39E-08	1.08E-07		
Th-230	1.9549E-11	365.39	730.78	0.00E+00	7.14E-09	1.43E-08		
Th-232	2.3744E-10	365.39	730.78	0.00E+00	8.68E-08	1.74E-07		
Ti-208	1.9459E-08	365.39	730.78	0.00E+00	7.11E-06	1.42E-05		
U-232	5.6015E-08	365.39	730.78	0.00E+00	2.05E-05	4.09E-05		
U-233	1.3132E-07	365.39	730.78	0.00E+00	4.80E-05	9.60E-05		
U-234	1.7323E-07	365.39	730.78	0.00E+00	6.33E-05	1.27E-04		
U-235	-2.6159E-08	365.39	0.00	4.51E-03	3.56E-03	4.51E-03		
U-236	1.2717E-05	365.39	730.78	0.00E+00	4.65E-03	9.29E-03		
U-238	-3.6857E-08	365.39	0.00	2.81E-03	2.79E-03	2.81E-03		
Y-90	2.6015E+00	365.39	730.78	0.00E+00	9.51E+02	1.90E+03		
Other Radionuclides					1.39E+03	2.78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+01	3.57E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.9999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	203.50	365.39
Bounding:		730.78

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.95	1.80
Bounding:	1.99	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF IL
 SNF ID #: 601
 Fuel Units & Descr: 1 - ELEMENT
 Heavy Metal Mass: BOL=0.18kg; EOL=0.173kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimates as of: 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:
 16"x10"
 0.01

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	6.30	12.60	0.00E+00	5.37E-09	1.07E-08	Avg. MeV	
Am-241	1.8331E-03	6.30	12.60	0.00E+00	1.15E-02	2.31E-02	0.0150	2.037E+12
Am-242m	1.4129E-06	6.30	12.60	0.00E+00	8.90E-06	1.78E-05	0.0250	4.481E+11
Am-243	1.4774E-07	6.30	12.60	0.00E+00	9.31E-07	1.86E-06	0.0375	3.816E+11
C-14	1.2871E-04	6.30	12.60	0.00E+00	8.11E-04	1.62E-03	0.0575	3.917E+11
Cl-36	2.8120E-06	6.30	12.60	0.00E+00	1.77E-05	3.54E-05	0.0850	2.427E+11
Cm-243	1.7940E-07	6.30	12.60	0.00E+00	1.13E-06	2.26E-06	0.1250	1.762E+11
Cm-244	1.6952E-06	6.30	12.60	0.00E+00	1.07E-05	2.14E-05	0.2250	2.059E+11
Co-60	1.2639E+00	6.30	12.60	0.00E+00	8.09E+00	1.62E+01	0.3750	1.045E+11
Cs-134	9.0541E-02	6.30	12.60	0.00E+00	5.70E-01	1.14E+00	0.5750	1.389E+12
Cs-135	3.2195E-05	6.30	12.60	0.00E+00	2.03E-04	4.06E-04	0.8500	5.961E+10
Cs-137	2.7564E+00	6.30	12.60	0.00E+00	1.74E+01	3.47E+01	1.2500	1.211E+12
Eu-154	1.5368E-02	6.30	12.60	0.00E+00	9.68E-02	1.94E-01	1.7500	8.089E+08
Eu-155	2.9293E-02	6.30	12.60	0.00E+00	1.85E-01	3.69E-01	2.2500	1.301E+09
Fe-55	7.7158E-01	6.30	12.60	0.00E+00	4.86E+00	9.72E+00	2.7500	1.032E+07
H-3	1.1111E-02	6.30	12.60	0.00E+00	7.00E-02	1.40E-01	3.5000	1.201E+06
I-129	7.3684E-07	6.30	12.60	0.00E+00	4.64E-06	9.28E-06	5.0000	6.716E+00
Kr-85	2.5263E-01	6.30	12.60	0.00E+00	1.59E+00	3.18E+00	7.0000	7.802E-01
Np-237	1.2427E-06	6.30	12.60	0.00E+00	7.83E-06	1.57E-05	11.0000	8.661E-02
Pa-231	3.8511E-09	6.30	12.60	0.00E+00	2.43E-08	4.85E-08		
Pb-210	7.3880E-15	6.30	12.60	0.00E+00	4.65E-14	9.31E-14		
Pm-147	2.1023E+00	6.30	12.60	0.00E+00	1.32E+01	2.65E+01		
Pu-238	1.0383E-03	6.30	12.60	0.00E+00	6.54E-03	1.31E-02		
Pu-239	5.5293E-03	6.30	12.60	0.00E+00	3.48E-02	6.97E-02		
Pu-240	2.1278E-03	6.30	12.60	0.00E+00	1.34E-02	2.68E-02		
Pu-241	1.0195E-01	6.30	12.60	0.00E+00	6.42E-01	1.28E+00		
Pu-242	2.3128E-07	6.30	12.60	0.00E+00	1.46E-06	2.91E-06		
Ra-226	5.2782E-14	6.30	12.60	0.00E+00	3.33E-13	6.65E-13		
Ra-228	1.8338E-10	6.30	12.60	0.00E+00	1.22E-09	2.44E-09		
Ru-106	9.1684E-02	6.30	12.60	0.00E+00	5.78E-01	1.16E+00		
Se-79	1.3018E-05	6.30	12.60	0.00E+00	8.20E-05	1.64E-04		
Sn-126	1.2167E-05	6.30	12.60	0.00E+00	7.67E-05	1.53E-04		
Sr-90	2.6045E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01		
Tc-99	4.4241E-04	6.30	12.60	0.00E+00	2.79E-03	5.57E-03		
Th-229	1.3713E-10	6.30	12.60	0.00E+00	8.64E-10	1.73E-09		
Th-230	1.8090E-11	6.30	12.60	0.00E+00	1.14E-10	2.28E-10		
Th-232	2.5278E-10	6.30	12.60	0.00E+00	1.59E-09	3.19E-09		
Ti-208	1.8947E-08	6.30	12.60	0.00E+00	1.07E-07	2.14E-07		
U-232	4.8737E-08	6.30	12.60	0.00E+00	3.07E-07	6.14E-07		
U-233	1.2203E-07	6.30	12.60	0.00E+00	7.69E-07	1.54E-06		
U-234	1.5925E-07	6.30	12.60	0.00E+00	1.00E-06	2.01E-06		
U-235	-2.6194E-06	6.30	0.00	7.78E-05	6.13E-05	7.78E-05		
U-236	1.2653E-05	6.30	12.60	0.00E+00	8.00E-05	1.60E-04		
U-238	-3.6331E-08	6.30	0.00	4.84E-05	4.82E-05	4.84E-05		
Y-90	2.6060E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01		
Other Radionuclides					2.27E+01	4.54E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	3.51	6.30
Bounding:		12.60

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL NM/Given EOL NM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF UTAH
SNF ID #: 699
Fuel Units & Descr: 63 - ELEMENT
Heavy Metal Mass: BOL=11kg; EOL=10.723kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.57

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	264.59	529.19	0.00E+00	2.13E-07	4.27E-07	Avg. MeV	
Am-241	2.2586E-03	264.59	529.19	0.00E+00	5.98E-01	1.20E+00	0.0150	8.954E+13
Am-242m	1.9925E-06	264.59	529.19	0.00E+00	5.27E-04	1.05E-03	0.0250	1.944E+13
Am-243	2.3323E-07	264.59	529.19	0.00E+00	6.17E-05	1.23E-04	0.0378	2.421E+13
C-14	4.3308E-05	264.59	529.19	0.00E+00	1.15E-02	2.29E-02	0.0575	1.856E+13
Cl-36	4.3023E-08	264.59	529.19	0.00E+00	1.14E-05	2.28E-05	0.0850	1.299E+13
Cm-243	2.7429E-07	264.59	529.19	0.00E+00	7.26E-05	1.45E-04	0.1250	1.943E+13
Cm-244	3.1504E-08	264.59	529.19	0.00E+00	8.34E-04	1.67E-03	0.2250	1.085E+13
Co-60	3.1008E-02	264.59	529.19	0.00E+00	8.20E+00	1.64E+01	0.3750	4.828E+12
Cs-134	1.0367E-01	264.59	529.19	0.00E+00	2.74E+01	5.49E+01	0.5750	6.121E+13
Cs-135	3.1549E-05	264.59	529.19	0.00E+00	8.35E-03	1.67E-02	0.8500	1.507E+13
Cs-137	2.7564E+00	264.59	529.19	0.00E+00	7.29E+02	1.46E+03	1.2500	1.562E+13
Eu-154	1.3490E+00	264.59	529.19	0.00E+00	3.57E+02	7.14E+02	1.7500	4.470E+11
Eu-155	4.3880E-01	264.59	529.19	0.00E+00	1.16E+02	2.32E+02	2.2500	5.433E+10
Fe-55	8.6782E-03	264.59	529.19	0.00E+00	2.30E+00	4.59E+00	2.7500	4.413E+08
H-3	1.0805E-02	264.59	529.19	0.00E+00	2.86E+00	5.72E+00	3.5000	5.158E+07
I-129	7.3805E-07	264.59	529.19	0.00E+00	1.95E-04	3.91E-04	5.0000	3.087E+02
Kr-85	2.5218E-01	264.59	529.19	0.00E+00	6.67E+01	1.33E+02	7.0000	3.495E+01
Np-237	1.4463E-08	264.59	529.19	0.00E+00	3.83E-04	7.65E-04	11.0000	3.981E+00
Pa-231	3.5970E-08	264.59	529.19	0.00E+00	9.52E-07	1.90E-06		
Pb-210	8.2511E-15	264.59	529.19	0.00E+00	2.18E-12	4.37E-12		
Pm-147	2.0767E+00	264.59	529.19	0.00E+00	5.49E+02	1.10E+03		
Pu-238	1.3514E-03	264.59	529.19	0.00E+00	3.58E-01	7.15E-01		
Pu-239	5.6947E-03	264.59	529.19	0.00E+00	1.51E+00	3.01E+00		
Pu-240	2.2647E-03	264.59	529.19	0.00E+00	5.99E-01	1.20E+00		
Pu-241	1.2574E-01	264.59	529.19	0.00E+00	3.33E+01	6.65E+01		
Pu-242	3.0602E-07	264.59	529.19	0.00E+00	8.10E-05	1.62E-04		
Ra-226	5.7353E-14	264.59	529.19	0.00E+00	1.52E-11	3.04E-11		
Ra-228	1.8150E-10	264.59	529.19	0.00E+00	4.80E-08	9.60E-08		
Ru-106	9.3744E-02	264.59	529.19	0.00E+00	2.48E+01	4.96E+01		
Se-79	1.2938E-05	264.59	529.19	0.00E+00	3.42E-03	6.85E-03		
Sn-126	1.2239E-05	264.59	529.19	0.00E+00	3.24E-03	6.48E-03		
Sr-90	2.6000E+00	264.59	529.19	0.00E+00	6.88E+02	1.38E+03		
Tc-99	4.4120E-04	264.59	529.19	0.00E+00	1.17E-01	2.33E-01		
Th-229	1.4749E-10	264.59	529.19	0.00E+00	3.90E-08	7.80E-08		
Th-230	1.9549E-11	264.59	529.19	0.00E+00	5.17E-09	1.03E-08		
Th-232	2.3744E-10	264.59	529.19	0.00E+00	6.28E-08	1.26E-07		
Ti-208	1.9459E-08	264.59	529.19	0.00E+00	5.15E-06	1.03E-05		
U-232	5.6015E-08	264.59	529.19	0.00E+00	1.48E-05	2.96E-05		
U-233	1.3132E-07	264.59	529.19	0.00E+00	3.47E-05	6.95E-05		
U-234	1.7323E-07	264.59	529.19	0.00E+00	4.58E-05	9.17E-05		
U-235	-2.6159E-08	264.59	0.00	4.73E-03	4.04E-03	4.73E-03		
U-236	1.2717E-05	264.59	529.19	0.00E+00	3.36E-03	6.73E-03		
U-238	-3.8857E-08	264.59	0.00	2.96E-03	2.95E-03	2.96E-03		
Y-90	2.6015E+00	264.59	529.19	0.00E+00	6.88E+02	1.38E+03		
Other Radionuclides					1.01E+03	2.01E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.89699819	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	214.41	264.59	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		529.19	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.65	1.23	1.00
Bounding:	1.30		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) UNIV. OF TEXAS
 SNF ID #: 577
 Fuel Units & Descr: 69 - ELEMENT
 Heavy Metal Mass: BOL=12.765kg; EOL=12.675kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1973
 Estimates as of: 2030
 Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)
²Template Burnup (MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 0.62

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.6842E-09	85.62	171.24	0.00E+00	7.44E-07	1.49E-06	Avg. MeV	
Am-241	4.9459E-03	85.62	171.24	0.00E+00	4.23E-01	8.47E-01	0.0150	8.397E+12
Am-242m	1.6241E-06	85.62	171.24	0.00E+00	1.39E-04	2.78E-04	0.0250	1.741E+12
Am-243	2.3233E-07	85.62	171.24	0.00E+00	1.89E-05	3.98E-05	0.0375	1.571E+12
C-14	4.3083E-05	85.62	171.24	0.00E+00	3.69E-03	7.38E-03	0.0575	1.644E+12
Ci-36	4.3023E-08	85.62	171.24	0.00E+00	3.68E-06	7.37E-06	0.0850	9.807E+11
Cm-243	9.1880E-08	85.62	171.24	0.00E+00	7.87E-06	1.57E-05	0.1250	7.278E+11
Cm-244	5.6346E-07	85.62	171.24	0.00E+00	4.82E-05	9.65E-05	0.2250	8.807E+11
Co-60	8.3699E-05	85.62	171.24	0.00E+00	7.17E-03	1.43E-02	0.3750	3.714E+11
Cs-134	2.6211E-08	85.62	171.24	0.00E+00	2.42E-06	4.83E-06	0.5750	6.234E+12
Cs-135	3.1649E-05	85.62	171.24	0.00E+00	2.70E-03	5.40E-03	0.8500	1.698E+11
Cs-137	9.7519E-01	85.62	171.24	0.00E+00	8.35E+01	1.67E+02	1.2500	1.435E+11
Eu-154	3.5970E-02	85.62	171.24	0.00E+00	3.08E+00	6.16E+00	1.7500	5.146E+09
Eu-155	8.1774E-04	85.62	171.24	0.00E+00	7.00E-02	1.40E-01	2.2500	1.745E+05
Fe-55	5.3940E-08	85.62	171.24	0.00E+00	4.62E-06	9.24E-06	2.7500	8.247E+04
H-3	8.6571E-04	85.62	171.24	0.00E+00	7.41E-02	1.48E-01	3.5000	2.434E+02
I-129	7.3805E-07	85.62	171.24	0.00E+00	6.32E-05	1.26E-04	5.0000	1.025E+02
Kr-85	1.3771E-02	85.62	171.24	0.00E+00	1.18E+00	2.36E+00	7.0000	1.157E+01
Np-237	1.5218E-06	85.62	171.24	0.00E+00	1.30E-04	2.61E-04	11.0000	1.316E+00
Pa-231	1.4152E-08	85.62	171.24	0.00E+00	1.21E-06	2.42E-06		
Pb-210	7.9774E-13	85.62	171.24	0.00E+00	6.83E-11	1.37E-10		
Pm-147	1.4362E-05	85.62	171.24	0.00E+00	1.23E-03	2.46E-03		
Pu-238	9.4782E-04	85.62	171.24	0.00E+00	8.12E-02	1.62E-01		
Pu-239	5.6872E-03	85.62	171.24	0.00E+00	4.87E-01	9.74E-01		
Pu-240	2.2541E-03	85.62	171.24	0.00E+00	1.83E-01	3.66E-01		
Pu-241	1.4433E-02	85.62	171.24	0.00E+00	1.24E+00	2.47E+00		
Pu-242	3.0602E-07	85.62	171.24	0.00E+00	2.62E-05	5.24E-05		
Ra-226	1.8857E-12	85.62	171.24	0.00E+00	1.61E-10	3.23E-10		
Ra-228	2.3729E-10	85.62	171.24	0.00E+00	2.03E-08	4.06E-08		
Ru-106	3.4857E-15	85.62	171.24	0.00E+00	2.88E-13	5.97E-13		
Se-79	1.2931E-05	85.62	171.24	0.00E+00	1.11E-03	2.21E-03		
Sn-126	1.2235E-05	85.62	171.24	0.00E+00	1.05E-03	2.10E-03		
Sr-90	8.9173E-01	85.62	171.24	0.00E+00	7.64E+01	1.53E+02		
Tc-99	4.4120E-04	85.62	171.24	0.00E+00	3.78E-02	7.56E-02		
Th-229	8.2752E-10	85.62	171.24	0.00E+00	7.09E-08	1.42E-07		
Th-230	1.4908E-10	85.62	171.24	0.00E+00	1.28E-08	2.55E-08		
Th-232	2.3744E-10	85.62	171.24	0.00E+00	2.03E-08	4.07E-08		
Ti-208	1.3668E-08	85.62	171.24	0.00E+00	1.17E-06	2.34E-06		
U-232	3.6797E-08	85.62	171.24	0.00E+00	3.15E-06	6.30E-06		
U-233	1.3164E-07	85.62	171.24	0.00E+00	1.13E-05	2.25E-05		
U-234	3.3665E-07	85.62	171.24	0.00E+00	2.90E-05	5.80E-05		
U-235	2.6144E-06	85.62	0.00	5.52E-03	5.29E-03	5.52E-03		
U-236	1.2722E-05	85.62	171.24	0.00E+00	1.09E-03	2.18E-03		
U-238	3.8857E-08	85.62	0.00	3.43E-03	3.43E-03	3.43E-03		
Y-90	8.9203E-01	85.62	171.24	0.00E+00	7.64E+01	1.53E+02		
Other Radionuclides					9.56E+01	1.91E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	62.20	85.62
Bounding:		171.24

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.19	1.36
Bounding:	0.36	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) USGS

SNF ID #: 267

Fuel Units & Descr: 222 - ELEMENT

Heavy Metal Mass: BOL=42.224kg; EOL=41.292kg

ROD Storage Slic: INEEL

Fuel decay start date: 2035

Estimate as of: 2030

Template: TRIGA-AI (LWAJ-Zr, Alum., 10 to 20%, U)

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 5 years

Estimated

Canister usage:

18"x10"

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	102.86	889.99
Bounding:		1,779.99

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ZAIRE
SNF ID #: 487

Fuel Units & Descr: 56 - ELEMENT

Heavy Metal Mass: BOL=10.06kg; EOL=10.052kg

ROD Storage Site: INEEL

Fuel decay start date: 2010

Estimates as of: 2030

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

*Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

0.50

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	2.4558E-09	147.36	294.72	0.00E+00	3.62E-07	7.24E-07	Avg. MeV	
Am-241	3.8752E-03	147.36	294.72	0.00E+00	5.71E-01	1.14E+00	0.0150	3.025E+13
Am-242m	1.8617E-06	147.36	294.72	0.00E+00	2.74E-04	5.49E-04	0.0250	6.245E+12
Am-243	2.3293E-07	147.36	294.72	0.00E+00	3.43E-05	6.86E-05	0.0375	6.537E+12
C-14	4.3233E-05	147.36	294.72	0.00E+00	6.37E-03	1.27E-02	0.0575	6.042E+12
Ci-36	4.3023E-08	147.36	294.72	0.00E+00	6.34E-06	1.27E-05	0.0650	3.679E+12
Cm-243	1.9053E-07	147.36	294.72	0.00E+00	2.81E-05	5.62E-05	0.1250	4.129E+12
Cm-244	1.7744E-06	147.36	294.72	0.00E+00	2.61E-04	5.23E-04	0.2250	3.334E+12
Co-60	4.3188E-03	147.36	294.72	0.00E+00	6.36E-01	1.27E+00	0.3750	1.370E+12
Cs-134	6.7188E-04	147.36	294.72	0.00E+00	9.90E-02	1.98E-01	0.5750	2.182E+13
Cs-135	3.1549E-05	147.36	294.72	0.00E+00	4.65E-03	9.30E-03	0.8500	2.322E+12
Cs-137	1.9489E+00	147.36	294.72	0.00E+00	2.87E+02	5.74E+02	1.2500	2.501E+12
Eu-154	4.0301E-01	147.36	294.72	0.00E+00	5.94E+01	1.19E+02	1.7500	7.493E+10
Eu-155	5.4000E-02	147.36	294.72	0.00E+00	7.96E+00	1.59E+01	2.2500	1.188E+06
Fe-55	1.5955E-04	147.36	294.72	0.00E+00	2.36E-02	4.70E-02	2.7500	1.977E+05
H-3	4.6571E-03	147.36	294.72	0.00E+00	6.86E-01	1.37E+00	3.5000	1.367E+03
I-129	7.3805E-07	147.36	294.72	0.00E+00	1.09E-04	2.18E-04	5.0000	1.718E+02
Kr-85	9.5684E-02	147.36	294.72	0.00E+00	1.41E+01	2.82E+01	7.0000	1.942E+01
Np-237	1.4618E-06	147.36	294.72	0.00E+00	2.15E-04	4.31E-04	11.0000	2.209E+00
Pa-231	6.4782E-09	147.36	294.72	0.00E+00	9.55E-07	1.91E-06		
Pb-210	6.3158E-14	147.36	294.72	0.00E+00	9.31E-12	1.86E-11		
Pm-147	3.9564E-02	147.36	294.72	0.00E+00	5.83E+00	1.17E+01		
Pu-238	1.2008E-03	147.36	294.72	0.00E+00	1.77E-01	3.54E-01		
Pu-239	5.6917E-03	147.36	294.72	0.00E+00	8.39E-01	1.68E+00		
Pu-240	2.2617E-03	147.36	294.72	0.00E+00	3.33E-01	6.67E-01		
Pu-241	6.1113E-02	147.36	294.72	0.00E+00	9.01E+00	1.80E+01		
Pu-242	3.0602E-07	147.36	294.72	0.00E+00	4.51E-05	9.02E-05		
Ra-226	2.6707E-13	147.36	294.72	0.00E+00	3.94E-11	7.87E-11		
Ra-228	2.2556E-10	147.36	294.72	0.00E+00	3.32E-08	6.65E-08		
Ru-106	3.1293E-06	147.36	294.72	0.00E+00	4.61E-04	9.22E-04		
Se-79	1.2935E-05	147.36	294.72	0.00E+00	1.91E-03	3.81E-03		
Sn-126	1.2238E-05	147.36	294.72	0.00E+00	1.80E-03	3.61E-03		
Sr-90	1.8195E+00	147.36	294.72	0.00E+00	2.68E+02	5.36E+02		
Tc-99	4.4120E-04	147.36	294.72	0.00E+00	6.50E-02	1.30E-01		
Th-229	3.3308E-10	147.36	294.72	0.00E+00	4.91E-08	9.82E-08		
Th-230	4.8526E-11	147.36	294.72	0.00E+00	6.86E-09	1.37E-08		
Th-232	2.3744E-10	147.36	294.72	0.00E+00	3.50E-08	7.00E-08		
Ti-208	1.8195E-08	147.36	294.72	0.00E+00	2.68E-06	5.36E-06		
U-232	4.9098E-08	147.36	294.72	0.00E+00	7.24E-06	1.45E-05	Thermal Power	
U-233	1.3140E-07	147.36	294.72	0.00E+00	1.94E-05	3.87E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.2571E-07	147.36	294.72	0.00E+00	3.33E-05	6.65E-05	3.83E+00	7.85E+00
U-235	-2.6159E-06	147.36	0.00	4.36E-03	3.97E-03	4.36E-03	Total	Total
U-236	1.2719E-05	147.36	294.72	0.00E+00	1.87E-03	3.75E-03		
U-238	-3.8857E-08	147.36	0.00	2.71E-03	2.70E-03	2.71E-03		
Y-90	1.8211E+00	147.36	294.72	0.00E+00	2.68E+02	5.37E+02		
Other Radionuclides					3.09E+02	6.17E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	147.36	26.73
Bounding:		294.72

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:	0.40	0.18
Bounding:	0.79	

Estimated EOL HM/Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 12/20 ROMANIA
SNF ID #: 1078
Fuel Units & Descr: 498 - ELEMENT
Heavy Metal Mass: BOL=124.5kg; EOL=121.462kg
ROD Storage Site: INEEL

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

Estimated
Canister usage:
18"x10"
4.49

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	2,899.91	5,799.81	0.00E+00	7.67E-06	1.53E-05	Avg. MeV	
Am-241	3.1429E-03	2,899.91	5,799.81	0.00E+00	9.11E+00	1.82E+01	0.0150	5.812E+14
Am-242m	1.3195E-06	2,899.91	5,799.81	0.00E+00	3.83E-03	7.65E-03	0.0250	1.210E+14
Am-243	1.4753E-07	2,899.91	5,799.81	0.00E+00	4.28E-04	8.56E-04	0.0375	1.048E+14
C-14	1.2847E-04	2,899.91	5,799.81	0.00E+00	3.73E-01	7.45E-01	0.0575	1.128E+14
Cl-36	2.8120E-06	2,899.91	5,799.81	0.00E+00	8.15E-03	1.63E-02	0.0850	6.807E+13
Cm-243	1.2465E-07	2,899.91	5,799.81	0.00E+00	3.61E-04	7.23E-04	0.1250	4.449E+13
Cm-244	9.5564E-07	2,899.91	5,799.81	0.00E+00	2.77E-03	5.54E-03	0.2250	5.845E+13
Co-60	1.7880E-01	2,899.91	5,799.81	0.00E+00	5.18E+02	1.04E+03	0.3750	2.562E+13
Cs-134	5.8692E-04	2,899.91	5,799.81	0.00E+00	1.70E+00	3.40E+00	0.5750	4.213E+14
Cs-135	3.2195E-05	2,899.91	5,799.81	0.00E+00	9.34E-02	1.87E-01	0.8500	4.749E+12
Cs-137	1.9489E+00	2,899.91	5,799.81	0.00E+00	5.65E+03	1.13E+04	1.2500	7.870E+13
Eu-154	4.5895E-03	2,899.91	5,799.81	0.00E+00	1.33E+01	2.66E+01	1.7500	1.220E+11
Eu-155	3.6045E-03	2,899.91	5,799.81	0.00E+00	1.05E+01	2.09E+01	2.2500	4.203E+08
Fe-55	1.4185E-02	2,899.91	5,799.81	0.00E+00	4.11E+01	8.23E+01	2.7500	4.630E+06
H-3	4.7895E-03	2,899.91	5,799.81	0.00E+00	1.39E+01	2.78E+01	3.5000	2.578E+04
I-129	7.3684E-07	2,899.91	5,799.81	0.00E+00	2.14E-03	4.27E-03	5.0000	3.091E+03
Kr-85	9.5820E-02	2,899.91	5,799.81	0.00E+00	2.78E+02	5.56E+02	7.0000	3.492E+02
Np-237	1.2552E-08	2,899.91	5,799.81	0.00E+00	3.64E-03	7.28E-03	11.0000	3.973E+01
Pa-231	7.0406E-09	2,899.91	5,799.81	0.00E+00	2.04E-05	4.08E-05		
Pb-210	5.8000E-14	2,899.91	5,799.81	0.00E+00	1.68E-10	3.36E-10		
Pm-147	4.0075E-02	2,899.91	5,799.81	0.00E+00	1.16E+02	2.32E+02		
Pu-238	9.2256E-04	2,899.91	5,799.81	0.00E+00	2.68E+00	5.35E+00		
Pu-239	5.5278E-03	2,899.91	5,799.81	0.00E+00	1.60E+01	3.21E+01		
Pu-240	2.1248E-03	2,899.91	5,799.81	0.00E+00	6.16E+00	1.23E+01		
Pu-241	4.9549E-02	2,899.91	5,799.81	0.00E+00	1.44E+02	2.87E+02		
Pu-242	2.3128E-07	2,899.91	5,799.81	0.00E+00	6.71E-04	1.34E-03		
Ra-226	2.4526E-13	2,899.91	5,799.81	0.00E+00	7.11E-10	1.42E-09		
Ra-228	2.4015E-10	2,899.91	5,799.81	0.00E+00	6.96E-07	1.39E-06		
Ru-106	3.0802E-06	2,899.91	5,799.81	0.00E+00	8.87E-03	1.77E-02		
Se-79	1.3015E-05	2,899.91	5,799.81	0.00E+00	3.77E-02	7.55E-02		
Sn-126	1.2165E-05	2,899.91	5,799.81	0.00E+00	3.53E-02	7.06E-02		
Sr-90	1.8226E+00	2,899.91	5,799.81	0.00E+00	5.29E+03	1.06E+04		
Tc-99	4.4241E-04	2,899.91	5,799.81	0.00E+00	1.28E+00	2.57E+00		
Th-229	3.0962E-10	2,899.91	5,799.81	0.00E+00	8.98E-07	1.80E-06		
Th-230	4.2346E-11	2,899.91	5,799.81	0.00E+00	1.23E-07	2.46E-07		
Th-232	2.5278E-10	2,899.91	5,799.81	0.00E+00	7.33E-07	1.47E-06		
Ti-206	1.5820E-08	2,899.91	5,799.81	0.00E+00	4.59E-05	9.18E-05		
U-232	4.2647E-08	2,899.91	5,799.81	0.00E+00	1.24E-04	2.47E-04		
U-233	1.2211E-07	2,899.91	5,799.81	0.00E+00	3.54E-04	7.08E-04		
U-234	1.9955E-07	2,899.91	5,799.81	0.00E+00	5.79E-04	1.16E-03		
U-235	2.6194E-06	2,899.91	0.00	5.35E-02	4.59E-02	5.35E-02		
U-236	1.2693E-05	2,899.91	5,799.81	0.00E+00	3.68E-02	7.36E-02		
U-238	3.6331E-08	2,899.91	0.00	3.35E-02	3.34E-02	3.35E-02		
Y-90	1.8241E+00	2,899.91	5,799.81	0.00E+00	5.29E+03	1.06E+04		
Other Radionuclides					5.58E+03	1.12E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.26E+01	1.45E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1,213.38	2,899.91	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		5,799.81	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.68	2.39	1.00
Bounding:	1.37		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 (IFE) ENGLAND
SNF ID #: 1043
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.376kg; EOL=0.367kg
ROD Storage Site: INEEL

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"
0.02

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	10.63	21.27	0.00E+00	2.81E-08	5.62E-08	Avg. MeV	
Am-241	3.1429E-03	10.63	21.27	0.00E+00	3.34E-02	6.68E-02	0.0150	2.131E+12
Am-242m	1.3195E-06	10.63	21.27	0.00E+00	1.40E-05	2.81E-05	0.0250	4.437E+11
Am-243	1.4753E-07	10.63	21.27	0.00E+00	1.57E-06	3.14E-06	0.0375	3.843E+11
C-14	1.2847E-04	10.63	21.27	0.00E+00	1.37E-03	2.73E-03	0.0575	4.135E+11
Cl-36	2.8120E-06	10.63	21.27	0.00E+00	2.99E-05	5.98E-05	0.0850	2.496E+11
Cm-243	1.2465E-07	10.63	21.27	0.00E+00	1.33E-06	2.65E-06	0.1250	1.631E+11
Cm-244	9.5564E-07	10.63	21.27	0.00E+00	1.02E-05	2.03E-05	0.2250	2.143E+11
Co-60	1.7880E-01	10.63	21.27	0.00E+00	1.90E+00	3.80E+00	0.3750	9.394E+10
Cs-134	5.8692E-04	10.63	21.27	0.00E+00	6.24E-03	1.25E-02	0.5750	1.545E+12
Cs-135	3.2195E-05	10.63	21.27	0.00E+00	3.42E-04	6.85E-04	0.8500	1.741E+10
Cs-137	1.9489E+00	10.63	21.27	0.00E+00	2.07E+01	4.14E+01	1.2500	2.886E+11
Eu-154	4.5895E-03	10.63	21.27	0.00E+00	4.88E-02	9.76E-02	1.7500	4.474E+08
Eu-155	3.6045E-03	10.63	21.27	0.00E+00	3.83E-02	7.67E-02	2.2500	1.541E+08
Fe-55	1.4185E-02	10.63	21.27	0.00E+00	1.51E-01	3.02E-01	2.7500	1.698E+04
H-3	4.7895E-03	10.63	21.27	0.00E+00	5.09E-02	1.02E-01	3.5000	9.443E+01
I-129	7.3684E-07	10.63	21.27	0.00E+00	7.84E-06	1.57E-05	5.0000	1.128E+01
Kr-85	9.5820E-02	10.63	21.27	0.00E+00	1.02E+00	2.04E+00	7.0000	1.275E+00
Np-237	1.2552E-06	10.63	21.27	0.00E+00	1.33E-05	2.67E-05	11.0000	1.450E-01
Pa-231	7.0406E-09	10.63	21.27	0.00E+00	7.49E-08	1.50E-07		
Pb-210	5.8000E-14	10.63	21.27	0.00E+00	6.17E-13	1.23E-12		
Pm-147	4.0075E-02	10.63	21.27	0.00E+00	4.26E-01	8.52E-01		
Pu-238	9.2256E-04	10.63	21.27	0.00E+00	9.81E-03	1.96E-02		
Pu-239	5.5278E-03	10.63	21.27	0.00E+00	5.88E-02	1.18E-01		
Pu-240	2.1248E-03	10.63	21.27	0.00E+00	2.26E-02	4.52E-02		
Pu-241	4.9549E-02	10.63	21.27	0.00E+00	5.27E-01	1.05E+00		
Pu-242	2.3128E-07	10.63	21.27	0.00E+00	2.46E-06	4.92E-06		
Ra-226	2.4526E-13	10.63	21.27	0.00E+00	2.61E-12	5.22E-12		
Ra-228	2.4015E-10	10.63	21.27	0.00E+00	2.55E-09	5.11E-09		
Ru-106	3.0602E-06	10.63	21.27	0.00E+00	3.25E-05	6.51E-05		
Se-79	1.3015E-05	10.63	21.27	0.00E+00	1.38E-04	2.77E-04		
Sn-126	1.2165E-05	10.63	21.27	0.00E+00	1.29E-04	2.59E-04		
Sr-90	1.8226E+00	10.63	21.27	0.00E+00	1.94E+01	3.88E+01		
Tc-99	4.4241E-04	10.63	21.27	0.00E+00	4.70E-03	9.41E-03		
Th-229	3.0962E-10	10.63	21.27	0.00E+00	3.29E-09	6.58E-09		
Th-230	4.2346E-11	10.63	21.27	0.00E+00	4.50E-10	9.01E-10		
Th-232	2.5278E-10	10.63	21.27	0.00E+00	2.69E-09	5.38E-09		
Ti-208	1.5820E-08	10.63	21.27	0.00E+00	1.68E-07	3.36E-07		
U-232	4.2647E-08	10.63	21.27	0.00E+00	4.53E-07	9.07E-07		
U-233	1.2211E-07	10.63	21.27	0.00E+00	1.30E-06	2.60E-06	Thermal Power	
U-234	1.9955E-07	10.63	21.27	0.00E+00	2.12E-06	4.24E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6194E-06	10.63	0.00	1.82E-04	1.34E-04	1.62E-04	2.86E-01	8.32E-01
U-236	1.2693E-05	10.63	21.27	0.00E+00	1.35E-04	2.70E-04	Total	Total
U-238	-3.6331E-08	10.63	0.00	1.01E-04	1.01E-04	1.01E-04		
Y-90	1.8241E+00	10.63	21.27	0.00E+00	1.94E+01	3.88E+01		
Other Radionuclides					2.05E+01	4.10E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)

	From SFD	Estimated
Nominal:	10.63	8.97
Bounding:		21.27

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 ARRR

SNF ID #: 780

Fuel Units & Descr: 15 - ELEMENT

Heavy Metal Mass: BOL=10.275kg; EOL=6.179kg

ROD Storage Site: INEEL

Fuel decay start date: 2035

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: 5 years

Estimated

Canister usage:

18"x10"

0.14

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,000.38	4,000.76	0.00E+00	1.70E-06	3.41E-06	Avg. MeV	
Am-241	1.8331E-03	2,000.38	4,000.76	0.00E+00	3.67E+00	7.33E+00	0.0150	6.466E+14
Am-242m	1.4129E-06	2,000.38	4,000.76	0.00E+00	2.83E-03	5.65E-03	0.0250	1.423E+14
Am-243	1.4774E-07	2,000.38	4,000.76	0.00E+00	2.96E-04	5.91E-04	0.0375	1.212E+14
C-14	1.2871E-04	2,000.38	4,000.76	0.00E+00	2.57E-01	5.15E-01	0.0575	1.244E+14
Cl-36	2.8120E-06	2,000.38	4,000.76	0.00E+00	5.63E-03	1.13E-02	0.0850	7.705E+13
Co-243	1.7940E-07	2,000.38	4,000.76	0.00E+00	3.59E-04	7.18E-04	0.1250	5.595E+13
Co-244	1.6962E-06	2,000.38	4,000.76	0.00E+00	3.39E-03	6.79E-03	0.2250	6.538E+13
Co-60	1.2839E+00	2,000.38	4,000.76	0.00E+00	2.57E+03	5.14E+03	0.3750	3.317E+13
Cs-134	9.0541E-02	2,000.38	4,000.76	0.00E+00	1.81E+02	3.62E+02	0.5750	4.410E+14
Cs-135	3.2195E-05	2,000.38	4,000.76	0.00E+00	6.44E-02	1.29E-01	0.8500	1.893E+13
Cs-137	2.7564E+00	2,000.38	4,000.76	0.00E+00	5.51E+03	1.10E+04	1.2500	3.843E+14
Eu-154	1.5368E-02	2,000.38	4,000.76	0.00E+00	3.07E+01	6.15E+01	1.7500	2.562E+11
Eu-155	2.9293E-02	2,000.38	4,000.76	0.00E+00	5.88E+01	1.17E+02	2.2500	4.129E+11
Fe-55	7.7158E-01	2,000.38	4,000.76	0.00E+00	1.54E+03	3.09E+03	2.7500	3.277E+09
H-3	1.1111E-02	2,000.38	4,000.76	0.00E+00	2.22E+01	4.45E+01	3.5000	3.814E+08
I-129	7.3684E-07	2,000.38	4,000.76	0.00E+00	1.47E-03	2.95E-03	5.0000	2.103E+03
Kr-85	2.5263E-01	2,000.38	4,000.76	0.00E+00	5.05E+02	1.01E+03	7.0000	2.390E+02
Np-237	1.2427E-06	2,000.38	4,000.76	0.00E+00	2.49E-03	4.97E-03	11.0000	2.711E+01
Pa-231	3.8511E-09	2,000.38	4,000.76	0.00E+00	7.70E-06	1.54E-05		
Pb-210	7.3880E-15	2,000.38	4,000.76	0.00E+00	1.48E-11	2.96E-11		
Pm-147	2.1023E+00	2,000.38	4,000.76	0.00E+00	4.21E+03	8.41E+03		
Pu-238	1.0383E-03	2,000.38	4,000.76	0.00E+00	2.08E+00	4.15E+00		
Pu-239	5.5293E-03	2,000.38	4,000.76	0.00E+00	1.11E+01	2.21E+01		
Pu-240	2.1278E-03	2,000.38	4,000.76	0.00E+00	4.26E+00	8.51E+00		
Pu-241	1.0195E-01	2,000.38	4,000.76	0.00E+00	2.04E+02	4.08E+02		
Pu-242	2.3128E-07	2,000.38	4,000.76	0.00E+00	4.63E-04	9.25E-04		
Ra-226	5.2782E-14	2,000.38	4,000.76	0.00E+00	1.06E-10	2.11E-10		
Ra-228	1.9338E-10	2,000.38	4,000.76	0.00E+00	3.87E-07	7.74E-07		
Ru-106	9.1684E-02	2,000.38	4,000.76	0.00E+00	1.83E+02	3.67E+02		
Se-79	1.3018E-05	2,000.38	4,000.76	0.00E+00	2.60E-02	5.21E-02		
Sn-126	1.2167E-05	2,000.38	4,000.76	0.00E+00	2.43E-02	4.87E-02		
Sr-90	2.6045E+00	2,000.38	4,000.76	0.00E+00	5.21E+03	1.04E+04		
Tc-99	4.4241E-04	2,000.38	4,000.76	0.00E+00	8.85E-01	1.77E+00		
Th-229	1.3713E-10	2,000.38	4,000.76	0.00E+00	2.74E-07	5.49E-07		
Th-230	1.8090E-11	2,000.38	4,000.76	0.00E+00	3.62E-08	7.24E-08		
Th-232	2.5278E-10	2,000.38	4,000.76	0.00E+00	5.06E-07	1.01E-06		
Ti-208	1.6947E-08	2,000.38	4,000.76	0.00E+00	3.39E-05	6.78E-05		
U-232	4.8737E-08	2,000.38	4,000.76	0.00E+00	9.75E-05	1.95E-04		
U-233	1.2203E-07	2,000.38	4,000.76	0.00E+00	2.44E-04	4.88E-04		
U-234	1.5925E-07	2,000.38	4,000.76	0.00E+00	3.19E-04	6.37E-04		
U-235	-2.6194E-06	2,000.38	0.00	4.36E-03	0.00E+00	4.36E-03		
U-236	1.2693E-05	2,000.38	4,000.76	0.00E+00	2.54E-02	5.08E-02		
U-238	-3.6331E-08	2,000.38	0.00	2.77E-03	2.70E-03	2.77E-03		
Y-90	2.6060E+00	2,000.38	4,000.76	0.00E+00	5.21E+03	1.04E+04		
Other Radionuclides					7.21E+03	1.44E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

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

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.08

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: TRIGA STD 20/20 MNRC
SNF ID #: 1053
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=3.962kg; EOL=3.962kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 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"
0.07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	4.193E+07
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	5.713E+04
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	3.498E+04
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	4.881E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	9.836E+06
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	3.410E+07
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	8.510E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	4.186E+03
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	6.537E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	3.906E+01
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	1.911E+01
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	1.107E+01
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	6.433E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	5.751E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	2.471E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	2.844E-01
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	3.270E-02
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	1.69E-03	1.69E-03	1.69E-03		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	1.07E-03	1.07E-03	1.07E-03		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides				0.00E+00	0.00E+00	0.00E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74990619	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	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 STD 20/20 MNRC
SNF ID #: 1054
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=41.605kg; EOL=40.555kg
RAD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.76

II. Estimates	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,002.34	2,004.68	0.00E+00	8.54E-07	1.71E-08	0.0150 3.240E+14
Am-241	1.8331E-03	1,002.34	2,004.68	0.00E+00	1.84E+00	3.67E+00	0.0250 7.129E+13
Am-242m	1.4129E-06	1,002.34	2,004.68	0.00E+00	1.42E-03	2.83E-03	0.0375 6.071E+13
Am-243	1.4774E-07	1,002.34	2,004.68	0.00E+00	1.48E-04	2.96E-04	0.0575 6.232E+13
C-14	1.2871E-04	1,002.34	2,004.68	0.00E+00	1.29E-01	2.58E-01	0.0850 3.861E+13
Cf-252	2.8120E-06	1,002.34	2,004.68	0.00E+00	2.82E-03	5.64E-03	0.1250 2.804E+13
Cm-243	1.7940E-07	1,002.34	2,004.68	0.00E+00	1.80E-04	3.60E-04	0.2250 3.275E+13
Cm-244	1.6962E-06	1,002.34	2,004.68	0.00E+00	1.70E-03	3.40E-03	0.3750 1.662E+13
Co-60	1.2839E+00	1,002.34	2,004.68	0.00E+00	1.29E+03	2.57E+03	0.5750 2.210E+14
Cs-134	9.0541E-02	1,002.34	2,004.68	0.00E+00	9.08E+01	1.82E+02	0.8500 9.483E+12
Cs-135	3.2195E-05	1,002.34	2,004.68	0.00E+00	3.23E-02	6.45E-02	1.2500 1.926E+14
Cs-137	2.7644E+00	1,002.34	2,004.68	0.00E+00	2.76E+03	5.53E+03	1.7500 1.284E+11
Eu-154	1.5368E-02	1,002.34	2,004.68	0.00E+00	1.54E+01	3.08E+01	2.2500 2.069E+11
Eu-155	2.9289E-02	1,002.34	2,004.68	0.00E+00	2.94E+01	5.87E+01	2.7500 1.642E+09
Fe-55	7.7158E-01	1,002.34	2,004.68	0.00E+00	7.73E+02	1.55E+03	3.5000 1.911E+08
H-3	1.1111E-02	1,002.34	2,004.68	0.00E+00	1.11E+01	2.23E+01	5.0000 1.077E+03
I-129	7.3684E-07	1,002.34	2,004.68	0.00E+00	7.39E-04	1.48E-03	7.0000 1.219E+02
Kr-85	2.5263E-01	1,002.34	2,004.68	0.00E+00	2.53E+02	5.06E+02	11.0000 1.389E+01
Np-237	1.2427E-06	1,002.34	2,004.68	0.00E+00	1.25E-03	2.49E-03	
Pa-231	3.8511E-09	1,002.34	2,004.68	0.00E+00	3.86E-08	7.72E-08	
Pb-210	7.3880E-15	1,002.34	2,004.68	0.00E+00	7.41E-12	1.48E-11	
Pm-147	2.1023E+00	1,002.34	2,004.68	0.00E+00	2.11E+03	4.21E+03	
Pu-238	1.0383E-03	1,002.34	2,004.68	0.00E+00	1.04E+00	2.08E+00	
Pu-239	5.5293E-03	1,002.34	2,004.68	0.00E+00	5.54E+00	1.11E+01	
Pu-240	2.1278E-03	1,002.34	2,004.68	0.00E+00	2.13E+00	4.27E+00	
Pu-241	1.0195E-01	1,002.34	2,004.68	0.00E+00	1.02E+02	2.04E+02	
Pu-242	2.3128E-07	1,002.34	2,004.68	0.00E+00	2.32E-04	4.64E-04	
Ra-226	5.2782E-14	1,002.34	2,004.68	0.00E+00	5.29E-11	1.06E-10	
Ra-228	1.9338E-10	1,002.34	2,004.68	0.00E+00	1.94E-07	3.88E-07	
Ru-106	9.1684E-02	1,002.34	2,004.68	0.00E+00	9.19E+01	1.84E+02	
Se-79	1.3018E-05	1,002.34	2,004.68	0.00E+00	1.30E-02	2.61E-02	
Sn-126	1.2167E-05	1,002.34	2,004.68	0.00E+00	1.22E-02	2.44E-02	
Sr-90	2.6045E+00	1,002.34	2,004.68	0.00E+00	2.61E+03	5.22E+03	
Tc-99	4.4241E-04	1,002.34	2,004.68	0.00E+00	4.43E-01	8.87E-01	
Th-229	1.3713E-10	1,002.34	2,004.68	0.00E+00	1.37E-07	2.75E-07	
Th-230	1.8090E-11	1,002.34	2,004.68	0.00E+00	1.81E-08	3.63E-08	
Th-232	2.5278E-10	1,002.34	2,004.68	0.00E+00	2.53E-07	5.07E-07	
Ti-208	1.6947E-08	1,002.34	2,004.68	0.00E+00	1.70E-05	3.40E-05	
U-232	4.8737E-08	1,002.34	2,004.68	0.00E+00	4.89E-05	9.77E-05	
U-233	1.2203E-07	1,002.34	2,004.68	0.00E+00	1.22E-04	2.45E-04	
U-234	1.5925E-07	1,002.34	2,004.68	0.00E+00	1.60E-04	3.19E-04	
U-235	-2.6194E-06	1,002.34	0.00	1.78E-02	1.51E-02	1.78E-02	
U-236	1.2693E-05	1,002.34	2,004.68	0.00E+00	1.27E-02	2.54E-02	
U-238	-3.6331E-08	1,002.34	0.00	1.12E-02	1.12E-02	1.12E-02	
Y-90	2.6060E+00	1,002.34	2,004.68	0.00E+00	2.61E+03	5.22E+03	
Other Radionuclides					3.61E+03	7.23E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7490819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	784.42	1,002.34
Bounding:		2,004.68

Basis for burnup used in estimates:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 SOLVENIA
SNF ID #: 731
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=4.949kg; EOL=4.754kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/AJ-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"
0.09

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	186.62	373.23	0.00E+00	4.93E-07	9.87E-07	Avg. MeV	
Am-241	3.1429E-03	186.62	373.23	0.00E+00	5.87E-01	1.17E+00	0.0150	3.740E+13
Am-242m	1.3195E-06	186.62	373.23	0.00E+00	2.46E-04	4.93E-04	0.0250	7.786E+12
Am-243	1.4753E-07	186.62	373.23	0.00E+00	2.75E-05	5.51E-05	0.0375	6.745E+12
C-14	1.2847E-04	186.62	373.23	0.00E+00	2.40E-02	4.79E-02	0.0575	7.256E+12
Cl-36	2.8120E-06	186.62	373.23	0.00E+00	5.25E-04	1.05E-03	0.0850	4.381E+12
Cm-243	1.2465E-07	186.62	373.23	0.00E+00	2.33E-05	4.65E-05	0.1250	2.863E+12
Cm-244	9.5564E-07	186.62	373.23	0.00E+00	1.78E-04	3.57E-04	0.2250	3.761E+12
Co-60	1.7880E-01	186.62	373.23	0.00E+00	3.34E+01	6.67E+01	0.3750	1.649E+12
Cs-134	5.8692E-04	186.62	373.23	0.00E+00	1.10E-01	2.19E-01	0.5750	2.711E+13
Cs-136	3.2195E-05	186.62	373.23	0.00E+00	6.01E-03	1.20E-02	0.8500	3.056E+11
Cs-137	1.9489E+00	186.62	373.23	0.00E+00	3.64E+02	7.27E+02	1.2500	5.064E+12
Eu-154	4.5895E-03	186.62	373.23	0.00E+00	8.56E-01	1.71E+00	1.7500	7.852E+09
Eu-155	3.6045E-03	186.62	373.23	0.00E+00	6.73E-01	1.35E+00	2.2500	2.704E+07
Fe-55	1.4185E-02	186.62	373.23	0.00E+00	2.85E+00	5.29E+00	2.7500	2.980E+05
H-3	4.7895E-03	186.62	373.23	0.00E+00	8.94E-01	1.79E+00	3.5000	1.855E+03
I-129	7.3584E-07	186.62	373.23	0.00E+00	1.38E-04	2.75E-04	5.0000	1.970E+02
Kr-85	9.5820E-02	186.62	373.23	0.00E+00	1.79E+01	3.58E+01	7.0000	2.225E+01
Np-237	1.2552E-06	186.62	373.23	0.00E+00	2.34E-04	4.68E-04	11.0000	2.532E+00
Pa-231	7.0406E-09	186.62	373.23	0.00E+00	1.31E-06	2.63E-06		
Pb-210	5.8000E-14	186.62	373.23	0.00E+00	1.08E-11	2.16E-11		
Pm-147	4.0075E-02	186.62	373.23	0.00E+00	7.48E+00	1.50E+01		
Pu-238	9.2256E-04	186.62	373.23	0.00E+00	1.72E-01	3.44E-01		
Pu-239	5.5278E-03	186.62	373.23	0.00E+00	1.03E+00	2.06E+00		
Pu-240	2.1248E-03	186.62	373.23	0.00E+00	3.97E-01	7.93E-01		
Pu-241	4.9549E-02	186.62	373.23	0.00E+00	9.25E+00	1.85E+01		
Pu-242	2.3128E-07	186.62	373.23	0.00E+00	4.32E-05	8.63E-05		
Ra-226	2.4526E-13	186.62	373.23	0.00E+00	4.58E-11	9.15E-11		
Ra-228	2.4015E-10	186.62	373.23	0.00E+00	4.48E-08	8.96E-08		
Ru-106	3.0602E-06	186.62	373.23	0.00E+00	5.71E-04	1.14E-03		
Se-79	1.3015E-05	186.62	373.23	0.00E+00	2.43E-03	4.86E-03		
Sn-126	1.2165E-05	186.62	373.23	0.00E+00	2.27E-03	4.54E-03		
Sr-90	1.8226E+00	186.62	373.23	0.00E+00	3.40E+02	6.80E+02		
Tc-99	4.4241E-04	186.62	373.23	0.00E+00	8.28E-02	1.65E-01		
Th-229	3.0962E-10	186.62	373.23	0.00E+00	5.78E-08	1.16E-07		
Th-230	4.2346E-11	186.62	373.23	0.00E+00	7.90E-09	1.58E-08		
Th-232	2.5278E-10	186.62	373.23	0.00E+00	4.72E-08	9.43E-08		
Th-208	1.5820E-08	186.62	373.23	0.00E+00	2.95E-06	5.90E-06		
U-232	4.2647E-08	186.62	373.23	0.00E+00	7.96E-06	1.59E-05		
U-233	1.2211E-07	186.62	373.23	0.00E+00	2.28E-05	4.56E-05		
U-234	1.9955E-07	186.62	373.23	0.00E+00	3.72E-05	7.45E-05		
U-235	-2.6194E-06	186.62	0.00	2.11E-03	1.63E-03	2.11E-03		
U-236	1.2693E-05	186.62	373.23	0.00E+00	2.37E-03	4.74E-03		
U-238	-3.6331E-08	186.62	0.00	1.33E-03	1.33E-03	1.33E-03		
Y-90	1.8241E+00	186.62	373.23	0.00E+00	3.40E+02	6.81E+02		
Other Radionuclides					3.59E+02	7.19E+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 NM Constituents:	U	U
BOL Enrichment %:	19.76747705	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	186.62	186.15
Bounding:		373.23

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.11	1.00
Bounding:	2.21	

Estimated EOL NM/Given EOL NM
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 3020
 SNF ID #: 995
 Fuel Units & Design: 19 - ELEMENT
 Heavy Metal Mass: BOL=16.625kg EOL=16.433kg
 ROD Storage Site: NEEL

Fuel decay start date: 2005
 Estimates as of: 2000
 Template: TRIGA-SS (LW/U-Zn, SST, 10 to 20%, U)
 Template Burnup (MWd/g): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 0.17

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
							Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	183.19	368.38	0.00E+00	1.56E-07	3.12E-07	Avg. MeV	
Am-241	1.8331E-03	183.19	368.38	0.00E+00	3.36E-01	6.72E-01	0.0150	5.922E+13
Am-242m	1.4129E-06	183.19	368.38	0.00E+00	2.59E-04	5.18E-04	0.0250	1.303E+13
Am-243	1.4774E-07	183.19	368.38	0.00E+00	2.71E-05	5.41E-05	0.0378	1.110E+13
C-14	1.2871E-04	183.19	368.38	0.00E+00	2.36E-02	4.72E-02	0.0578	1.159E+13
Ca-38	2.8120E-06	183.19	368.38	0.00E+00	5.15E-04	1.03E-03	0.0650	7.056E+12
Cm-243	1.7940E-07	183.19	368.38	0.00E+00	3.29E-05	6.57E-05	0.1250	5.124E+12
Cm-244	1.6962E-06	183.19	368.38	0.00E+00	3.11E-04	6.21E-04	0.2250	5.986E+12
Co-60	1.2838E-02	183.19	368.38	0.00E+00	2.35E-02	4.70E-02	0.3750	3.038E+12
Co-134	9.0541E-02	183.19	368.38	0.00E+00	1.66E+01	3.32E+01	0.5750	4.038E+12
Co-135	3.2195E-05	183.19	368.38	0.00E+00	5.90E-03	1.18E-02	0.8500	1.733E+12
Co-137	2.7564E-00	183.19	368.38	0.00E+00	5.05E+02	1.01E+03	1.2500	3.520E+12
Eu-154	1.5369E-02	183.19	368.38	0.00E+00	2.82E+00	5.63E+00	1.7500	2.346E+10
Eu-155	2.9293E-02	183.19	368.38	0.00E+00	5.37E+00	1.07E+01	2.2500	3.782E+10
Fe-55	7.7159E-01	183.19	368.38	0.00E+00	1.41E+02	2.83E+02	2.7500	3.001E+08
H-3	1.1111E-02	183.19	368.38	0.00E+00	2.04E+00	4.07E+00	3.5000	3.483E+07
I-129	7.3694E-07	183.19	368.38	0.00E+00	1.35E-04	2.70E-04	5.0000	2.022E+02
K-85	2.5636E-01	183.19	368.38	0.00E+00	4.63E+01	9.26E+01	7.0000	2.282E+01
Np-237	1.2427E-06	183.19	368.38	0.00E+00	7.05E-07	1.41E-06	11.0000	2.612E+00
Pa-231	3.8511E-09	183.19	368.38	0.00E+00	2.28E-04	4.55E-04		
Pb-210	7.3890E-15	183.19	368.38	0.00E+00	1.35E-12	2.71E-12		
Pm-147	2.1023E-00	183.19	368.38	0.00E+00	3.85E+02	7.70E+02		
Pu-238	1.0393E-03	183.19	368.38	0.00E+00	1.90E-01	3.80E-01		
Pu-239	5.5293E-03	183.19	368.38	0.00E+00	1.01E+00	2.03E+00		
Pu-240	2.1278E-03	183.19	368.38	0.00E+00	3.90E-01	7.80E-01		
Pu-241	1.0195E-01	183.19	368.38	0.00E+00	1.87E+01	3.74E+01		
Pu-242	2.3128E-07	183.19	368.38	0.00E+00	4.24E-05	8.47E-05		
Re-228	5.2782E-14	183.19	368.38	0.00E+00	9.67E-12	1.93E-11		
Re-228	1.9338E-10	183.19	368.38	0.00E+00	3.54E-08	7.09E-08		
Ru-106	9.1694E-02	183.19	368.38	0.00E+00	1.69E+01	3.38E+01		
Se-78	1.3018E-05	183.19	368.38	0.00E+00	2.38E-03	4.77E-03		
Sm-128	1.2167E-05	183.19	368.38	0.00E+00	2.23E-03	4.46E-03		
Sn-90	2.6045E+00	183.19	368.38	0.00E+00	4.77E+02	9.54E+02		
Tc-99	4.4241E-04	183.19	368.38	0.00E+00	8.10E-02	1.62E-01		
Th-229	1.3713E-10	183.19	368.38	0.00E+00	2.51E-08	5.02E-08		
Th-230	1.8000E-11	183.19	368.38	0.00E+00	3.31E-09	6.63E-09		
Th-232	1.5278E-10	183.19	368.38	0.00E+00	4.83E-08	9.26E-08		
Th-232	1.6947E-08	183.19	368.38	0.00E+00	3.10E-06	6.21E-06		
U-232	4.8737E-08	183.19	368.38	0.00E+00	8.93E-06	1.79E-05		
U-233	1.2203E-07	183.19	368.38	0.00E+00	2.24E-05	4.47E-05		
U-234	1.5925E-07	183.19	368.38	0.00E+00	2.92E-05	5.83E-05		
U-235	2.8194E-06	183.19	368.38	0.00E+00	7.19E-03	1.43E-02		
U-236	1.2693E-05	183.19	368.38	0.00E+00	2.33E-03	4.65E-03		
U-238	3.6331E-08	183.19	368.38	0.00E+00	4.46E-03	8.91E-03		
Y-90	2.6060E+00	183.19	368.38	0.00E+00	6.60E+02	1.32E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Burnup Summary (MWd/g)	
From SFD	Used	From SFD	Estimated
Reactor Moderator: LW AND U ZIRC HYDROIDE			
Fuel Cladding: SST	SST		
BOL H/M Constituents: U	U		
BOL Enrichment %:	20		

Burnup Summary (MWd/g)		Burnup Summary (MWd/g)	
Nominal:	Estimated	Nominal:	Estimated
183.19	183.19	183.19	183.19
368.38	368.38	368.38	368.38

Checks		Estimated BOL H/M/Given EOL H/M	
Burnup Multiplier	Estimated Burnup/Given Burnup		
0.32	0.32		
0.65	0.65		

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 30/20 MNRC
SNF ID #: 704
Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=4.974kg; EOL=4.974kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup (MWd): 6.66
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.05

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources
Radionuclide	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 Avg. MeV Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0675
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Ti-206	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
U-235	-2.6194E-06	0.00	0.00	2.13E-03	2.13E-03	2.13E-03	
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
U-238	-3.6331E-08	0.00	0.00	1.34E-03	1.34E-03	1.34E-03	
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	
Other Radionuclides					0.00E+00	0.00E+00	

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 %:	19.82495894	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 STD 8.5/20
SNF ID #: 252
Fuel Units & Descr: 50 - ELEMENT
Heavy Metal Mass: BOL=9.37kg, EOL=9.07kg
ROD Storage Shc: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.45

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	286.38	572.76	0.00E+00	2.44E-07	4.88E-07	Avg. MeV	
Am-241	1.8331E-03	286.38	572.76	0.00E+00	5.25E-01	1.05E+00	0.0150	9.257E+13
Am-242m	1.4129E-08	286.38	572.76	0.00E+00	4.05E-04	8.09E-04	0.0250	2.037E+13
Am-243	1.4774E-07	286.38	572.76	0.00E+00	4.23E-05	8.46E-05	0.0375	1.735E+13
C-14	1.2871E-04	286.38	572.76	0.00E+00	3.69E-02	7.37E-02	0.0575	1.781E+13
Cl-36	2.8120E-06	286.38	572.76	0.00E+00	8.05E-04	1.61E-03	0.0850	1.103E+13
Cm-243	1.7940E-07	286.38	572.76	0.00E+00	5.14E-05	1.03E-04	0.1250	8.010E+12
Cm-244	1.6962E-06	286.38	572.76	0.00E+00	4.86E-04	9.72E-04	0.2250	9.357E+12
Co-60	1.2839E+00	286.38	572.76	0.00E+00	3.68E+02	7.35E+02	0.3750	4.749E+12
Cs-134	9.0541E-02	286.38	572.76	0.00E+00	2.59E+01	5.19E+01	0.5750	6.313E+13
Cs-136	3.2195E-05	286.38	572.76	0.00E+00	9.22E-03	1.84E-02	0.8500	2.709E+12
Cs-137	2.7564E+00	286.38	572.76	0.00E+00	7.89E+02	1.58E+03	1.2500	5.502E+13
Eu-154	1.5368E-02	286.38	572.76	0.00E+00	4.40E+00	8.80E+00	1.7500	3.668E+10
Eu-155	2.9293E-02	286.38	572.76	0.00E+00	8.39E+00	1.68E+01	2.2500	5.912E+10
Fe-55	7.7158E-01	286.38	572.76	0.00E+00	2.21E+02	4.42E+02	2.7500	4.691E+08
H-3	1.1111E-02	286.38	572.76	0.00E+00	3.18E+00	6.36E+00	3.5000	5.460E+07
I-129	7.3684E-07	286.38	572.76	0.00E+00	2.11E-04	4.22E-04	5.0000	3.060E+02
Kr-85	2.5263E-01	286.38	572.76	0.00E+00	7.23E+01	1.45E+02	7.0000	3.465E+01
Np-237	1.2427E-06	286.38	572.76	0.00E+00	3.56E-04	7.12E-04	11.0000	3.947E+00
Pa-231	3.8511E-09	286.38	572.76	0.00E+00	1.10E-06	2.21E-06		
Pb-210	7.3880E-15	286.38	572.76	0.00E+00	2.12E-12	4.23E-12		
Pm-147	2.1023E+00	286.38	572.76	0.00E+00	6.02E+02	1.20E+03		
Pu-238	1.0383E-03	286.38	572.76	0.00E+00	2.97E-01	5.95E-01		
Pu-239	5.5293E-03	286.38	572.76	0.00E+00	1.58E+00	3.17E+00		
Pu-240	2.1278E-03	286.38	572.76	0.00E+00	6.09E-01	1.22E+00		
Pu-241	1.0195E-01	286.38	572.76	0.00E+00	2.92E+01	5.84E+01		
Pu-242	2.3128E-07	286.38	572.76	0.00E+00	6.62E-05	1.32E-04		
Ra-226	5.2782E-14	286.38	572.76	0.00E+00	1.51E-11	3.02E-11		
Ra-228	1.9338E-10	286.38	572.76	0.00E+00	5.54E-08	1.11E-07		
Ru-106	9.1684E-02	286.38	572.76	0.00E+00	2.63E+01	5.25E+01		
Se-79	1.3018E-05	286.38	572.76	0.00E+00	3.73E-03	7.46E-03		
Sn-126	1.2167E-05	286.38	572.76	0.00E+00	3.48E-03	6.97E-03		
Sr-90	2.6045E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03		
Tc-99	4.4241E-04	286.38	572.76	0.00E+00	1.27E-01	2.53E-01		
Th-229	1.3713E-10	286.38	572.76	0.00E+00	3.93E-08	7.85E-08		
Th-230	1.8090E-11	286.38	572.76	0.00E+00	5.18E-09	1.04E-08		
Th-232	2.5278E-10	286.38	572.76	0.00E+00	7.24E-08	1.45E-07		
Ti-206	1.6947E-08	286.38	572.76	0.00E+00	4.85E-06	9.71E-06		
U-232	4.8737E-08	286.38	572.76	0.00E+00	1.40E-05	2.79E-05		
U-233	1.2203E-07	286.38	572.76	0.00E+00	3.49E-05	6.99E-05		
U-234	1.5925E-07	286.38	572.76	0.00E+00	4.56E-05	9.12E-05		
U-235	-2.6194E-06	286.38	0.00	3.95E-03	3.20E-03	3.95E-03		
U-238	1.2693E-05	286.38	572.76	0.00E+00	3.64E-03	7.27E-03		
U-238	-3.6331E-08	286.38	0.00	2.54E-03	2.53E-03	2.54E-03		
Y-90	2.6060E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03		
Other Radionuclides					1.03E+03	2.06E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

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

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

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).

L. Fuel and Template Information

SNF 10 # 929

Fuel Units & Descr: 2 - ELEMENT

Heavy Metal Mass: BOL=0.383kg; EOL=0.372kg

ROD Storage Site: INEEL

¹Fuel decay start date: 1999

Estimates as of: 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"

$$\frac{10 \times 10}{0.02}$$

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	0.80
Sounding:	2.00	

Estimated EOL HM/Given EOL HM
0.99

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

^aTotal burnup for all fuel associated with this worksheet must be divided 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 (FE) OSU
 SNF ID #: 1040
 Fuel Units & Dates: 2 - ELEMENT
 Heavy Metal Mass: BOL=0.38kg EOL=0.38kg
 ROD Storage Site: INEL

Fuel decay start date: 2025
 Estimate as of: 2030
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20% U)
 Template BOL Heavy Metal Mass (LWT): 6.65
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18.7107
 0.02

II. Estimates

Radionuclide	CLAIMED From Template	Nonfuel Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Photon Source	Total Photon Source (Bouding)
Ac-227	8.5173E-10	9.55	18.09	0.00E+00	8.13E-09	1.63E-08	Avg. MW		
Am-241	1.8331E-03	9.55	18.09	0.00E+00	1.75E-02	3.50E-02	0.0150		3.088E-12
Am-242m	1.4129E-08	9.55	18.09	0.00E+00	1.35E-05	2.70E-05	0.0250		6.700E-11
Am-243	1.4774E-07	9.55	18.09	0.00E+00	1.41E-06	2.82E-06	0.0075		5.782E-11
C-14	1.2871E-04	9.55	18.09	0.00E+00	1.23E-03	2.46E-03	0.0575		5.935E-11
Co-56	2.8120E-08	9.55	18.09	0.00E+00	2.68E-05	5.37E-05	0.0850		3.677E-11
Co-243	1.7940E-07	9.55	18.09	0.00E+00	1.71E-08	3.43E-08	0.1250		2.870E-11
Co-244	1.6982E-08	9.55	18.09	0.00E+00	1.62E-05	3.24E-05	0.2250		3.119E-11
Co-60	1.2839E+00	9.55	18.09	0.00E+00	1.23E+01	2.45E+01	0.3750		1.583E+11
Co-134	9.0541E-02	9.55	18.09	0.00E+00	8.64E-01	1.73E+00	0.5750		2.104E+12
Co-135	3.2195E-05	9.55	18.09	0.00E+00	3.07E-04	6.15E-04	0.8500		9.031E+10
Co-137	2.7564E+00	9.55	18.09	0.00E+00	2.63E+01	5.26E+01	1.2500		1.834E+12
Eu-154	1.5368E-02	9.55	18.09	0.00E+00	1.47E-01	2.93E-01	1.7500		1.223E+08
Eu-155	2.8233E-02	9.55	18.09	0.00E+00	2.80E-01	5.59E-01	2.2500		1.871E+08
Fe-55	7.7158E-01	9.55	18.09	0.00E+00	7.37E+00	1.47E+01	2.7500		1.584E+07
H-3	1.1111E-02	9.55	18.09	0.00E+00	1.05E-01	2.12E-01	3.5000		1.820E+06
I-129	7.3694E-07	9.55	18.09	0.00E+00	7.03E-06	1.41E-05	5.0000		1.025E+01
Kr-85	2.5263E-01	9.55	18.09	0.00E+00	2.41E+00	4.82E+00	7.0000		1.160E+00
Np-237	1.2427E-05	9.55	18.09	0.00E+00	1.19E-05	2.37E-05	11.0000		1.322E-01
Pa-231	3.6511E-09	9.55	18.09	0.00E+00	3.68E-08	7.35E-08			
Pm-210	7.3890E-15	9.55	18.09	0.00E+00	7.05E-14	1.41E-13			
Pm-147	2.1023E+00	9.55	18.09	0.00E+00	2.01E+01	4.01E+01			
Pu-238	1.0383E-03	9.55	18.09	0.00E+00	9.91E-03	1.98E-02			
Pu-239	5.5263E-03	9.55	18.09	0.00E+00	5.28E-02	1.06E-01			
Pu-240	2.1278E-03	9.55	18.09	0.00E+00	2.03E-02	4.06E-02			
Pu-241	1.0195E-01	9.55	18.09	0.00E+00	9.73E-01	1.95E+00			
Pu-242	2.3128E-07	9.55	18.09	0.00E+00	2.21E-08	4.42E-08			
Pa-226	5.2782E-14	9.55	18.09	0.00E+00	5.04E-13	1.01E-12			
Pa-228	1.9338E-01	9.55	18.09	0.00E+00	1.85E-09	3.69E-09			
Ru-106	8.1684E-02	9.55	18.09	0.00E+00	8.75E-01	1.75E+00			
Sa-79	1.3018E-05	9.55	18.09	0.00E+00	1.24E-04	2.49E-04			
Sm-126	1.2167E-05	9.55	18.09	0.00E+00	1.18E-04	2.32E-04			
Sm-147	2.6045E+00	9.55	18.09	0.00E+00	2.49E+01	4.97E+01			
Tc-99	4.4241E-04	9.55	18.09	0.00E+00	4.22E-03	8.45E-03			
Ti-229	1.3713E-10	9.55	18.09	0.00E+00	1.31E-09	2.62E-09			
Ti-230	1.8090E-11	9.55	18.09	0.00E+00	1.73E-10	3.45E-10			
Ti-232	2.5278E-10	9.55	18.09	0.00E+00	2.41E-09	4.83E-09			
Ti-208	1.6947E-08	9.55	18.09	0.00E+00	1.62E-07	3.24E-07			
U-232	4.8737E-08	9.55	18.09	0.00E+00	4.65E-07	9.30E-07			
U-233	1.2203E-07	9.55	18.09	0.00E+00	1.18E-06	2.33E-06			
U-234	1.5825E-07	9.55	18.09	0.00E+00	1.52E-06	3.04E-06			
U-235	2.6194E-06	9.55	0.00	1.88E-04	1.43E-04	1.68E-04			
U-236	1.2693E-05	9.55	18.09	0.00E+00	1.21E-04	2.42E-04			
U-238	3.6331E-08	9.55	0.00	1.05E-04	1.05E-04	1.05E-04			
Y-90	2.600E+00	9.55	18.09	0.00E+00	2.49E+01	4.98E+01			

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	1.11E+06	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (HMd) ³	From SFD	Estimated	Basis for burnup used in estimate:
Nominal: 3.80		9.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding: 19.09		19.09	Bounding burnup assumed to be twice nominal burnup.

Checks	Nonfuel: Bounding:	Burnup Multiplier: 0.72	Estimated Burnup: 2.51	Estimated EOL HM/Given EOL HM: 1.00
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Reactor shutdown, core removal, storage, shipping or other data containing that radiation ceased for fuel.
 Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (HMd/GM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF AZ

SNF ID #: 972

Fuel Units & Descr: 1 - ELEMENT

Heavy Metal Mass: BOL=0.195kg; EOL=0.195kg

ROO Storage Site: INEEL

¹Fuel decay start date: 1998

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 _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.1459E-09	6.68	13.36	0.00E+00	2.77E-08	5.54E-08	Avg. MeV	
Am-241	3.5850E-03	6.68	13.36	0.00E+00	2.40E-02	4.79E-02	0.0150	1.186E+12
Am-242m	1.2899E-06	6.68	13.36	0.00E+00	8.62E-06	1.72E-05	0.0250	2.466E+11
Am-243	1.4747E-07	6.68	13.36	0.00E+00	9.85E-07	1.97E-06	0.0375	2.140E+11
C-14	1.2839E-04	6.68	13.36	0.00E+00	8.58E-04	1.72E-03	0.0575	2.304E+11
Cl-36	2.8120E-06	6.68	13.36	0.00E+00	1.88E-05	3.76E-05	0.0850	1.389E+11
Cm-243	1.1038E-07	6.68	13.36	0.00E+00	7.38E-07	1.48E-06	0.1250	9.062E+10
Cm-244	7.8917E-07	6.68	13.36	0.00E+00	5.27E-06	1.05E-05	0.2250	1.194E+11
Co-60	9.2647E-02	6.68	13.36	0.00E+00	6.19E-01	1.24E+00	0.3750	5.217E+10
Cs-134	1.0940E-04	6.68	13.36	0.00E+00	7.31E-04	1.46E-03	0.5750	8.648E+11
Cs-135	3.2195E-05	6.68	13.36	0.00E+00	2.15E-04	4.30E-04	0.8500	9.285E+09
Cs-137	1.7368E+00	6.68	13.36	0.00E+00	1.16E+01	2.32E+01	1.2500	9.534E+10
Eu-154	3.0677E-03	6.68	13.36	0.00E+00	2.05E-02	4.10E-02	1.7500	2.417E+08
Eu-155	1.7925E-03	6.68	13.36	0.00E+00	1.20E-02	2.40E-02	2.2500	5.096E+05
Fe-55	3.7444E-03	6.68	13.36	0.00E+00	2.50E-02	5.00E-02	2.7500	8.617E+03
H-3	3.6180E-03	6.68	13.36	0.00E+00	2.42E-02	4.84E-02	3.5000	1.811E+01
I-129	7.3684E-07	6.68	13.36	0.00E+00	4.92E-06	9.85E-06	5.0000	7.053E+00
Kr-85	6.9368E-02	6.68	13.36	0.00E+00	4.64E-01	9.27E-01	7.0000	7.962E-01
Np-237	1.2662E-06	6.68	13.36	0.00E+00	8.46E-06	1.69E-05	11.0000	9.055E-02
Pa-231	9.1654E-09	6.68	13.36	0.00E+00	6.12E-08	1.22E-07		
Pb-210	1.3728E-13	6.68	13.36	0.00E+00	9.17E-13	1.83E-12		
Pm-147	1.0702E-02	6.68	13.36	0.00E+00	7.15E-02	1.43E-01		
Pu-238	8.8692E-04	6.68	13.36	0.00E+00	5.93E-03	1.19E-02		
Pu-239	5.5263E-03	6.68	13.36	0.00E+00	3.69E-02	7.39E-02		
Pu-240	2.1233E-03	6.68	13.36	0.00E+00	1.42E-02	2.84E-02		
Pu-241	3.8962E-02	6.68	13.36	0.00E+00	2.60E-01	5.21E-01		
Pu-242	2.3128E-07	6.68	13.36	0.00E+00	1.55E-06	3.09E-06		
Ra-226	4.6752E-13	6.68	13.36	0.00E+00	3.12E-12	6.25E-12		
Ra-228	2.4827E-10	6.68	13.36	0.00E+00	1.66E-09	3.32E-09		
Ru-106	9.8526E-08	6.68	13.36	0.00E+00	6.58E-07	1.32E-06		
Se-79	1.3015E-05	6.68	13.36	0.00E+00	8.70E-05	1.74E-04		
Sn-126	1.2185E-05	6.68	13.36	0.00E+00	8.13E-05	1.63E-04		
Sr-90	1.6195E+00	6.68	13.36	0.00E+00	1.08E+01	2.16E+01		
Tc-99	4.4241E-04	6.68	13.36	0.00E+00	2.96E-03	5.91E-03		
Th-229	4.2451E-10	6.68	13.36	0.00E+00	2.84E-09	5.67E-09		
Th-230	6.1398E-11	6.68	13.36	0.00E+00	4.10E-10	8.21E-10		
Th-232	2.5278E-10	6.68	13.36	0.00E+00	1.69E-09	3.38E-09		
Ti-208	1.5068E-08	6.68	13.36	0.00E+00	1.01E-07	2.02E-07		
U-232	4.0662E-08	6.68	13.36	0.00E+00	2.72E-07	5.43E-07		
U-233	1.2217E-07	6.68	13.36	0.00E+00	8.16E-07	1.63E-06		
U-234	2.2391E-07	6.68	13.36	0.00E+00	1.50E-06	2.99E-06		
U-235	-2.6194E-06	6.68	0.00	8.43E-05	6.68E-05	8.43E-05		
U-236	1.2695E-05	6.68	13.36	0.00E+00	8.48E-05	1.70E-04		
U-238	-3.8331E-08	6.68	0.00	5.24E-05	5.22E-05	5.24E-05		
Y-90	1.6195E+00	6.68	13.36	0.00E+00	1.08E+01	2.16E+01		
Other Radionuclides					1.15E+01	2.30E+01		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	1.90	6.65	
Bounding:		13.36	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:	1.00	3.52	
Bounding:	2.01		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (FE) U OF AZ
 SWF ID #: 073
 Fuel Units & Dates: 2 - ELEMENT
 Heavy Metal Mass: BOL=0.39kg EOL=0.378kg
 ROD Storage Size: INEEL

Fuel decay start date: 2005
 Estimate as of: 2030
 Template: TRIGA-SS (LW/LZ-X, SST, 10 to 20%, U)
 Template Burnup (MWd/t): 6.65
 Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18.718
 0.02

Radionuclide	C/NWd From Template	Nominal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources
							Photon Energy Group
Ac-227	8.5173E-10	11.46	22.91	0.00E+00	8.76E-08	1.95E-08	Avg. MW
Am-241	1.8331E-03	11.46	22.91	0.00E+00	2.10E-02	4.20E-02	0.0150
Am-242m	1.4129E-06	11.46	22.91	0.00E+00	1.62E-06	3.24E-06	3.703E+12
Am-243	1.4774E-07	11.46	22.91	0.00E+00	1.69E-06	3.38E-06	0.0250
C-14	1.2671E-04	11.46	22.91	0.00E+00	1.47E-03	2.95E-03	0.0075
C-36	2.8120E-06	11.46	22.91	0.00E+00	3.22E-06	6.44E-06	0.0575
Cm-243	1.7940E-07	11.46	22.91	0.00E+00	2.06E-06	4.11E-06	0.0850
Cm-244	1.6962E-06	11.46	22.91	0.00E+00	1.94E-06	3.89E-06	0.1250
Cm-60	1.2639E+00	11.46	22.91	0.00E+00	1.47E+01	2.94E+01	0.2250
Co-134	9.0641E-02	11.46	22.91	0.00E+00	1.04E+00	2.07E+00	0.3750
Co-135	3.2195E-05	11.46	22.91	0.00E+00	3.69E-04	7.38E-04	0.8500
Co-137	2.7564E+00	11.46	22.91	0.00E+00	3.16E+01	6.32E+01	1.2500
Eu-154	1.5369E-02	11.46	22.91	0.00E+00	1.78E-01	3.52E-01	1.7500
Eu-155	2.9293E-02	11.46	22.91	0.00E+00	3.36E-01	6.71E-01	2.2500
Fe-55	7.7159E-01	11.46	22.91	0.00E+00	8.84E+00	1.77E+01	2.7500
H-3	1.1111E-02	11.46	22.91	0.00E+00	1.27E-01	2.55E-01	1.877E+07
I-129	7.3684E-07	11.46	22.91	0.00E+00	8.44E-08	1.69E-08	5.0000
K-40	2.5363E-01	11.46	22.91	0.00E+00	8.44E-06	1.69E-06	5.0000
Np-237	1.2427E-06	11.46	22.91	0.00E+00	1.42E-06	2.85E-06	7.0000
Np-239	3.8511E-09	11.46	22.91	0.00E+00	4.41E-08	8.82E-08	11.0000
Pb-210	7.3880E-15	11.46	22.91	0.00E+00	8.46E-14	1.69E-13	
Pm-147	2.1023E+00	11.46	22.91	0.00E+00	2.41E+01	4.82E+01	
Pu-238	1.0383E-03	11.46	22.91	0.00E+00	1.19E-02	2.38E-02	
Pu-239	5.5293E-03	11.46	22.91	0.00E+00	6.33E-02	1.27E-01	
Pu-240	2.1278E-03	11.46	22.91	0.00E+00	2.44E-02	4.87E-02	
Pu-241	1.0195E-01	11.46	22.91	0.00E+00	1.17E+00	2.34E+00	
Pu-242	2.3128E-07	11.46	22.91	0.00E+00	2.65E-06	5.30E-06	
Pu-238	5.2782E-14	11.46	22.91	0.00E+00	6.05E-13	1.21E-12	
Pu-238	1.9339E-10	11.46	22.91	0.00E+00	2.22E-09	4.43E-09	
Ra-106	9.1684E-02	11.46	22.91	0.00E+00	1.05E+00	2.10E+00	
Sr-78	1.3018E-05	11.46	22.91	0.00E+00	1.49E-04	2.98E-04	
Sr-126	1.2167E-05	11.46	22.91	0.00E+00	1.39E-04	2.79E-04	
Sr-90	2.6045E+00	11.46	22.91	0.00E+00	2.99E+01	5.97E+01	
Tc-99	1.3713E-10	11.46	22.91	0.00E+00	1.57E-09	3.14E-09	
Th-229	4.4241E-04	11.46	22.91	0.00E+00	5.07E-03	1.01E-02	
Th-230	1.8009E-11	11.46	22.91	0.00E+00	2.07E-10	4.14E-10	
Th-232	2.5278E-10	11.46	22.91	0.00E+00	2.90E-09	5.79E-09	
Th-230	1.6947E-08	11.46	22.91	0.00E+00	1.94E-07	3.88E-07	
U-232	4.8737E-08	11.46	22.91	0.00E+00	5.58E-07	1.12E-06	
U-233	1.2203E-07	11.46	22.91	0.00E+00	1.40E-06	2.80E-06	
U-234	1.5925E-07	11.46	22.91	0.00E+00	1.82E-06	3.65E-06	
U-235	2.6194E-06	11.46	0.00	1.69E-04	1.39E-04	1.69E-04	
U-238	1.2683E-05	11.46	22.91	0.00E+00	1.45E-04	2.91E-04	
U-238	3.6331E-08	11.46	0.00	1.05E-04	1.04E-04	1.05E-04	
Y-90	2.8090E+00	11.46	22.91	0.00E+00	2.99E+01	5.97E+01	

Thermal Power	
Nominal Heat Output (Watts)	1.33E+08
Bounding Heat Output (Watts)	2.67E+08
Total	

Other Radionuclides

TLE Template Selection Summary, Burnup Summary, and Checks:

Template Selection Summary		Burnup Summary		Checks	
From SFD	Used	From SFD	Used	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDROE	LW AND U ZIRC HYDROE	SST		
Fuel Cladding	SST				
BOL H18 Constituents	U				
BOL Enrichment %	20				

Basis for burnup used in estimates:

Burnup Summary (MWd/t)	
Nominal	1.50
Bounding	22.91

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	0.981		6.03
Bounding	1.721		

Estimated EOL H18/Given EOL H18
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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"
0.07

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	38.18	76.37	0.00E+00	3.25E-08	6.50E-08	Avg. MeV	
Am-241	1.8331E-03	38.18	76.37	0.00E+00	7.00E-02	1.40E-01	0.0150	1.234E+13
Am-242m	1.4129E-06	38.18	76.37	0.00E+00	5.40E-05	1.08E-04	0.0250	2.716E+12
Am-243	1.4774E-07	38.18	76.37	0.00E+00	5.64E-06	1.13E-05	0.0375	2.313E+12
C-14	1.2871E-04	38.18	76.37	0.00E+00	4.91E-03	9.83E-03	0.0675	2.374E+12
Cl-36	2.8120E-06	38.18	76.37	0.00E+00	1.07E-04	2.15E-04	0.0850	1.471E+12
Cm-243	1.7940E-07	38.18	76.37	0.00E+00	6.85E-06	1.37E-05	0.1250	1.068E+12
Cm-244	1.6962E-06	38.18	76.37	0.00E+00	6.48E-05	1.30E-04	0.2250	1.248E+12
Co-60	1.2839E+00	38.18	76.37	0.00E+00	4.90E+01	9.81E+01	0.3750	6.331E+11
Cs-134	9.0541E-02	38.18	76.37	0.00E+00	3.46E+00	6.91E+00	0.5750	8.417E+12
Cs-135	3.2185E-05	38.18	76.37	0.00E+00	1.23E-03	2.46E-03	0.8500	3.613E+11
Cs-137	2.7564E+00	38.18	76.37	0.00E+00	1.05E+02	2.11E+02	1.2500	7.336E+12
Eu-154	1.5368E-02	38.18	76.37	0.00E+00	5.87E-01	1.17E+00	1.7500	4.890E+09
Eu-155	2.9293E-02	38.18	76.37	0.00E+00	1.12E+00	2.24E+00	2.2500	7.833E+09
Fe-55	7.7158E-01	38.18	76.37	0.00E+00	2.95E+01	5.89E+01	2.7500	8.255E+07
H-3	1.1111E-02	38.18	76.37	0.00E+00	4.24E-01	8.49E-01	3.5000	7.280E+06
I-129	7.3684E-07	38.18	76.37	0.00E+00	2.81E-05	5.63E-05	6.0000	4.099E+01
Kr-85	2.5263E-01	38.18	76.37	0.00E+00	9.65E+00	1.93E+01	7.0000	4.641E+00
Np-237	1.2427E-06	38.18	76.37	0.00E+00	4.75E-05	9.49E-05	11.0000	5.288E-01
Pa-231	3.8511E-09	38.18	76.37	0.00E+00	1.47E-07	2.94E-07		
Pb-210	7.3880E-15	38.18	76.37	0.00E+00	2.82E-13	5.64E-13		
Pm-147	2.1023E+00	38.18	76.37	0.00E+00	8.03E+01	1.61E+02		
Pu-238	1.0383E-03	38.18	76.37	0.00E+00	3.96E-02	7.93E-02		
Pu-239	5.5293E-03	38.18	76.37	0.00E+00	2.11E-01	4.22E-01		
Pu-240	2.1278E-03	38.18	76.37	0.00E+00	8.12E-02	1.62E-01		
Pu-241	1.0195E-01	38.18	76.37	0.00E+00	3.89E+00	7.79E+00		
Pu-242	2.3128E-07	38.18	76.37	0.00E+00	8.83E-06	1.77E-05		
Ra-226	5.2782E-14	38.18	76.37	0.00E+00	2.02E-12	4.03E-12		
Ra-228	1.9338E-10	38.18	76.37	0.00E+00	7.38E-09	1.48E-08		
Ru-106	9.1684E-02	38.18	76.37	0.00E+00	3.50E+00	7.00E+00		
Se-79	1.3018E-05	38.18	76.37	0.00E+00	4.97E-04	9.94E-04		
Sn-126	1.2167E-05	38.18	76.37	0.00E+00	4.85E-04	9.29E-04		
Sr-90	2.6045E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02		
Tc-99	4.4241E-04	38.18	76.37	0.00E+00	1.89E-02	3.38E-02		
Th-229	1.3713E-10	38.18	76.37	0.00E+00	5.24E-09	1.05E-08		
Th-230	1.8090E-11	38.18	76.37	0.00E+00	6.91E-10	1.38E-09		
Th-232	2.5278E-10	38.18	76.37	0.00E+00	9.65E-09	1.93E-08		
Ti-208	1.6947E-08	38.18	76.37	0.00E+00	6.47E-07	1.29E-06		
U-232	4.8737E-08	38.18	76.37	0.00E+00	1.86E-06	3.72E-06		
U-233	1.2203E-07	38.18	76.37	0.00E+00	4.66E-06	9.32E-06		
U-234	1.5925E-07	38.18	76.37	0.00E+00	6.08E-06	1.22E-05		
U-235	2.6194E-06	38.18	0.00	6.74E-04	5.74E-04	6.74E-04		
U-236	1.2693E-05	38.18	76.37	0.00E+00	4.85E-04	9.69E-04		
U-238	3.6331E-08	38.18	0.00	4.19E-04	4.18E-04	4.19E-04		
Y-90	2.6060E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02		
Other Radionuclides					1.38E+02	2.75E+02		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	30.41	38.18	
Bounding:		76.37	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.72	1.26	
Bounding:	1.44		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) UNIV. OF CAL-IRVINE

SNF ID #: 824

Fuel Units & Descr: 5 - ELEMENT

Heavy Metal Mass: BOL=0.916kg; EOL=0.916kg

ROD Storage Site: INEEL

¹Fuel decay start date:

2035

Estimates as of:

2030

²Template Burnup (MWd):

6.65

Template BOL Heavy Metal Mass (MT):

0.000195

Template Decay Time:

5 years

Estimated

Canister usage:

18"x10"

0.05

II. Estimates

	m	x _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)	Photo Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	9.804E+06
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	1.338E+04
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	8.107E+03
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	1.143E+06
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	2.257E+06
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	7.988E+06
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.993E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	9.805E+02
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	1.528E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	9.009E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	4.406E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	2.553E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	1.484E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	1.326E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	5.898E-01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	6.559E-02
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	7.541E-03
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ti-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.6194E-06	0.00	0.00	3.96E-04	3.96E-04	3.96E-04		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	2.46E-04	2.46E-04	2.46E-04		
Y-90	2.6080E+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)
1.56E-06	1.56E-06
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 %:	19.99996708	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

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

²Total burnup for all fuel associated with this worksheet must be divided 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 (FE) UNIV. OF CAL-IRVINE
SNF ID #: 1051
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.192kg; EOL=0.19kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.01

II. Estimates	a	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1.87	3.73	0.00E+00	1.59E-09	3.18E-09	Avg. MeV	
Am-241	1.8331E-03	1.87	3.73	0.00E+00	3.42E-03	6.85E-03	0.0150	6.036E+11
Am-242m	1.4129E-06	1.87	3.73	0.00E+00	2.64E-06	5.28E-06	0.0250	1.328E+11
Am-243	1.4774E-07	1.87	3.73	0.00E+00	2.76E-07	5.52E-07	0.0375	1.131E+11
C-14	1.2871E-04	1.87	3.73	0.00E+00	2.40E-04	4.81E-04	0.0575	1.161E+11
Cl-36	2.8120E-06	1.87	3.73	0.00E+00	5.25E-06	1.05E-05	0.0850	7.192E+10
Cm-243	1.7940E-07	1.87	3.73	0.00E+00	3.35E-07	6.70E-07	0.1250	5.223E+10
Cm-244	1.6962E-06	1.87	3.73	0.00E+00	3.17E-06	6.33E-06	0.2250	6.101E+10
Co-60	1.2839E+00	1.87	3.73	0.00E+00	2.40E+00	4.79E+00	0.3750	3.096E+10
Cs-134	9.0541E-02	1.87	3.73	0.00E+00	1.69E-01	3.38E-01	0.5750	4.116E+11
Cs-135	3.2195E-05	1.87	3.73	0.00E+00	6.01E-05	1.20E-04	0.8500	1.767E+10
Cs-137	2.7564E+00	1.87	3.73	0.00E+00	5.15E+00	1.03E+01	1.2500	3.588E+11
Eu-154	1.5368E-02	1.87	3.73	0.00E+00	2.87E-02	5.74E-02	1.7500	2.392E+08
Eu-155	2.9293E-02	1.87	3.73	0.00E+00	5.47E-02	1.09E-01	2.2500	3.855E+08
Fe-55	7.7158E-01	1.87	3.73	0.00E+00	1.44E+00	2.88E+00	2.7500	3.059E+06
H-3	1.1111E-02	1.87	3.73	0.00E+00	2.07E-02	4.15E-02	3.5000	3.560E+05
I-129	7.3684E-07	1.87	3.73	0.00E+00	1.38E-06	2.75E-06	5.0000	2.076E+00
Kr-85	2.5263E-01	1.87	3.73	0.00E+00	4.72E-01	9.43E-01	7.0000	2.352E-01
Np-237	1.2427E-06	1.87	3.73	0.00E+00	2.32E-06	4.64E-06	11.0000	2.881E-02
Pa-231	3.8511E-09	1.87	3.73	0.00E+00	7.19E-09	1.44E-08		
Pb-210	7.3880E-15	1.87	3.73	0.00E+00	1.38E-14	2.76E-14		
Pm-147	2.1023E+00	1.87	3.73	0.00E+00	3.93E+00	7.85E+00		
Pu-238	1.0383E-03	1.87	3.73	0.00E+00	1.94E-03	3.88E-03		
Pu-239	5.5293E-03	1.87	3.73	0.00E+00	1.03E-02	2.07E-02		
Pu-240	2.1278E-03	1.87	3.73	0.00E+00	3.97E-03	7.95E-03		
Pu-241	1.0195E-01	1.87	3.73	0.00E+00	1.90E-01	3.81E-01		
Pu-242	2.3128E-07	1.87	3.73	0.00E+00	4.32E-07	8.64E-07		
Ra-226	5.2782E-14	1.87	3.73	0.00E+00	9.66E-14	1.97E-13		
Ra-228	1.9338E-10	1.87	3.73	0.00E+00	3.61E-10	7.22E-10		
Ru-106	9.1684E-02	1.87	3.73	0.00E+00	1.71E-01	3.42E-01		
Se-79	1.3018E-05	1.87	3.73	0.00E+00	2.43E-05	4.86E-05		
Sn-126	1.2167E-05	1.87	3.73	0.00E+00	2.27E-05	4.54E-05		
Sr-90	2.6045E+00	1.87	3.73	0.00E+00	4.86E+00	9.73E+00		
Tc-99	4.4241E-04	1.87	3.73	0.00E+00	8.26E-04	1.65E-03		
Th-229	1.3713E-10	1.87	3.73	0.00E+00	2.56E-10	5.12E-10		
Th-230	1.8090E-11	1.87	3.73	0.00E+00	3.38E-11	6.76E-11		
Th-232	2.5278E-10	1.87	3.73	0.00E+00	4.72E-10	9.44E-10		
Ti-208	1.6947E-08	1.87	3.73	0.00E+00	3.16E-08	6.33E-08		
U-232	4.8737E-08	1.87	3.73	0.00E+00	9.10E-08	1.82E-07		
U-233	1.2203E-07	1.87	3.73	0.00E+00	2.28E-07	4.56E-07		
U-234	1.5925E-07	1.87	3.73	0.00E+00	2.97E-07	5.95E-07		
U-235	-2.6194E-06	1.87	0.00	8.28E-05	7.79E-05	8.28E-05		
U-236	1.2693E-05	1.87	3.73	0.00E+00	2.37E-05	4.74E-05		
U-238	-3.6331E-08	1.87	0.00	5.15E-05	5.14E-05	5.15E-05		
Y-90	2.6060E+00	1.87	3.73	0.00E+00	4.87E+00	9.73E+00		
Other Radionuclides					6.73E+00	1.35E+01		

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 %:	20.00002068	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	1.87	1.43
Bounding:		3.73

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.520 AFRRI
SNF ID #: 250
Fuel Units & Descr: 95 - ELEMENT
Heavy Metal Mass: BOL=18.525kg; EOL=18.012kg
ROD Storage Site: INEEL

Fuel decay start date: 2019
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.86

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	489.71	979.43	0.00E+00	6.72E-07	1.34E-06	Avg. MeV	
Am-241	2.3865E-03	489.71	979.43	0.00E+00	1.17E+00	2.34E+00	0.0150	1.265E+14
Am-242m	1.3812E-06	489.71	979.43	0.00E+00	6.76E-04	1.35E-03	0.0250	2.681E+13
Am-243	1.4767E-07	489.71	979.43	0.00E+00	7.23E-05	1.45E-04	0.0375	2.289E+13
C-14	1.2863E-04	489.71	979.43	0.00E+00	6.30E-02	1.26E-01	0.0575	2.440E+13
Cl-36	2.8120E-06	489.71	979.43	0.00E+00	1.38E-03	2.75E-03	0.0850	1.480E+13
Cm-243	1.5895E-07	489.71	979.43	0.00E+00	7.78E-05	1.56E-04	0.1250	9.732E+12
Cm-244	1.4008E-06	489.71	979.43	0.00E+00	6.86E-04	1.37E-03	0.2250	1.263E+13
Co-60	6.6541E-01	489.71	979.43	0.00E+00	3.26E+02	6.52E+02	0.3750	5.800E+12
Cs-134	1.6887E-02	489.71	979.43	0.00E+00	8.27E+00	1.65E+01	0.5750	9.066E+13
Cs-135	3.2195E-05	489.71	979.43	0.00E+00	1.58E-02	3.15E-02	0.8500	1.622E+12
Cs-137	2.4556E+00	489.71	979.43	0.00E+00	1.20E+03	2.41E+03	1.2500	4.877E+13
Eu-154	1.0268E-02	489.71	979.43	0.00E+00	5.03E+00	1.01E+01	1.7500	2.935E+10
Eu-155	1.4570E-02	489.71	979.43	0.00E+00	7.14E+00	1.43E+01	2.2500	1.533E+09
Fe-55	2.0361E-01	489.71	979.43	0.00E+00	9.97E+01	1.99E+02	2.7500	2.538E+07
H-3	8.3940E-03	489.71	979.43	0.00E+00	4.11E+00	8.22E+00	3.5000	3.007E+06
I-129	7.3684E-07	489.71	979.43	0.00E+00	3.61E-04	7.22E-04	5.0000	5.226E+02
Kr-85	1.8286E-01	489.71	979.43	0.00E+00	8.95E+01	1.79E+02	7.0000	5.912E+01
Np-237	1.2462E-06	489.71	979.43	0.00E+00	6.10E-04	1.22E-03	11.0000	6.731E+00
Pa-231	4.9143E-09	489.71	979.43	0.00E+00	2.41E-06	4.81E-06		
Pb-210	1.7173E-14	489.71	979.43	0.00E+00	8.41E-12	1.68E-11		
Pm-147	5.6165E-01	489.71	979.43	0.00E+00	2.75E+02	5.50E+02		
Pu-238	9.9820E-04	489.71	979.43	0.00E+00	4.89E-01	9.78E-01		
Pu-239	5.5293E-03	489.71	979.43	0.00E+00	2.71E+00	5.42E+00		
Pu-240	2.1263E-03	489.71	979.43	0.00E+00	1.04E+00	2.08E+00		
Pu-241	8.0165E-02	489.71	979.43	0.00E+00	3.93E+01	7.85E+01		
Pu-242	2.3128E-07	489.71	979.43	0.00E+00	1.13E-04	2.27E-04		
Ra-226	9.9774E-14	489.71	979.43	0.00E+00	4.89E-11	9.77E-11		
Ra-228	2.1729E-10	489.71	979.43	0.00E+00	1.06E-07	2.13E-07		
Ru-106	2.9519E-03	489.71	979.43	0.00E+00	1.45E+00	2.89E+00		
Se-79	1.3017E-05	489.71	979.43	0.00E+00	6.37E-03	1.27E-02		
Sn-126	1.2167E-05	489.71	979.43	0.00E+00	5.96E-03	1.19E-02		
Sr-90	2.3128E+00	489.71	979.43	0.00E+00	1.13E+03	2.27E+03		
Tc-99	4.4241E-04	489.71	979.43	0.00E+00	2.17E-01	4.33E-01		
Th-229	1.9459E-10	489.71	979.43	0.00E+00	9.53E-08	1.91E-07		
Th-230	2.5564E-11	489.71	979.43	0.00E+00	1.25E-08	2.50E-08		
Th-232	2.5278E-10	489.71	979.43	0.00E+00	1.24E-07	2.48E-07		
Th-208	1.6947E-08	489.71	979.43	0.00E+00	8.30E-06	1.66E-05		
U-232	4.6812E-08	489.71	979.43	0.00E+00	2.29E-05	4.58E-05		
U-233	1.2206E-07	489.71	979.43	0.00E+00	5.98E-05	1.20E-04		
U-234	1.7323E-07	489.71	979.43	0.00E+00	8.48E-05	1.70E-04		
U-235	-2.6194E-06	489.71	0.00	8.01E-03	6.72E-03	8.01E-03		
U-236	1.2693E-05	489.71	979.43	0.00E+00	6.22E-03	1.24E-02		
U-238	-3.6331E-08	489.71	0.00	4.98E-03	4.96E-03	4.98E-03		
Y-90	2.3128E+00	489.71	979.43	0.00E+00	1.13E+03	2.27E+03		
Other Radionuclides							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.52E+01	3.54E+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 %:	20	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimates:
	From SFD	Estimated	
Nominal:	90.27	489.71	
Bounding:		979.43	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.78	5.42	
Bounding:	1.55		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ANL-W
SNF ID #: 353
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.39kg; EOL=0.17kg
ROO Storage Site: INEEL

Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.02

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.7038E-09	209.82	372.30	0.00E+00	1.41E-06	2.50E-06	Avg. MeV	
Am-241	3.9068E-03	209.82	372.30	0.00E+00	8.20E-01	1.45E+00	0.0150	2.599E+13
Am-242m	1.2325E-06	209.82	372.30	0.00E+00	2.59E-04	4.59E-04	0.0250	5.400E+12
Am-243	1.4732E-07	209.82	372.30	0.00E+00	3.09E-05	5.48E-05	0.0375	4.891E+12
C-14	1.2824E-04	209.82	372.30	0.00E+00	2.89E-02	4.77E-02	0.0575	5.054E+12
Cl-36	2.8120E-06	209.82	372.30	0.00E+00	5.90E-04	1.05E-03	0.0850	3.041E+12
Cm-243	6.6556E-08	209.82	372.30	0.00E+00	1.82E-05	3.22E-05	0.1250	1.979E+12
Cm-244	5.3835E-07	209.82	372.30	0.00E+00	1.13E-04	2.00E-04	0.2250	2.620E+12
Co-60	2.4887E-02	209.82	372.30	0.00E+00	5.22E+00	9.27E+00	0.3750	1.142E+12
Cs-134	3.8030E-06	209.82	372.30	0.00E+00	7.98E-04	1.42E-03	0.5750	1.911E+13
Cs-135	3.2185E-05	209.82	372.30	0.00E+00	6.76E-03	1.20E-02	0.8500	1.955E+11
Cs-137	1.3788E+00	209.82	372.30	0.00E+00	2.89E+02	5.13E+02	1.2500	7.588E+11
Eu-154	1.3711E-03	209.82	372.30	0.00E+00	2.88E-01	5.10E-01	1.7500	5.075E+09
Eu-155	4.4361E-04	209.82	372.30	0.00E+00	9.31E-02	1.65E-01	2.2500	4.159E+06
Fe-55	2.6075E-04	209.82	372.30	0.00E+00	5.47E-02	9.71E-02	2.7500	1.912E+05
H-3	2.0647E-03	209.82	372.30	0.00E+00	4.33E-01	7.89E-01	3.5000	4.573E+02
I-129	7.3684E-07	209.82	372.30	0.00E+00	1.55E-04	2.74E-04	6.0000	1.925E+02
Kr-85	3.6346E-02	209.82	372.30	0.00E+00	7.63E+00	1.35E+01	7.0000	2.171E+01
Np-237	1.2844E-06	209.82	372.30	0.00E+00	2.89E-04	4.78E-04	11.0000	2.468E+00
Pa-231	1.2352E-08	209.82	372.30	0.00E+00	2.59E-06	4.60E-06		
Pb-210	3.5338E-13	209.82	372.30	0.00E+00	7.41E-11	1.32E-10		
Pm-147	7.6346E-04	209.82	372.30	0.00E+00	1.60E-01	2.84E-01		
Pu-238	8.1970E-04	209.82	372.30	0.00E+00	1.72E-01	3.05E-01		
Pu-239	5.5248E-03	209.82	372.30	0.00E+00	1.16E+00	2.06E+00		
Pu-240	2.1203E-03	209.82	372.30	0.00E+00	4.45E-01	7.89E-01		
Pu-241	2.4075E-02	209.82	372.30	0.00E+00	5.05E+00	8.96E+00		
Pu-242	2.3128E-07	209.82	372.30	0.00E+00	4.85E-05	8.61E-05		
Ra-226	9.6481E-13	209.82	372.30	0.00E+00	2.02E-10	3.59E-10		
Ra-228	2.5188E-10	209.82	372.30	0.00E+00	5.29E-08	9.38E-08		
Ru-106	1.0214E-10	209.82	372.30	0.00E+00	2.14E-08	3.80E-08		
Se-79	1.3014E-05	209.82	372.30	0.00E+00	2.73E-03	4.84E-03		
Sn-126	1.2164E-05	209.82	372.30	0.00E+00	2.55E-03	4.53E-03		
Sr-90	1.2762E+00	209.82	372.30	0.00E+00	2.68E+02	4.75E+02		
Tc-99	4.4241E-04	209.82	372.30	0.00E+00	9.28E-02	1.65E-01		
Th-229	5.6684E-10	209.82	372.30	0.00E+00	1.25E-07	2.22E-07		
Th-230	9.3880E-11	209.82	372.30	0.00E+00	1.97E-08	3.50E-08		
Th-232	2.5278E-10	209.82	372.30	0.00E+00	5.30E-08	9.41E-08		
Ti-208	1.3723E-08	209.82	372.30	0.00E+00	2.88E-06	5.11E-06		
U-232	3.6932E-08	209.82	372.30	0.00E+00	7.75E-06	1.37E-05		
U-233	1.2224E-07	209.82	372.30	0.00E+00	2.56E-05	4.55E-05		
U-234	2.5714E-07	209.82	372.30	0.00E+00	5.40E-05	9.57E-05		
U-235	-2.6194E-06	209.82	0.00	1.69E-04	0.00E+00	1.89E-04		
U-236	1.2695E-05	209.82	372.30	0.00E+00	2.66E-03	4.73E-03		
U-238	-3.6331E-08	209.82	0.00	1.05E-04	9.72E-05	1.05E-04		
Y-90	1.2765E+00	209.82	372.30	0.00E+00	2.68E+02	4.75E+02		
Other Radionuclides					2.89E+02	5.12E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	13.30	209.82
Bounding:	15.99	372.30

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

2.07

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ANL-W
SNF ID #: 370
Fuel Units & Descr: 40 - ELEMENT
Heavy Metal Mass: BOL=7.12kg; EOL=6.86kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-SS (LWA/J-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"
0.36

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	6.7038E-09	248.20	496.40	0.00E+00	1.66E-08	3.33E-08	Avg. MeV	
Am-241	3.9068E-03	248.20	496.40	0.00E+00	9.70E-01	1.94E+00	0.0150	3.465E+13
Am-242m	1.2325E-08	248.20	496.40	0.00E+00	3.06E-04	6.12E-04	0.0250	7.199E+12
Am-243	1.4732E-07	248.20	496.40	0.00E+00	3.66E-05	7.31E-05	0.0375	6.255E+12
C-14	1.2824E-04	248.20	496.40	0.00E+00	3.18E-02	6.37E-02	0.0575	6.739E+12
Cl-36	2.8120E-06	248.20	496.40	0.00E+00	6.98E-04	1.40E-03	0.0850	4.055E+12
Cm-243	8.6556E-08	248.20	496.40	0.00E+00	2.15E-05	4.30E-05	0.1250	2.639E+12
Cm-244	5.3835E-07	248.20	496.40	0.00E+00	1.34E-04	2.67E-04	0.2250	3.493E+12
Co-60	2.4887E-02	248.20	496.40	0.00E+00	6.18E+00	1.24E+01	0.3750	1.523E+12
Cs-134	3.8030E-08	248.20	496.40	0.00E+00	9.44E-04	1.89E-03	0.5750	2.548E+13
Cs-135	3.2195E-05	248.20	496.40	0.00E+00	7.99E-03	1.60E-02	0.8500	2.607E+11
Cs-137	1.3788E+00	248.20	496.40	0.00E+00	3.42E+02	6.84E+02	1.2500	1.012E+12
Eu-154	1.3711E-03	248.20	496.40	0.00E+00	3.40E-01	6.81E-01	1.7500	6.767E+09
Eu-155	4.4361E-04	248.20	496.40	0.00E+00	1.10E-01	2.20E-01	2.2500	5.545E+06
Fe-55	2.6075E-04	248.20	496.40	0.00E+00	6.47E-02	1.29E-01	2.7500	2.549E+06
H-3	2.0647E-03	248.20	496.40	0.00E+00	5.12E-01	1.02E+00	3.5000	6.193E+02
I-129	7.3684E-07	248.20	496.40	0.00E+00	1.83E-04	3.66E-04	5.0000	2.608E+02
Kr-85	3.6346E-02	248.20	496.40	0.00E+00	9.02E+00	1.80E+01	7.0000	2.942E+01
Np-237	1.2844E-06	248.20	496.40	0.00E+00	3.19E-04	6.38E-04	11.0000	3.346E+00
Pa-231	1.2352E-08	248.20	496.40	0.00E+00	3.07E-06	6.13E-06		
Pb-210	3.5338E-13	248.20	496.40	0.00E+00	8.77E-11	1.75E-10		
Pm-147	7.6346E-04	248.20	496.40	0.00E+00	1.89E-01	3.79E-01		
Pu-238	8.1970E-04	248.20	496.40	0.00E+00	2.03E-01	4.07E-01		
Pu-239	5.5248E-03	248.20	496.40	0.00E+00	1.37E+00	2.74E+00		
Pu-240	2.1203E-03	248.20	496.40	0.00E+00	5.26E-01	1.05E+00		
Pu-241	2.4075E-02	248.20	496.40	0.00E+00	5.98E+00	1.20E+01		
Pu-242	2.3128E-07	248.20	496.40	0.00E+00	5.74E-05	1.15E-04		
Ra-226	9.6481E-13	248.20	496.40	0.00E+00	2.39E-10	4.79E-10		
Ra-228	2.5188E-10	248.20	496.40	0.00E+00	6.25E-08	1.25E-07		
Ru-106	1.0214E-10	248.20	496.40	0.00E+00	2.53E-08	5.07E-08		
Se-79	1.3014E-05	248.20	496.40	0.00E+00	3.23E-03	6.46E-03		
Sn-126	1.2164E-05	248.20	496.40	0.00E+00	3.02E-03	6.04E-03		
Sr-90	1.2762E+00	248.20	496.40	0.00E+00	3.17E+02	6.34E+02		
Tc-99	4.4241E-04	248.20	496.40	0.00E+00	1.10E-01	2.20E-01		
Th-229	5.9684E-10	248.20	496.40	0.00E+00	1.48E-07	2.96E-07		
Th-230	9.3880E-11	248.20	496.40	0.00E+00	2.33E-08	4.66E-08		
Th-232	2.5278E-10	248.20	496.40	0.00E+00	6.27E-08	1.25E-07		
Ti-208	1.3723E-08	248.20	496.40	0.00E+00	3.41E-06	6.81E-06		
U-232	3.6932E-08	248.20	496.40	0.00E+00	9.17E-06	1.83E-05		
U-233	1.2224E-07	248.20	496.40	0.00E+00	3.03E-05	6.07E-05		
U-234	2.5714E-07	248.20	496.40	0.00E+00	6.38E-05	1.28E-04		
U-235	-2.6194E-06	248.20	0.00	3.03E-03	2.38E-03	3.03E-03		
U-236	1.2695E-05	248.20	496.40	0.00E+00	3.15E-03	6.30E-03		
U-238	-3.6331E-08	248.20	0.00	1.92E-03	1.91E-03	1.92E-03		
Y-90	1.2765E+00	248.20	496.40	0.00E+00	3.17E+02	6.34E+02		
Other Radionuclides					3.41E+02	6.83E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.99E+00	7.98E+00
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 %:	19.66292135	10 to 20.1	

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

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.520 AUSTRIA
 SNF ID #: 469
 Fuel Units & Descr: 30 - ELEMENT
 Heavy Metal Mass: BOL-5.65kg EOL-5.643kg
 ROD Storage Site: NEEI

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: TRIGA SS (LW/LZn, SST, 10 to 20%, U)
 Template Burnup (MWd): 6.65
 Heavy Metal Mass (HT): 0.000155
 Template Decay Time: 20 years

Estimated
 Cluster usage:
 18 "x10"
 0.27

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	CANWD 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
Ac-227	2.643E-09	197.60	395.21	0.00E+00	6.22E-07	1.04E-06	Avg. BEV
Am-241	3.1429E-03	197.60	395.21	0.00E+00	6.21E-01	1.24E+00	0.0150
Am-242m	1.3185E-06	197.60	395.21	0.00E+00	2.81E-04	5.21E-04	0.0250
Am-243	1.4715E-07	197.60	395.21	0.00E+00	2.92E-05	5.83E-05	0.0375
C-14	1.2847E-04	197.60	395.21	0.00E+00	2.54E-02	5.08E-02	0.0575
C-36	2.8120E-06	197.60	395.21	0.00E+00	5.56E-04	1.11E-03	0.0850
Cm-243	1.2465E-07	197.60	395.21	0.00E+00	2.46E-05	4.85E-05	0.1250
Cm-244	9.5564E-07	197.60	395.21	0.00E+00	1.89E-04	3.78E-04	0.2250
Co-60	1.7880E-01	197.60	395.21	0.00E+00	3.55E-01	7.07E-01	0.5750
Co-134	5.8692E-04	197.60	395.21	0.00E+00	1.16E-01	2.32E-01	0.6500
Co-135	3.2195E-05	197.60	395.21	0.00E+00	6.36E-03	1.27E-02	0.8500
Ce-137	1.9489E-00	197.60	395.21	0.00E+00	3.85E-02	7.70E+02	1.2500
Eu-154	4.5895E-03	197.60	395.21	0.00E+00	9.07E-01	1.81E+00	1.7500
Eu-155	3.6045E-01	197.60	395.21	0.00E+00	7.12E-01	1.42E+00	2.2500
Fe-55	1.4185E-02	197.60	395.21	0.00E+00	2.80E+00	5.61E+00	2.7500
H-3	4.7895E-07	197.60	395.21	0.00E+00	9.45E-01	1.89E+00	3.5000
I-129	7.3684E-07	197.60	395.21	0.00E+00	1.46E-04	2.91E-04	5.0000
K-40	8.5820E-02	197.60	395.21	0.00E+00	1.89E+01	3.78E+01	7.0000
Np-237	1.2552E-06	197.60	395.21	0.00E+00	2.48E-04	4.96E-04	11.0000
Np-239	7.0406E-09	197.60	395.21	0.00E+00	1.39E-06	2.78E-06	
Pb-210	5.8000E-14	197.60	395.21	0.00E+00	1.15E-11	2.29E-11	
Pm-147	4.0075E-02	197.60	395.21	0.00E+00	7.82E-00	1.58E+01	
Pu-238	9.2256E-04	197.60	395.21	0.00E+00	1.82E-01	3.65E-01	
Pu-239	5.5278E-03	197.60	395.21	0.00E+00	1.00E+00	2.18E+00	
Pu-240	2.1248E-03	197.60	395.21	0.00E+00	4.20E-01	8.40E-01	
Pu-241	4.9549E-02	197.60	395.21	0.00E+00	9.79E+00	1.95E+01	
Pu-242	2.3128E-07	197.60	395.21	0.00E+00	4.57E-05	9.14E-05	
Pu-243	2.4526E-13	197.60	395.21	0.00E+00	4.85E-11	9.69E-11	
Ra-226	2.4015E-10	197.60	395.21	0.00E+00	4.75E-08	9.49E-08	
Ra-106	3.0622E-06	197.60	395.21	0.00E+00	6.05E-04	1.21E-03	
Se-78	1.3015E-05	197.60	395.21	0.00E+00	2.57E-03	5.14E-03	
Sn-126	1.2165E-05	197.60	395.21	0.00E+00	2.40E-03	4.81E-03	
Sn-90	1.8226E-00	197.60	395.21	0.00E+00	3.60E+02	7.20E+02	
Tc-99	4.4241E-04	197.60	395.21	0.00E+00	8.74E-02	1.75E-01	
Th-230	3.0932E-10	197.60	395.21	0.00E+00	6.12E-08	1.22E-07	
Th-232	4.2340E-11	197.60	395.21	0.00E+00	8.37E-09	1.67E-08	
Th-230	2.5278E-10	197.60	395.21	0.00E+00	5.00E-08	9.99E-08	
Th-232	1.5820E-08	197.60	395.21	0.00E+00	3.13E-06	6.25E-06	
U-232	4.2847E-08	197.60	395.21	0.00E+00	8.43E-06	1.69E-05	
U-233	1.2211E-07	197.60	395.21	0.00E+00	2.41E-05	4.82E-05	
U-234	1.9955E-07	197.60	395.21	0.00E+00	3.94E-05	7.89E-05	
U-235	2.6194E-06	197.60	0.00	2.53E-03	2.01E-03	2.53E-03	
U-236	1.2633E-05	197.60	395.21	0.00E+00	2.51E-03	5.02E-03	
U-238	3.6331E-08	197.60	0.00	1.57E-03	1.57E-03	1.57E-03	
Y-90	1.8241E-00	197.60	395.21	0.00E+00	3.81E+02	7.61E+02	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	4.88E+00	8.88E+00

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ³	From SFD	Estimated	Basis for Burnup used in estimate:
Nominal:	57.01	197.60	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		395.21	Bounding burnup assumed to be twice nominal burnup.

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HMI/Given EOL HMI
Nominal:	0.99	3.47	1.00
Bounding:	1.98		

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 BRAZIL

SNF ID #: 1063

Fuel Units & Descr: 9 - ELEMENT

Heavy Metal Mass: BOL=1.755kg; EOL=1.741kg

ROD Storage Site: INEEL

¹Fuel decay start date: 2006

Estimates as of: 2030

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

²Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 20 years

Estimated
Canister usage:

18"x10"

0.08

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	2.6436E-09	17.10	34.21	0.00E+00	4.52E-08	9.04E-08	Avg. MeV	
Am-241	3.1429E-03	17.10	34.21	0.00E+00	5.38E-02	1.08E-01	0.0150	3.428E+12
Am-242m	1.3195E-06	17.10	34.21	0.00E+00	2.26E-05	4.51E-05	0.0250	7.136E+11
Am-243	1.4753E-07	17.10	34.21	0.00E+00	2.52E-06	5.05E-06	0.0375	6.182E+11
C-14	1.2847E-04	17.10	34.21	0.00E+00	2.20E-03	4.39E-03	0.0575	6.651E+11
Cl-36	2.8120E-06	17.10	34.21	0.00E+00	4.81E-05	9.62E-05	0.0850	4.015E+11
Cm-243	1.2465E-07	17.10	34.21	0.00E+00	2.13E-06	4.26E-06	0.1250	2.624E+11
Cm-244	9.5564E-07	17.10	34.21	0.00E+00	1.63E-05	3.27E-05	0.2250	3.447E+11
Co-60	1.7880E-01	17.10	34.21	0.00E+00	3.06E+00	6.12E+00	0.3750	1.511E+11
Cs-134	5.8692E-04	17.10	34.21	0.00E+00	1.00E-02	2.01E-02	0.5750	2.485E+12
Cs-135	3.2195E-05	17.10	34.21	0.00E+00	5.51E-04	1.10E-03	0.8500	2.801E+10
Cs-137	1.9489E+00	17.10	34.21	0.00E+00	3.33E+01	6.67E+01	1.2500	4.642E+11
Eu-154	4.5895E-03	17.10	34.21	0.00E+00	7.85E-02	1.57E-01	1.7500	7.197E+08
Eu-155	3.6045E-03	17.10	34.21	0.00E+00	6.17E-02	1.23E-01	2.2500	2.479E+08
Fe-55	1.4185E-02	17.10	34.21	0.00E+00	2.43E-01	4.85E-01	2.7500	2.731E+04
H-3	4.7895E-03	17.10	34.21	0.00E+00	8.19E-02	1.64E-01	3.5000	1.535E+02
I-129	7.3684E-07	17.10	34.21	0.00E+00	1.26E-05	2.52E-05	5.0000	1.886E+01
Kr-85	9.5820E-02	17.10	34.21	0.00E+00	1.64E+00	3.28E+00	7.0000	2.133E+00
Np-237	1.2552E-06	17.10	34.21	0.00E+00	2.15E-05	4.29E-05	11.0000	2.428E-01
Pa-231	7.0406E-09	17.10	34.21	0.00E+00	1.20E-07	2.41E-07		
Pb-210	5.8000E-14	17.10	34.21	0.00E+00	9.92E-13	1.98E-12		
Pm-147	4.0075E-02	17.10	34.21	0.00E+00	6.85E-01	1.37E+00		
Pu-238	9.2256E-04	17.10	34.21	0.00E+00	1.58E-02	3.16E-02		
Pu-239	5.5278E-03	17.10	34.21	0.00E+00	9.45E-02	1.89E-01		
Pu-240	2.1248E-03	17.10	34.21	0.00E+00	3.63E-02	7.27E-02		
Pu-241	4.9549E-02	17.10	34.21	0.00E+00	8.47E-01	1.69E+00		
Pu-242	2.3128E-07	17.10	34.21	0.00E+00	3.96E-06	7.91E-06		
Ra-226	2.4526E-13	17.10	34.21	0.00E+00	4.20E-12	8.39E-12		
Ra-228	2.4015E-10	17.10	34.21	0.00E+00	4.11E-09	8.22E-09		
Ru-106	3.0602E-06	17.10	34.21	0.00E+00	5.23E-05	1.05E-04		
Se-79	1.3015E-05	17.10	34.21	0.00E+00	2.23E-04	4.45E-04		
Sn-126	1.2165E-05	17.10	34.21	0.00E+00	2.08E-04	4.16E-04		
Sr-90	1.8226E+00	17.10	34.21	0.00E+00	3.12E+01	6.23E+01		
Tc-99	4.4241E-04	17.10	34.21	0.00E+00	7.57E-03	1.51E-02		
Th-229	3.0962E-10	17.10	34.21	0.00E+00	5.30E-09	1.06E-08		
Th-230	4.2346E-11	17.10	34.21	0.00E+00	7.24E-10	1.45E-09		
Th-232	2.5278E-10	17.10	34.21	0.00E+00	4.32E-09	8.65E-09		
Ti-208	1.5820E-08	17.10	34.21	0.00E+00	2.71E-07	5.41E-07		
U-232	4.2647E-08	17.10	34.21	0.00E+00	7.29E-07	1.46E-06		
U-233	1.2211E-07	17.10	34.21	0.00E+00	2.09E-06	4.18E-06		
U-234	1.9955E-07	17.10	34.21	0.00E+00	3.41E-06	6.83E-06		
U-235	-2.6194E-06	17.10	0.00	7.59E-04	7.14E-04	7.59E-04		
U-236	1.2693E-05	17.10	34.21	0.00E+00	2.17E-04	4.34E-04		
U-238	-3.6331E-08	17.10	0.00	4.72E-04	4.71E-04	4.72E-04		
Y-90	1.8241E+00	17.10	34.21	0.00E+00	3.12E+01	6.24E+01		
Other Radionuclides					3.29E+01	6.59E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	17.10	13.75
Bounding:		34.21

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	0.80
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.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.520 CORNELL
SNF ID #: 246
Fuel Units & Descr: 115 - ELEMENT
Heavy Metal Mass: BOL=21.896kg; EOL=21.586kg
ROO Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.04

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	8.5173E-10	320.10	640.20	0.00E+00	2.73E-07	5.45E-07	0.0150 1.035E+14
Am-241	1.8331E-03	320.10	640.20	0.00E+00	5.87E-01	1.17E+00	0.0250 2.277E+13
Am-242m	1.4129E-06	320.10	640.20	0.00E+00	4.52E-04	9.05E-04	0.0375 1.939E+13
Am-243	1.4774E-07	320.10	640.20	0.00E+00	4.73E-05	9.46E-05	0.0575 1.960E+13
C-14	1.2871E-04	320.10	640.20	0.00E+00	4.12E-02	8.24E-02	0.0850 1.233E+13
Cl-36	2.8120E-06	320.10	640.20	0.00E+00	9.00E-04	1.80E-03	0.1250 8.953E+12
Cm-243	1.7940E-07	320.10	640.20	0.00E+00	5.74E-05	1.15E-04	0.2250 1.046E+13
Cm-244	1.8962E-06	320.10	640.20	0.00E+00	5.43E-04	1.09E-03	0.3750 5.308E+12
Co-60	1.2839E+00	320.10	640.20	0.00E+00	4.11E+02	8.22E+02	0.5750 7.056E+13
Cs-134	9.0541E-02	320.10	640.20	0.00E+00	2.90E+01	5.80E+01	0.8500 3.028E+12
Cs-135	3.2195E-05	320.10	640.20	0.00E+00	1.03E-02	2.06E-02	1.2500 6.150E+13
Cs-137	2.7564E+00	320.10	640.20	0.00E+00	8.82E+02	1.76E+03	1.7500 4.100E+10
Eu-154	1.5368E-02	320.10	640.20	0.00E+00	4.92E+00	9.84E+00	2.2500 6.806E+10
Eu-155	2.9293E-02	320.10	640.20	0.00E+00	9.38E+00	1.88E+01	2.7500 5.244E+08
Fe-55	7.7158E-01	320.10	640.20	0.00E+00	2.47E+02	4.94E+02	3.5000 6.103E+07
H-3	1.1111E-02	320.10	640.20	0.00E+00	3.56E+00	7.11E+00	5.0000 3.491E+02
I-129	7.3684E-07	320.10	640.20	0.00E+00	2.36E-04	4.72E-04	7.0000 3.954E+01
Kr-85	2.5263E-01	320.10	640.20	0.00E+00	8.09E+01	1.62E+02	11.0000 4.505E+00
Np-237	1.2427E-06	320.10	640.20	0.00E+00	3.85E-04	7.66E-04	
Pa-231	3.8511E-09	320.10	640.20	0.00E+00	1.23E-06	2.47E-06	
Pb-210	7.3880E-15	320.10	640.20	0.00E+00	2.36E-12	4.73E-12	
Pm-147	2.1023E+00	320.10	640.20	0.00E+00	6.73E+02	1.35E+03	
Pu-238	1.0383E-03	320.10	640.20	0.00E+00	3.32E-01	6.65E-01	
Pu-239	5.5293E-03	320.10	640.20	0.00E+00	1.77E+00	3.54E+00	
Pu-240	2.1278E-09	320.10	640.20	0.00E+00	8.81E-01	1.36E+00	
Pu-241	1.0195E-01	320.10	640.20	0.00E+00	3.26E+01	6.53E+01	
Pu-242	2.3128E-07	320.10	640.20	0.00E+00	7.40E-05	1.48E-04	
Ra-226	5.2782E-14	320.10	640.20	0.00E+00	1.69E-11	3.38E-11	
Ra-228	1.9338E-10	320.10	640.20	0.00E+00	6.19E-08	1.24E-07	
Ru-106	9.1684E-02	320.10	640.20	0.00E+00	2.93E+01	5.87E+01	
Se-79	1.3018E-05	320.10	640.20	0.00E+00	4.17E-03	8.33E-03	
Sn-126	1.2167E-05	320.10	640.20	0.00E+00	3.89E-03	7.79E-03	
Sr-90	2.6045E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03	
Tc-99	4.4241E-04	320.10	640.20	0.00E+00	1.42E-01	2.83E-01	
Th-229	1.3713E-10	320.10	640.20	0.00E+00	4.39E-08	8.78E-08	
Th-230	1.8090E-11	320.10	640.20	0.00E+00	5.79E-09	1.16E-08	
Th-232	2.5278E-10	320.10	640.20	0.00E+00	8.09E-08	1.62E-07	
Ti-206	1.8947E-08	320.10	640.20	0.00E+00	5.42E-06	1.08E-05	
U-232	4.8737E-08	320.10	640.20	0.00E+00	1.56E-05	3.12E-05	
U-233	1.2203E-07	320.10	640.20	0.00E+00	3.91E-05	7.81E-05	
U-234	1.5925E-07	320.10	640.20	0.00E+00	5.10E-05	1.02E-04	
U-235	-2.6194E-06	320.10	0.00	9.45E-03	8.61E-03	9.45E-03	
U-236	1.2693E-05	320.10	640.20	0.00E+00	4.06E-03	8.13E-03	
U-238	-3.6331E-08	320.10	0.00	5.89E-03	5.88E-03	5.89E-03	
Y-90	2.6060E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03	
Other Radionuclides					1.15E+03	2.31E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	19.97350572	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	320.10	296.41
Bounding:		640.20

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:	0.43	0.93
Bounding:	0.86	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 DOW
SNF ID #: 251

Fuel Units & Descr: 77 - ELEMENT

Heavy Metal Mass: BOL=15.015kg; EOL=14.63kg

ROD Storage Site: INEEL

Fuel decay start date: 2035

Estimate as of: 2030

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

Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated
Canister usage:

18"x10"

0.69

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	367.52	735.05	0.00E+00	3.13E-07	6.26E-07	Avg. MeV	
Am-241	1.8331E-03	367.52	735.05	0.00E+00	6.74E-01	1.35E+00	0.0150	1.188E+14
Am-242m	1.4129E-06	367.52	735.05	0.00E+00	5.19E-04	1.04E-03	0.0250	2.614E+13
Am-243	1.4774E-07	367.52	735.05	0.00E+00	5.43E-05	1.09E-04	0.0375	2.226E+13
C-14	1.2871E-04	367.52	735.05	0.00E+00	4.73E-02	9.46E-02	0.0575	2.285E+13
Cl-38	2.8120E-06	367.52	735.05	0.00E+00	1.03E-03	2.07E-03	0.0850	1.416E+13
Cm-243	1.7940E-07	367.52	735.05	0.00E+00	6.59E-05	1.32E-04	0.1250	1.028E+13
Cm-244	1.6962E-06	367.52	735.05	0.00E+00	6.23E-04	1.25E-03	0.2250	1.201E+13
Co-60	1.2839E+00	367.52	735.05	0.00E+00	4.72E+02	9.44E+02	0.3750	6.094E+12
Cs-134	9.0541E-02	367.52	735.05	0.00E+00	3.33E+01	6.66E+01	0.5750	8.102E+13
Cs-135	3.2195E-05	367.52	735.05	0.00E+00	1.18E-02	2.37E-02	0.8500	3.477E+12
Cs-137	2.7564E+00	367.52	735.05	0.00E+00	1.01E+03	2.03E+03	1.2500	7.061E+13
Eu-154	1.5368E-02	367.52	735.05	0.00E+00	5.65E+00	1.13E+01	1.7500	4.707E+10
Eu-155	2.9293E-02	367.52	735.05	0.00E+00	1.08E+01	2.15E+01	2.2500	7.587E+10
Fe-55	7.7158E-01	367.52	735.05	0.00E+00	2.84E+02	5.67E+02	2.7500	6.021E+06
H-3	1.1111E-02	367.52	735.05	0.00E+00	4.08E+00	8.17E+00	3.5000	7.007E+07
I-129	7.3684E-07	367.52	735.05	0.00E+00	2.71E-04	5.42E-04	5.0000	3.946E+02
Kr-85	2.5263E-01	367.52	735.05	0.00E+00	9.28E+01	1.86E+02	7.0000	4.467E+01
Np-237	1.2427E-06	367.52	735.05	0.00E+00	4.57E-04	9.13E-04	11.0000	5.069E+00
Pa-231	3.8511E-09	367.52	735.05	0.00E+00	1.42E-06	2.83E-06		
Pb-210	7.3880E-15	367.52	735.05	0.00E+00	2.72E-12	5.43E-12		
Pm-147	2.1023E+00	367.52	735.05	0.00E+00	7.73E+02	1.55E+03		
Pu-238	1.0383E-03	367.52	735.05	0.00E+00	3.82E-01	7.63E-01		
Pu-239	5.5293E-03	367.52	735.05	0.00E+00	2.03E+00	4.06E+00		
Pu-240	2.1278E-03	367.52	735.05	0.00E+00	7.82E-01	1.56E+00		
Pu-241	1.0195E-01	367.52	735.05	0.00E+00	3.75E+01	7.49E+01		
Pu-242	2.3128E-07	367.52	735.05	0.00E+00	8.50E-05	1.70E-04		
Ra-226	5.2782E-14	367.52	735.05	0.00E+00	1.94E-11	3.88E-11		
Ra-228	1.9338E-10	367.52	735.05	0.00E+00	7.11E-08	1.42E-07		
Ru-106	9.1684E-02	367.52	735.05	0.00E+00	3.37E+01	6.74E+01		
Se-79	1.3018E-05	367.52	735.05	0.00E+00	4.78E-03	9.57E-03		
Sn-126	1.2167E-05	367.52	735.05	0.00E+00	4.47E-03	8.94E-03		
Sr-90	2.6045E+00	367.52	735.05	0.00E+00	9.57E+02	1.91E+03		
Tc-99	4.4241E-04	367.52	735.05	0.00E+00	1.63E-01	3.25E-01		
Th-229	1.3713E-10	367.52	735.05	0.00E+00	5.04E-08	1.01E-07		
Th-230	1.8090E-11	367.52	735.05	0.00E+00	6.65E-09	1.33E-08		
Th-232	2.5278E-10	367.52	735.05	0.00E+00	9.29E-06	1.86E-07		
Ti-208	1.6947E-06	367.52	735.05	0.00E+00	6.23E-06	1.25E-05		
U-232	4.8737E-08	367.52	735.05	0.00E+00	1.79E-05	3.58E-05		
U-233	1.2203E-07	367.52	735.05	0.00E+00	4.48E-05	8.97E-05		
U-234	1.5925E-07	367.52	735.05	0.00E+00	5.85E-05	1.17E-04		
U-235	-2.6194E-06	367.52	0.00	6.49E-03	5.53E-03	6.49E-03		
U-236	1.2693E-05	367.52	735.05	0.00E+00	4.67E-03	9.33E-03		
U-238	-3.6331E-06	367.52	0.00	4.04E-03	4.02E-03	4.04E-03		
Y-90	2.6060E+00	367.52	735.05	0.00E+00	9.58E+02	1.92E+03		
Other Radionuclides					1.33E+03	2.65E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	219.50	367.52
Bounding:		735.05

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.72	1.67
Bounding:	1.44	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ENGLAND
 SNF ID #: 485
 Fuel Units & Descr: 84 - ELEMENT
 Heavy Metal Mass: BOL=16.187kg; EOL=15.826kg
 ROD Storage Site: INEEL

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

Estimated
 Canister usage:
 18"x10"
 0.76

II. Estimates

	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	394.39	788.78	0.00E+00	1.04E-06	2.09E-06	Avg. MeV	
Am-241	3.1429E-03	394.39	788.78	0.00E+00	1.24E+00	2.48E+00	0.0150	7.905E+13
Am-242m	1.3195E-06	394.39	788.78	0.00E+00	5.20E-04	1.04E-03	0.0250	1.645E+13
Am-243	1.4753E-07	394.39	788.78	0.00E+00	5.82E-05	1.16E-04	0.0375	1.425E+13
C-14	1.2847E-04	394.39	788.78	0.00E+00	5.07E-02	1.01E-01	0.0575	1.534E+13
Cl-36	2.8120E-06	394.39	788.78	0.00E+00	1.11E-03	2.22E-03	0.0850	9.258E+12
Cm-243	1.2465E-07	394.39	788.78	0.00E+00	4.92E-05	9.83E-05	0.1250	6.051E+12
Cm-244	9.5564E-07	394.39	788.78	0.00E+00	3.77E-04	7.54E-04	0.2250	7.949E+12
Co-60	1.7880E-01	394.39	788.78	0.00E+00	7.05E+01	1.41E+02	0.3750	3.484E+12
Cs-134	5.8692E-04	394.39	788.78	0.00E+00	2.31E-01	4.63E-01	0.5750	5.730E+13
Cs-135	3.2195E-05	394.39	788.78	0.00E+00	1.27E-02	2.54E-02	0.8500	6.456E+11
Cs-137	1.9489E+00	394.39	788.78	0.00E+00	7.69E+02	1.54E+03	1.2500	1.070E+13
Eu-154	4.5895E-03	394.39	788.78	0.00E+00	1.81E+00	3.62E+00	1.7500	1.859E+10
Eu-155	3.6045E-03	394.39	788.78	0.00E+00	1.42E+00	2.84E+00	2.2500	5.716E+07
Fe-55	1.4185E-02	394.39	788.78	0.00E+00	5.59E+00	1.12E+01	2.7500	6.297E+05
H-3	4.7895E-03	394.39	788.78	0.00E+00	1.89E+00	3.78E+00	3.5000	3.505E+03
I-129	7.3684E-07	394.39	788.78	0.00E+00	2.91E-04	5.81E-04	5.0000	4.199E+02
Kr-85	9.5820E-02	394.39	788.78	0.00E+00	3.78E+01	7.56E+01	7.0000	4.744E+01
Np-237	1.2552E-06	394.39	788.78	0.00E+00	4.95E-04	9.90E-04	11.0000	5.398E+00
Pa-231	7.0406E-09	394.39	788.78	0.00E+00	2.78E-06	5.55E-06		
Pb-210	5.8000E-14	394.39	788.78	0.00E+00	2.29E-11	4.57E-11		
Pm-147	4.0075E-02	394.39	788.78	0.00E+00	1.58E+01	3.16E+01		
Pu-238	9.2256E-04	394.39	788.78	0.00E+00	3.64E-01	7.28E-01		
Pu-239	5.5278E-03	394.39	788.78	0.00E+00	2.18E+00	4.36E+00		
Pu-240	2.1248E-03	394.39	788.78	0.00E+00	8.38E-01	1.68E+00		
Pu-241	4.9549E-02	394.39	788.78	0.00E+00	1.95E+01	3.91E+01		
Pu-242	2.3128E-07	394.39	788.78	0.00E+00	9.12E-05	1.82E-04		
Ra-226	2.4526E-13	394.39	788.78	0.00E+00	9.67E-11	1.93E-10		
Ra-228	2.4015E-10	394.39	788.78	0.00E+00	9.47E-08	1.89E-07		
Ru-106	3.0602E-06	394.39	788.78	0.00E+00	1.21E-03	2.41E-03		
Se-79	1.3015E-05	394.39	788.78	0.00E+00	5.13E-03	1.03E-02		
Sn-126	1.2165E-05	394.39	788.78	0.00E+00	4.80E-03	9.60E-03		
Sr-90	1.8226E+00	394.39	788.78	0.00E+00	7.19E+02	1.44E+03		
Tc-99	4.4241E-04	394.39	788.78	0.00E+00	1.74E-01	3.49E-01		
Th-229	3.0962E-10	394.39	788.78	0.00E+00	1.22E-07	2.44E-07		
Th-230	4.2346E-11	394.39	788.78	0.00E+00	1.67E-08	3.34E-08		
Th-232	2.5278E-10	394.39	788.78	0.00E+00	9.97E-08	1.99E-07		
Ti-208	1.5820E-08	394.39	788.78	0.00E+00	6.24E-06	1.25E-05		
U-232	4.2647E-08	394.39	788.78	0.00E+00	1.68E-05	3.36E-05		
U-233	1.2211E-07	394.39	788.78	0.00E+00	4.82E-05	9.63E-05	Thermal Power	
U-234	1.9955E-07	394.39	788.78	0.00E+00	7.87E-05	1.57E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.8194E-06	394.39	0.00	6.93E-03	5.90E-03	6.93E-03	9.87E+00	1.97E+01
U-236	1.2693E-05	394.39	788.78	0.00E+00	5.01E-03	1.00E-02	Total	Total
U-238	-3.6331E-08	394.39	0.00	4.36E-03	4.35E-03	4.36E-03		
Y-90	1.8241E+00	394.39	788.78	0.00E+00	7.19E+02	1.44E+03		
Other Radionuclides					7.59E+02	1.52E+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	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.80853811	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	394.39	344.80	
Bounding:		788.78	Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.71	0.87	
Bounding:	1.43		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 FINLAND
SNF ID #: 472
Fuel Units & Descr: 102 - ELEMENT
Heavy Metal Mass: BOL=19.89kg; EOL=19.686kg
ROD Storage Site: INEEL

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

Estimated
Canister usage:
18"x10"
0.92

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	194.74	389.48	0.00E+00	5.15E-07	1.03E-08	Avg. MeV	
Am-241	3.1429E-03	194.74	389.48	0.00E+00	6.12E-01	1.22E+00	0.0150	3.903E+13
Am-242m	1.3195E-06	194.74	389.48	0.00E+00	2.57E-04	5.14E-04	0.0250	8.125E+12
Am-243	1.4753E-07	194.74	389.48	0.00E+00	2.87E-05	5.75E-05	0.0375	7.039E+12
C-14	1.2847E-04	194.74	389.48	0.00E+00	2.50E-02	5.00E-02	0.0575	7.572E+12
Cl-36	2.8120E-06	194.74	389.48	0.00E+00	5.48E-04	1.10E-03	0.0850	4.571E+12
Cm-243	1.2465E-07	194.74	389.48	0.00E+00	2.43E-05	4.85E-05	0.1250	2.988E+12
Cm-244	9.5564E-07	194.74	389.48	0.00E+00	1.86E-04	3.72E-04	0.2250	3.925E+12
Co-60	1.7880E-01	194.74	389.48	0.00E+00	3.48E+01	6.96E+01	0.3750	1.720E+12
Cs-134	5.8692E-04	194.74	389.48	0.00E+00	1.14E-01	2.29E-01	0.5750	2.829E+13
Cs-135	3.2195E-05	194.74	389.48	0.00E+00	6.27E-03	1.25E-02	0.8500	3.189E+11
Cs-137	1.9489E+00	194.74	389.48	0.00E+00	3.80E+02	7.59E+02	1.2500	5.285E+12
Eu-154	4.5895E-03	194.74	389.48	0.00E+00	8.94E-01	1.79E+00	1.7500	8.194E+09
Eu-155	3.6045E-03	194.74	389.48	0.00E+00	7.02E-01	1.40E+00	2.2500	2.822E+07
Fe-55	1.4185E-02	194.74	389.48	0.00E+00	2.76E+00	5.52E+00	2.7500	3.110E+05
H-3	4.7895E-03	194.74	389.48	0.00E+00	9.33E-01	1.87E+00	3.5000	1.748E+03
I-129	7.3684E-07	194.74	389.48	0.00E+00	1.43E-04	2.87E-04	5.0000	2.147E+02
Kr-85	9.5820E-02	194.74	389.48	0.00E+00	1.87E+01	3.73E+01	7.0000	2.427E+01
Np-237	1.2552E-06	194.74	389.48	0.00E+00	2.44E-04	4.89E-04	11.0000	2.763E+00
Pa-231	7.0406E-09	194.74	389.48	0.00E+00	1.37E-06	2.74E-06		
Pb-210	5.8000E-14	194.74	389.48	0.00E+00	1.13E-11	2.26E-11		
Pm-147	4.0075E-02	194.74	389.48	0.00E+00	7.80E+00	1.56E+01		
Pu-238	9.2256E-04	194.74	389.48	0.00E+00	1.80E-01	3.59E-01		
Pu-239	5.5278E-03	194.74	389.48	0.00E+00	1.08E+00	2.15E+00		
Pu-240	2.1248E-03	194.74	389.48	0.00E+00	4.14E-01	8.28E-01		
Pu-241	4.9549E-02	194.74	389.48	0.00E+00	9.65E+00	1.93E+01		
Pu-242	2.3128E-07	194.74	389.48	0.00E+00	4.50E-05	9.01E-05		
Ra-226	2.4526E-13	194.74	389.48	0.00E+00	4.78E-11	9.55E-11		
Ra-228	2.4015E-10	194.74	389.48	0.00E+00	4.68E-08	9.35E-08		
Ru-106	3.0602E-06	194.74	389.48	0.00E+00	5.96E-04	1.19E-03		
Se-79	1.3015E-05	194.74	389.48	0.00E+00	2.53E-03	5.07E-03		
Sn-126	1.2165E-05	194.74	389.48	0.00E+00	2.37E-03	4.74E-03		
Sr-90	1.8226E+00	194.74	389.48	0.00E+00	3.55E+02	7.10E+02		
Tc-99	4.4241E-04	194.74	389.48	0.00E+00	8.82E-02	1.72E-01		
Th-229	3.0962E-10	194.74	389.48	0.00E+00	6.03E-08	1.21E-07		
Th-230	4.2346E-11	194.74	389.48	0.00E+00	8.25E-09	1.65E-08		
Th-232	2.5278E-10	194.74	389.48	0.00E+00	4.92E-08	9.85E-08		
Ti-208	1.5820E-08	194.74	389.48	0.00E+00	3.08E-06	6.16E-06		
U-232	4.2647E-08	194.74	389.48	0.00E+00	8.30E-06	1.66E-05		
U-233	1.2211E-07	194.74	389.48	0.00E+00	2.38E-05	4.76E-05		
U-234	1.9955E-07	194.74	389.48	0.00E+00	3.89E-05	7.77E-05		
U-235	-2.6194E-06	194.74	0.00	8.60E-03	8.09E-03	8.60E-03		
U-236	1.2693E-05	194.74	389.48	0.00E+00	2.47E-03	4.94E-03		
U-238	-3.6331E-08	194.74	0.00	5.35E-03	5.34E-03	5.35E-03		
Y-90	1.8241E+00	194.74	389.48	0.00E+00	3.55E+02	7.10E+02		
Other Radionuclides					3.75E+02	7.50E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.87E+00	9.74E+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 %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	193.85	194.74
Bounding:		389.48

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GA
SNF ID #: 244
Fuel Units & Descr: 114 - ELEMENT
Heavy Metal Mass: BOL=22.23kg; EOL=19.688kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1982
Estimates as of: 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"
1.03

II. Estimates	m	X ₁	X ₂	b	Y ₁	Y ₂	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	2,426.80	4,853.61	0.00E+00	1.63E-05	3.25E-05	Avg. MeV	
Am-241	3.9068E-03	2,426.80	4,853.61	0.00E+00	9.48E+00	1.90E+01	0.0150	3.388E+14
Am-242m	1.2325E-06	2,426.80	4,853.61	0.00E+00	2.99E-03	5.98E-03	0.0250	7.039E+13
Am-243	1.4732E-07	2,426.80	4,853.61	0.00E+00	3.58E-04	7.15E-04	0.0375	6.116E+13
C-14	1.2824E-04	2,426.80	4,853.61	0.00E+00	3.11E-01	6.22E-01	0.0575	6.589E+13
Cl-36	2.8120E-06	2,426.80	4,853.61	0.00E+00	6.82E-03	1.36E-02	0.0650	3.965E+13
Cm-243	8.6556E-08	2,426.80	4,853.61	0.00E+00	2.10E-04	4.20E-04	0.1250	2.580E+13
Cm-244	5.3835E-07	2,426.80	4,853.61	0.00E+00	1.31E-03	2.61E-03	0.2250	3.415E+13
Co-60	2.4887E-02	2,426.80	4,853.61	0.00E+00	6.04E+01	1.21E+02	0.3750	1.489E+13
Cs-134	3.8030E-06	2,426.80	4,853.61	0.00E+00	9.23E-03	1.85E-02	0.5750	2.491E+14
Cs-135	3.2195E-05	2,426.80	4,853.61	0.00E+00	7.81E-02	1.56E-01	0.8500	2.549E+12
Cs-137	1.3788E+00	2,426.80	4,853.61	0.00E+00	3.35E+03	6.69E+03	1.2500	9.893E+12
Eu-154	1.3711E-03	2,426.80	4,853.61	0.00E+00	3.33E+00	6.65E+00	1.7500	6.816E+10
Eu-155	4.4361E-04	2,426.80	4,853.61	0.00E+00	1.08E+00	2.15E+00	2.2500	5.422E+07
Fe-55	2.6075E-04	2,426.80	4,853.61	0.00E+00	6.33E-01	1.27E+00	2.7500	2.492E+06
H-3	2.0647E-03	2,426.80	4,853.61	0.00E+00	5.01E+00	1.00E+01	3.5000	5.987E+03
I-129	7.3684E-07	2,426.80	4,853.61	0.00E+00	1.79E-03	3.58E-03	5.0000	2.820E+03
Kr-85	3.6346E-02	2,426.80	4,853.61	0.00E+00	8.82E+01	1.76E+02	7.0000	2.843E+02
Np-237	1.2844E-06	2,426.80	4,853.61	0.00E+00	3.12E-03	6.23E-03	11.0000	3.232E+01
Pa-231	1.2352E-08	2,426.80	4,853.61	0.00E+00	3.00E-05	6.00E-05		
Pb-210	3.5338E-13	2,426.80	4,853.61	0.00E+00	8.58E-10	1.72E-09		
Pm-147	7.6346E-04	2,426.80	4,853.61	0.00E+00	1.85E+00	3.71E+00		
Pu-238	8.1970E-04	2,426.80	4,853.61	0.00E+00	1.99E+00	3.98E+00		
Pu-239	5.5248E-03	2,426.80	4,853.61	0.00E+00	1.34E+01	2.68E+01		
Pu-240	2.1203E-03	2,426.80	4,853.61	0.00E+00	5.15E+00	1.03E+01		
Pu-241	2.4075E-02	2,426.80	4,853.61	0.00E+00	5.84E+01	1.17E+02		
Pu-242	2.3128E-07	2,426.80	4,853.61	0.00E+00	5.81E-04	1.12E-03		
Ra-226	9.6481E-13	2,426.80	4,853.61	0.00E+00	2.34E-09	4.68E-09		
Ra-228	2.5188E-10	2,426.80	4,853.61	0.00E+00	6.11E-07	1.22E-06		
Ru-106	1.0214E-10	2,426.80	4,853.61	0.00E+00	2.48E-07	4.96E-07		
Se-79	1.3014E-05	2,426.80	4,853.61	0.00E+00	3.16E-02	6.32E-02		
Sn-126	1.2164E-05	2,426.80	4,853.61	0.00E+00	2.95E-02	5.90E-02		
Sr-90	1.2762E+00	2,426.80	4,853.61	0.00E+00	3.10E+03	6.19E+03		
Tc-99	4.4241E-04	2,426.80	4,853.61	0.00E+00	1.07E+00	2.15E+00		
Th-229	5.9684E-10	2,426.80	4,853.61	0.00E+00	1.45E-06	2.90E-06		
Th-230	9.3880E-11	2,426.80	4,853.61	0.00E+00	2.28E-07	4.56E-07		
Th-232	2.5278E-10	2,426.80	4,853.61	0.00E+00	6.13E-07	1.23E-06		
Ti-208	1.3723E-08	2,426.80	4,853.61	0.00E+00	3.33E-05	6.66E-05		
U-232	3.8932E-08	2,426.80	4,853.61	0.00E+00	8.96E-05	1.79E-04		
U-233	1.2224E-07	2,426.80	4,853.61	0.00E+00	2.97E-04	5.93E-04		
U-234	2.5714E-07	2,426.80	4,853.61	0.00E+00	6.24E-04	1.25E-03		
U-235	-2.6194E-06	2,426.80	0.00	9.61E-03	3.25E-03	9.61E-03		
U-236	1.2695E-05	2,426.80	4,853.61	0.00E+00	3.08E-02	6.16E-02		
U-238	-3.6331E-08	2,426.80	0.00	5.98E-03	5.89E-03	5.98E-03		
Y-80	1.2765E+00	2,426.80	4,853.61	0.00E+00	3.10E+03	6.20E+03		
Other Radionuclides					3.34E+03	6.67E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	758.29	2,426.80
Bounding:		4,853.61

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GERMANY
SNF ID #: 305
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=2.925kg; EOL=2.883kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 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"
0.14

II. Estimates

	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	40.09	80.19	0.00E+00	1.06E-07	2.12E-07	Avg. MeV	
Am-241	3.1429E-03	40.09	80.19	0.00E+00	1.26E-01	2.52E-01	0.0150	8.036E+12
Am-242m	1.3195E-06	40.09	80.19	0.00E+00	5.29E-05	1.06E-04	0.0250	1.673E+12
Am-243	1.4753E-07	40.09	80.19	0.00E+00	5.92E-08	1.18E-05	0.0375	1.449E+12
C-14	1.2847E-04	40.09	80.19	0.00E+00	5.15E-03	1.03E-02	0.0575	1.559E+12
Cl-36	2.8120E-06	40.09	80.19	0.00E+00	1.13E-04	2.25E-04	0.0850	9.411E+11
Cm-243	1.2465E-07	40.09	80.19	0.00E+00	5.00E-08	1.00E-05	0.1250	6.151E+11
Cm-244	9.5564E-07	40.09	80.19	0.00E+00	3.83E-05	7.66E-05	0.2250	8.081E+11
Co-60	1.7880E-01	40.09	80.19	0.00E+00	7.17E+00	1.43E+01	0.3750	3.542E+11
Cs-134	5.8692E-04	40.09	80.19	0.00E+00	2.35E-02	4.71E-02	0.5750	5.825E+12
Cs-135	3.2195E-05	40.09	80.19	0.00E+00	1.29E-03	2.58E-03	0.8500	6.566E+10
Cs-137	1.9489E+00	40.09	80.19	0.00E+00	7.81E+01	1.56E+02	1.2500	1.088E+12
Eu-154	4.5895E-03	40.09	80.19	0.00E+00	1.84E-01	3.68E-01	1.7500	1.687E+09
Eu-155	3.6045E-03	40.09	80.19	0.00E+00	1.45E-01	2.89E-01	2.2500	5.810E+06
Fe-55	1.4185E-02	40.09	80.19	0.00E+00	5.69E-01	1.14E+00	2.7500	6.402E+04
H-3	4.7895E-03	40.09	80.19	0.00E+00	1.92E-01	3.84E-01	3.5000	3.582E+02
I-129	7.3684E-07	40.09	80.19	0.00E+00	2.95E-05	5.91E-05	5.0000	4.348E+01
Kr-85	9.5820E-02	40.09	80.19	0.00E+00	3.84E+00	7.68E+00	7.0000	4.914E+00
Np-237	1.2552E-06	40.09	80.19	0.00E+00	5.03E-05	1.01E-04	11.0000	5.592E-01
Pa-231	7.0406E-09	40.09	80.19	0.00E+00	2.82E-07	5.65E-07		
Pb-210	5.8000E-14	40.09	80.19	0.00E+00	2.33E-12	4.65E-12		
Pm-147	4.0075E-02	40.09	80.19	0.00E+00	1.61E+00	3.21E+00		
Pu-238	9.2256E-04	40.09	80.19	0.00E+00	3.70E-02	7.40E-02		
Pu-239	5.5278E-03	40.09	80.19	0.00E+00	2.22E-01	4.43E-01		
Pu-240	2.1248E-03	40.09	80.19	0.00E+00	8.52E-02	1.70E-01		
Pu-241	4.9549E-02	40.09	80.19	0.00E+00	1.99E+00	3.97E+00		
Pu-242	2.3128E-07	40.09	80.19	0.00E+00	9.27E-08	1.85E-05		
Ra-226	2.4526E-13	40.09	80.19	0.00E+00	9.83E-12	1.97E-11		
Ra-228	2.4015E-10	40.09	80.19	0.00E+00	9.63E-09	1.93E-08		
Ru-106	3.0602E-06	40.09	80.19	0.00E+00	1.23E-04	2.45E-04		
Se-79	1.3015E-05	40.09	80.19	0.00E+00	5.22E-04	1.04E-03		
Sn-126	1.2165E-05	40.09	80.19	0.00E+00	4.88E-04	9.76E-04		
Sr-90	1.8226E+00	40.09	80.19	0.00E+00	7.31E+01	1.46E+02		
Tc-99	4.4241E-04	40.09	80.19	0.00E+00	1.77E-02	3.55E-02		
Th-229	3.0962E-10	40.09	80.19	0.00E+00	1.24E-08	2.48E-08		
Th-230	4.2346E-11	40.09	80.19	0.00E+00	1.70E-09	3.40E-09		
Th-232	2.5278E-10	40.09	80.19	0.00E+00	1.01E-08	2.03E-08		
Ti-208	1.5820E-08	40.09	80.19	0.00E+00	6.34E-07	1.27E-06		
U-232	4.2647E-08	40.09	80.19	0.00E+00	1.71E-06	3.42E-06		
U-233	1.2211E-07	40.09	80.19	0.00E+00	4.90E-06	9.79E-06		
U-234	1.9955E-07	40.09	80.19	0.00E+00	8.00E-06	1.60E-05		
U-235	2.8194E-06	40.09	0.00	1.25E-03	1.16E-03	1.26E-03		
U-236	1.2693E-05	40.09	80.19	0.00E+00	5.09E-04	1.02E-03		
U-238	-3.6331E-08	40.09	0.00	7.86E-04	7.85E-04	7.86E-04		
Y-90	1.8241E+00	40.09	80.19	0.00E+00	7.31E+01	1.46E+02		
Other Radionuclides					7.72E+01	1.54E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.00E+06	2.01E+06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	28.51	40.09	
Bounding:		80.19	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.40	1.41	
Bounding:	0.80		
			1.00

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided 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 9.5/20 GERMANY
SNF ID #: 474
Fuel Units & Descr: 70 - ELEMENT
Heavy Metal Mass: BOL=13.85kg; EOL=13.377kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.63

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	260.61	521.22	0.00E+00	6.89E-07	1.38E-06	Avg. MeV	
Am-241	3.1429E-03	260.61	521.22	0.00E+00	8.19E-01	1.64E+00	0.0150	5.223E+13
Am-242m	1.3195E-06	260.61	521.22	0.00E+00	3.44E-04	6.88E-04	0.0250	1.087E+13
Am-243	1.4753E-07	260.61	521.22	0.00E+00	3.84E-05	7.69E-05	0.0375	9.419E+12
C-14	1.2847E-04	260.61	521.22	0.00E+00	3.35E-02	6.70E-02	0.0675	1.013E+13
Cl-36	2.8120E-06	260.61	521.22	0.00E+00	7.33E-04	1.47E-03	0.0850	6.117E+12
Cm-243	1.2465E-07	260.61	521.22	0.00E+00	3.25E-05	6.50E-05	0.1250	3.998E+12
Cm-244	9.5564E-07	260.61	521.22	0.00E+00	2.49E-04	4.98E-04	0.2250	5.253E+12
Co-60	1.7880E-01	260.61	521.22	0.00E+00	4.66E+01	9.32E+01	0.3750	2.302E+12
Cs-134	5.8692E-04	260.61	521.22	0.00E+00	1.53E-01	3.06E-01	0.5750	3.786E+13
Cs-135	3.2195E-05	260.61	521.22	0.00E+00	8.39E-03	1.68E-02	0.8500	4.268E+11
Cs-137	1.9489E+00	260.61	521.22	0.00E+00	5.08E+02	1.02E+03	1.2500	7.072E+12
Eu-154	4.5895E-03	260.61	521.22	0.00E+00	1.20E+00	2.39E+00	1.7500	1.097E+10
Eu-155	3.6045E-03	260.61	521.22	0.00E+00	9.39E-01	1.88E+00	2.2500	3.777E+07
Fe-55	1.4185E-02	260.61	521.22	0.00E+00	3.70E+00	7.39E+00	2.7500	4.161E+05
H-3	4.7895E-03	260.61	521.22	0.00E+00	1.25E+00	2.50E+00	3.5000	2.321E+03
I-129	7.3684E-07	260.61	521.22	0.00E+00	1.92E-04	3.84E-04	5.0000	2.793E+02
Kr-85	9.5820E-02	260.61	521.22	0.00E+00	2.50E+01	4.99E+01	7.0000	3.156E+01
Np-237	1.2552E-06	260.61	521.22	0.00E+00	3.27E-04	6.54E-04	11.0000	3.591E+00
Pa-231	7.0406E-09	260.61	521.22	0.00E+00	1.83E-06	3.67E-06		
Pb-210	5.8000E-14	260.61	521.22	0.00E+00	1.51E-11	3.02E-11		
Pm-147	4.0075E-02	260.61	521.22	0.00E+00	1.04E+01	2.09E+01		
Pu-238	9.2256E-04	260.61	521.22	0.00E+00	2.40E-01	4.81E-01		
Pu-239	5.5278E-03	260.61	521.22	0.00E+00	1.44E+00	2.88E+00		
Pu-240	2.1248E-03	260.61	521.22	0.00E+00	5.54E-01	1.11E+00		
Pu-241	4.9549E-02	260.61	521.22	0.00E+00	1.29E+01	2.58E+01		
Pu-242	2.3128E-07	260.61	521.22	0.00E+00	6.03E-05	1.21E-04		
Ra-226	2.4526E-13	260.61	521.22	0.00E+00	6.39E-11	1.28E-10		
Ra-228	2.4015E-10	260.61	521.22	0.00E+00	6.26E-08	1.25E-07		
Ru-106	3.0602E-06	260.61	521.22	0.00E+00	7.97E-04	1.59E-03		
Se-79	1.3015E-05	260.61	521.22	0.00E+00	3.39E-03	6.78E-03		
Sn-126	1.2165E-05	260.61	521.22	0.00E+00	3.17E-03	6.34E-03		
Sr-90	1.8226E+00	260.61	521.22	0.00E+00	4.75E+02	9.50E+02		
Tc-99	4.4241E-04	260.61	521.22	0.00E+00	1.15E-01	2.31E-01		
Th-229	3.0962E-10	260.61	521.22	0.00E+00	8.07E-08	1.61E-07		
Th-230	4.2346E-11	260.61	521.22	0.00E+00	1.10E-08	2.21E-08		
Th-232	2.5278E-10	260.61	521.22	0.00E+00	6.59E-08	1.32E-07		
Ti-208	1.5820E-08	260.61	521.22	0.00E+00	4.12E-06	8.25E-06		
U-232	4.2647E-08	260.61	521.22	0.00E+00	1.11E-05	2.22E-05		
U-233	1.2211E-07	260.61	521.22	0.00E+00	3.18E-05	6.36E-05		
U-234	1.8955E-07	260.61	521.22	0.00E+00	5.20E-05	1.04E-04		
U-235	-2.6194E-06	260.61	0.00	5.90E-03	5.22E-03	5.90E-03		
U-236	1.2693E-05	260.61	521.22	0.00E+00	3.31E-03	6.62E-03		
U-238	-3.6331E-08	260.61	0.00	3.67E-03	3.66E-03	3.67E-03		
Y-90	1.8241E+00	260.61	521.22	0.00E+00	4.75E+02	9.51E+02		
Other Radionuclides					5.02E+02	1.00E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	133.03	260.61
Bounding:		521.22

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 HANNOVER
 SNF ID #: 473
 Fuel Units & Descr: 5 - ELEMENT
 Heavy Metal Mass: BOL=0.972kg; EOL=0.95kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1990
 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: 25 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	4.1459E-09	21.48	42.96	0.00E+00	8.90E-08	1.78E-07	Avg. MeV	
Am-241	3.5850E-03	21.48	42.96	0.00E+00	7.70E-02	1.54E-01	0.0150	3.813E+12
Am-242m	1.2899E-06	21.48	42.96	0.00E+00	2.77E-05	5.54E-05	0.0250	7.927E+11
Am-243	1.4747E-07	21.48	42.96	0.00E+00	3.17E-06	6.34E-06	0.0375	8.877E+11
C-14	1.2839E-04	21.48	42.96	0.00E+00	2.76E-03	5.52E-03	0.0575	7.406E+11
Cl-36	2.8120E-08	21.48	42.96	0.00E+00	6.04E-05	1.21E-04	0.0850	4.464E+11
Cm-243	1.1038E-07	21.48	42.96	0.00E+00	2.37E-06	4.74E-06	0.1250	2.913E+11
Cm-244	7.8917E-07	21.48	42.96	0.00E+00	1.70E-05	3.39E-05	0.2250	3.839E+11
Co-60	9.2647E-02	21.48	42.96	0.00E+00	1.99E+00	3.98E+00	0.3750	1.677E+11
Cs-134	1.0940E-04	21.48	42.96	0.00E+00	2.35E-03	4.70E-03	0.5750	2.780E+12
Cs-135	3.2195E-05	21.48	42.96	0.00E+00	6.92E-04	1.38E-03	0.8500	2.984E+10
Cs-137	1.7368E+00	21.48	42.96	0.00E+00	3.73E+01	7.46E+01	1.2500	3.064E+11
Eu-154	3.0677E-03	21.48	42.96	0.00E+00	6.59E-02	1.32E-01	1.7500	7.768E+08
Eu-155	1.7925E-03	21.48	42.96	0.00E+00	3.85E-02	7.70E-02	2.2500	1.638E+08
Fe-55	3.7444E-03	21.48	42.96	0.00E+00	8.04E-02	1.61E-01	2.7500	2.770E+04
H-3	3.6180E-03	21.48	42.96	0.00E+00	7.77E-02	1.55E-01	3.5000	5.871E+01
I-129	7.3684E-07	21.48	42.96	0.00E+00	1.58E-05	3.17E-05	5.0000	2.289E+01
Kr-85	6.9368E-02	21.48	42.96	0.00E+00	1.49E+00	2.98E+00	7.0000	2.584E+00
Np-237	1.2662E-06	21.48	42.96	0.00E+00	2.72E-05	5.44E-05	11.0000	2.939E+01
Pa-231	9.1654E-09	21.48	42.96	0.00E+00	1.97E-07	3.94E-07		
Pb-210	1.3728E-13	21.48	42.96	0.00E+00	2.95E-12	5.90E-12		
Pm-147	1.0702E-02	21.48	42.96	0.00E+00	2.30E-01	4.60E-01		
Pu-238	8.8692E-04	21.48	42.96	0.00E+00	1.90E-02	3.81E-02		
Pu-239	5.5263E-03	21.48	42.96	0.00E+00	1.19E-01	2.37E-01		
Pu-240	2.1233E-03	21.48	42.96	0.00E+00	4.56E-02	9.12E-02		
Pu-241	3.8962E-02	21.48	42.96	0.00E+00	8.37E-01	1.67E+00		
Pu-242	2.3128E-07	21.48	42.96	0.00E+00	4.97E-06	9.94E-06		
Ra-226	4.6752E-13	21.48	42.96	0.00E+00	1.00E-11	2.01E-11		
Ra-228	2.4827E-10	21.48	42.96	0.00E+00	5.33E-09	1.07E-08		
Ru-106	9.8526E-08	21.48	42.96	0.00E+00	2.12E-06	4.23E-06		
Se-79	1.3015E-05	21.48	42.96	0.00E+00	2.80E-04	5.59E-04		
Sn-126	1.2165E-05	21.48	42.96	0.00E+00	2.61E-04	5.23E-04		
Sr-90	1.6195E+00	21.48	42.96	0.00E+00	3.48E+01	6.96E+01		
Tc-99	4.4241E-04	21.48	42.96	0.00E+00	9.50E-03	1.90E-02		
Th-229	4.2451E-10	21.48	42.96	0.00E+00	9.12E-09	1.82E-08		
Th-230	6.1398E-11	21.48	42.96	0.00E+00	1.32E-09	2.64E-09		
Th-232	2.5278E-10	21.48	42.96	0.00E+00	5.43E-09	1.09E-08		
Ti-206	1.5098E-08	21.48	42.96	0.00E+00	3.24E-07	6.49E-07		
U-232	4.0662E-08	21.48	42.96	0.00E+00	8.73E-07	1.75E-06		
U-233	1.2217E-07	21.48	42.96	0.00E+00	2.62E-06	5.25E-06		
U-234	2.2391E-07	21.48	42.96	0.00E+00	4.81E-06	9.62E-06		
U-235	-2.6194E-06	21.48	0.00	4.16E-04	3.60E-04	4.16E-04		
U-238	1.2695E-05	21.48	42.96	0.00E+00	2.73E-04	5.45E-04		
U-238	-3.6331E-08	21.48	0.00	2.62E-04	2.61E-04	2.62E-04		
Y-90	1.6195E+00	21.48	42.96	0.00E+00	3.48E+01	6.96E+01		
Other Radionuclides					3.70E+01	7.39E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.56E-01	9.12E-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 %:	19.81481481	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	2.37	21.48
Bounding:		42.96

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM
 1.00

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

²Total burnup for all fuel associated with this worksheet must be divided 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 HEIDELBERG
SNF ID #: 1044
Fuel Units & Descr: 56 - ELEMENT
Heavy Metal Mass: BOL=10.713kg; EOL=10.556kg
ROD Storage Site: INEEL

*Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
*Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.50

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	2.6436E-09	208.81	417.63	0.00E+00	5.52E-07	1.10E-06	Avg. MeV	
Am-241	3.1429E-03	208.81	417.63	0.00E+00	6.56E-01	1.31E+00	0.0150	4.185E+13
Am-242m	1.3195E-06	208.81	417.63	0.00E+00	2.76E-04	5.51E-04	0.0250	8.712E+12
Am-243	1.4753E-07	208.81	417.63	0.00E+00	3.08E-05	6.16E-05	0.0375	7.547E+12
C-14	1.2847E-04	208.81	417.63	0.00E+00	2.68E-02	5.37E-02	0.0575	8.119E+12
Ci-36	2.8120E-06	208.81	417.63	0.00E+00	5.87E-04	1.17E-03	0.0850	4.902E+12
Cm-243	1.2465E-07	208.81	417.63	0.00E+00	2.60E-05	5.21E-05	0.1250	3.204E+12
Cm-244	9.5564E-07	208.81	417.63	0.00E+00	2.00E-04	3.99E-04	0.2250	4.209E+12
Co-60	1.7880E-01	208.81	417.63	0.00E+00	3.73E+01	7.47E+01	0.3750	1.845E+12
Cs-134	5.8692E-04	208.81	417.63	0.00E+00	1.23E-01	2.45E-01	0.5750	3.034E+13
Cs-135	3.2195E-05	208.81	417.63	0.00E+00	6.72E-03	1.34E-02	0.8500	3.420E+11
Cs-137	1.9489E+00	208.81	417.63	0.00E+00	4.07E+02	8.14E+02	1.2500	5.667E+12
Eu-154	4.5895E-03	208.81	417.63	0.00E+00	9.58E-01	1.92E+00	1.7500	8.786E+09
Eu-155	3.6045E-03	208.81	417.63	0.00E+00	7.53E-01	1.51E+00	2.2500	3.026E+07
Fe-55	1.4185E-02	208.81	417.63	0.00E+00	2.96E+00	5.92E+00	2.7500	3.334E+05
H-3	4.7895E-03	208.81	417.63	0.00E+00	1.00E+00	2.00E+00	3.5000	1.859E+03
I-129	7.3684E-07	208.81	417.63	0.00E+00	1.54E-04	3.08E-04	5.0000	2.236E+02
Kr-85	9.5820E-02	208.81	417.63	0.00E+00	2.00E+01	4.00E+01	7.0000	2.527E+01
Np-237	1.2552E-06	208.81	417.63	0.00E+00	2.62E-04	5.24E-04	11.0000	2.876E+00
Pa-231	7.0406E-09	208.81	417.63	0.00E+00	1.47E-06	2.94E-06		
Pb-210	5.8000E-14	208.81	417.63	0.00E+00	1.21E-11	2.42E-11		
Pm-147	4.0075E-02	208.81	417.63	0.00E+00	8.37E+00	1.67E+01		
Pu-238	9.2256E-04	208.81	417.63	0.00E+00	1.93E-01	3.85E-01		
Pu-239	5.5278E-03	208.81	417.63	0.00E+00	1.15E+00	2.31E+00		
Pu-240	2.1248E-03	208.81	417.63	0.00E+00	4.44E-01	8.87E-01		
Pu-241	4.9549E-02	208.81	417.63	0.00E+00	1.03E+01	2.07E+01		
Pu-242	2.3128E-07	208.81	417.63	0.00E+00	4.83E-05	9.66E-05		
Ra-226	2.4526E-13	208.81	417.63	0.00E+00	5.12E-11	1.02E-10		
Ra-228	2.4015E-10	208.81	417.63	0.00E+00	5.01E-08	1.00E-07		
Ru-106	3.0602E-06	208.81	417.63	0.00E+00	6.39E-04	1.28E-03		
Se-79	1.3015E-05	208.81	417.63	0.00E+00	2.72E-03	5.44E-03		
Sn-126	1.2165E-05	208.81	417.63	0.00E+00	2.54E-03	5.08E-03		
Sr-90	1.8226E+00	208.81	417.63	0.00E+00	3.81E+02	7.61E+02		
Tc-99	4.4241E-04	208.81	417.63	0.00E+00	9.24E-02	1.85E-01		
Th-229	3.0962E-10	208.81	417.63	0.00E+00	6.47E-08	1.29E-07		
Th-230	4.2346E-11	208.81	417.63	0.00E+00	8.84E-09	1.77E-08		
Th-232	2.5278E-10	208.81	417.63	0.00E+00	5.28E-08	1.06E-07		
Ti-208	1.5820E-08	208.81	417.63	0.00E+00	3.30E-06	6.61E-06		
U-232	4.2647E-08	208.81	417.63	0.00E+00	8.91E-06	1.78E-05		
U-233	1.2211E-07	208.81	417.63	0.00E+00	2.55E-05	5.10E-05		
U-234	1.9955E-07	208.81	417.63	0.00E+00	4.17E-05	8.33E-05		
U-235	-2.6194E-06	208.81	0.00	4.57E-03	4.02E-03	4.57E-03		
U-236	1.2693E-05	208.81	417.63	0.00E+00	2.65E-03	5.30E-03		
U-238	-3.6331E-08	208.81	0.00	2.89E-03	2.88E-03	2.89E-03		
Y-60	1.8241E+00	208.81	417.63	0.00E+00	3.81E+02	7.62E+02		
Other Radionuclides					4.02E+02	8.04E+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 %:	19.72849245	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	208.81	149.88
Bounding:		417.63

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	0.72
Bounding:	1.14	

Estimated EOL HM/Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 INDONESIA
SNF ID #: 475
Fuel Units & Descr: 174 - ELEMENT
Heavy Metal Mass: BOL=33.93kg; EOL=33.251kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LWA/J-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
1.57

II. Estimates	n	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	647.80	1,295.59	0.00E+00	1.71E-06	3.43E-06	Avg. MeV	
Am-241	3.1429E-03	647.80	1,295.59	0.00E+00	2.04E+00	4.07E+00	0.0150	1.298E+14
Am-242m	1.3195E-06	647.80	1,295.59	0.00E+00	8.55E-04	1.71E-03	0.0250	2.703E+13
Am-243	1.4753E-07	647.80	1,295.59	0.00E+00	9.56E-05	1.91E-04	0.0375	2.341E+13
C-14	1.2847E-04	647.80	1,295.59	0.00E+00	8.32E-02	1.66E-01	0.0575	2.519E+13
Cl-36	2.8120E-06	647.80	1,295.59	0.00E+00	1.82E-03	3.64E-03	0.0850	1.521E+13
Cm-243	1.2465E-07	647.80	1,295.59	0.00E+00	8.07E-05	1.61E-04	0.1250	9.938E+12
Cm-244	9.5564E-07	647.80	1,295.59	0.00E+00	6.19E-04	1.24E-03	0.2250	1.306E+13
Co-60	1.7880E-01	647.80	1,295.59	0.00E+00	1.16E+02	2.32E+02	0.3750	5.723E+12
Cs-134	5.8692E-04	647.80	1,295.59	0.00E+00	3.80E-01	7.60E-01	0.5750	9.411E+13
Cs-135	3.2195E-05	647.80	1,295.59	0.00E+00	2.09E-02	4.17E-02	0.8500	1.061E+12
Cs-137	1.9489E+00	647.80	1,295.59	0.00E+00	1.26E+03	2.52E+03	1.2500	1.758E+13
Eu-154	4.5895E-03	647.80	1,295.59	0.00E+00	2.97E+00	5.95E+00	1.7500	2.728E+10
Eu-155	3.6045E-03	647.80	1,295.59	0.00E+00	2.33E+00	4.67E+00	2.2500	9.388E+07
Fe-55	1.4185E-02	647.80	1,295.59	0.00E+00	9.19E+00	1.84E+01	2.7500	1.034E+06
H-3	4.7895E-03	647.80	1,295.59	0.00E+00	3.10E+00	6.21E+00	3.5000	5.768E+03
I-129	7.3684E-07	647.80	1,295.59	0.00E+00	4.77E-04	9.55E-04	5.0000	6.942E+02
Kr-85	9.5820E-02	647.80	1,295.59	0.00E+00	6.21E+01	1.24E+02	7.0000	7.844E+01
Np-237	1.2552E-06	647.80	1,295.59	0.00E+00	8.13E-04	1.63E-03	11.0000	8.926E+00
Pa-231	7.0406E-09	647.80	1,295.59	0.00E+00	4.56E-06	9.12E-06		
Pb-210	5.8000E-14	647.80	1,295.59	0.00E+00	3.76E-11	7.51E-11		
Pm-147	4.0075E-02	647.80	1,295.59	0.00E+00	2.60E+01	5.19E+01		
Pu-238	9.2256E-04	647.80	1,295.59	0.00E+00	5.98E-01	1.20E+00		
Pu-239	5.5278E-03	647.80	1,295.59	0.00E+00	3.58E+00	7.16E+00		
Pu-240	2.1248E-03	647.80	1,295.59	0.00E+00	1.38E+00	2.75E+00		
Pu-241	4.9549E-02	647.80	1,295.59	0.00E+00	3.21E+01	6.42E+01		
Pu-242	2.3128E-07	647.80	1,295.59	0.00E+00	1.50E-04	3.00E-04		
Ra-226	2.4526E-13	647.80	1,295.59	0.00E+00	1.59E-10	3.18E-10		
Ra-228	2.4015E-10	647.80	1,295.59	0.00E+00	1.56E-07	3.11E-07		
Ru-106	3.0602E-06	647.80	1,295.59	0.00E+00	1.98E-03	3.96E-03		
Se-79	1.3015E-05	647.80	1,295.59	0.00E+00	8.43E-03	1.69E-02		
Sn-126	1.2165E-05	647.80	1,295.59	0.00E+00	7.88E-03	1.58E-02		
Sr-90	1.8226E+00	647.80	1,295.59	0.00E+00	1.18E+03	2.36E+03		
Tc-99	4.4241E-04	647.80	1,295.59	0.00E+00	2.87E-01	5.73E-01		
Th-229	3.0962E-10	647.80	1,295.59	0.00E+00	2.01E-07	4.01E-07		
Th-230	4.2346E-11	647.80	1,295.59	0.00E+00	2.74E-08	5.49E-08		
Th-232	2.5278E-10	647.80	1,295.59	0.00E+00	1.64E-07	3.28E-07		
Ti-208	1.5820E-08	647.80	1,295.59	0.00E+00	1.02E-05	2.05E-05		
U-232	4.2647E-08	647.80	1,295.59	0.00E+00	2.76E-05	5.53E-05		
U-233	1.2211E-07	647.80	1,295.59	0.00E+00	7.91E-05	1.58E-04		
U-234	1.9955E-07	647.80	1,295.59	0.00E+00	1.29E-04	2.59E-04		
U-235	2.6194E-06	647.80	0.00	1.47E-02	1.30E-02	1.47E-02		
U-236	1.2693E-05	647.80	1,295.59	0.00E+00	8.22E-03	1.64E-02		
U-238	-3.6331E-08	647.80	0.00	9.12E-03	9.10E-03	9.12E-03		
Y-90	1.8241E+00	647.80	1,295.59	0.00E+00	1.18E+03	2.36E+03		
Other Radionuclides					1.25E+03	2.49E+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 %:	20.00000041	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimates:
	From SFD	Estimated	
Nominal:	330.68	647.80	
Bounding:		1,295.59	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:	0.58	1.96	
Bounding:	1.12		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 INDONESIA
 SNF ID #: 476
 Fuel Units & Descr: 71 - ELEMENT
 Heavy Metal Mass: BOL=13.845kg; EOL=13.568kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 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:
 16"x10"
 0.64

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	264.33	528.66	0.00E+00	6.99E-07	1.40E-06	Avg. MeV	
Am-241	3.1429E-03	264.33	528.66	0.00E+00	8.31E-01	1.66E+00	0.0150	5.298E+13
Am-242m	1.3195E-06	264.33	528.66	0.00E+00	3.49E-04	6.98E-04	0.0250	1.103E+13
Am-243	1.4753E-07	264.33	528.66	0.00E+00	3.90E-05	7.80E-05	0.0375	9.554E+12
C-14	1.2847E-04	264.33	528.66	0.00E+00	3.40E-02	6.79E-02	0.0575	1.028E+13
Cl-36	2.8120E-06	264.33	528.66	0.00E+00	7.43E-04	1.49E-03	0.0850	6.205E+12
Cm-243	1.2465E-07	264.33	528.66	0.00E+00	3.29E-05	6.59E-05	0.1250	4.055E+12
Cm-244	9.5564E-07	264.33	528.66	0.00E+00	2.53E-04	5.05E-04	0.2250	5.328E+12
Co-60	1.7880E-01	264.33	528.66	0.00E+00	4.73E+01	9.45E+01	0.3750	2.335E+12
Cs-134	5.8692E-04	264.33	528.66	0.00E+00	1.55E-01	3.10E-01	0.5750	3.840E+13
Cs-135	3.2195E-05	264.33	528.66	0.00E+00	8.51E-03	1.70E-02	0.8500	4.329E+11
Cs-137	1.9489E+00	264.33	528.66	0.00E+00	5.15E+02	1.03E+03	1.2500	7.173E+12
Eu-154	4.5895E-03	264.33	528.66	0.00E+00	1.21E+00	2.43E+00	1.7500	1.112E+10
Eu-155	3.6045E-03	264.33	528.66	0.00E+00	9.53E-01	1.91E+00	2.2500	3.831E+07
Fe-55	1.4185E-02	264.33	528.66	0.00E+00	3.75E+00	7.50E+00	2.7500	4.221E+05
H-3	4.7895E-03	264.33	528.66	0.00E+00	1.27E+00	2.53E+00	3.5000	2.954E+03
I-129	7.3684E-07	264.33	528.66	0.00E+00	1.95E-04	3.90E-04	5.0000	2.833E+02
Kr-85	9.5820E-02	264.33	528.66	0.00E+00	2.53E+01	5.07E+01	7.0000	3.201E+01
Np-237	1.2552E-06	264.33	528.66	0.00E+00	3.32E-04	6.64E-04	11.0000	3.642E+00
Pa-231	7.0406E-09	264.33	528.66	0.00E+00	1.86E-06	3.72E-06		
Pb-210	5.8000E-14	264.33	528.66	0.00E+00	1.53E-11	3.07E-11		
Pm-147	4.0075E-02	264.33	528.66	0.00E+00	1.06E+01	2.12E+01		
Pu-238	9.2256E-04	264.33	528.66	0.00E+00	2.44E-01	4.88E-01		
Pu-239	5.5278E-03	264.33	528.66	0.00E+00	1.46E+00	2.92E+00		
Pu-240	2.1248E-03	264.33	528.66	0.00E+00	5.62E-01	1.12E+00		
Pu-241	4.9549E-02	264.33	528.66	0.00E+00	1.31E+01	2.62E+01		
Pu-242	2.3128E-07	264.33	528.66	0.00E+00	6.11E-05	1.22E-04		
Ra-226	2.4526E-13	264.33	528.66	0.00E+00	6.48E-11	1.30E-10		
Ra-228	2.4015E-10	264.33	528.66	0.00E+00	6.35E-08	1.27E-07		
Ru-106	3.0602E-08	264.33	528.66	0.00E+00	8.09E-04	1.62E-03		
Se-79	1.3015E-05	264.33	528.66	0.00E+00	3.44E-03	6.88E-03		
Sn-126	1.2165E-05	264.33	528.66	0.00E+00	3.22E-03	6.43E-03		
Sr-90	1.8226E+00	264.33	528.66	0.00E+00	4.82E+02	9.64E+02		
Tc-99	4.4241E-04	264.33	528.66	0.00E+00	1.17E-01	2.34E-01		
Th-229	3.0962E-10	264.33	528.66	0.00E+00	8.18E-08	1.64E-07		
Th-230	4.2346E-11	264.33	528.66	0.00E+00	1.12E-08	2.24E-08		
Th-232	2.5278E-10	264.33	528.66	0.00E+00	6.68E-08	1.34E-07		
Tl-208	1.5820E-08	264.33	528.66	0.00E+00	4.18E-06	8.36E-06		
U-232	4.2647E-08	264.33	528.66	0.00E+00	1.13E-05	2.25E-05		
U-233	1.2211E-07	264.33	528.66	0.00E+00	3.23E-05	6.46E-05		
U-234	1.9955E-07	264.33	528.66	0.00E+00	5.27E-05	1.05E-04		
U-235	-2.6194E-06	264.33	0.00	5.98E-03	5.29E-03	5.68E-03		
U-236	1.2693E-05	264.33	528.66	0.00E+00	3.36E-03	6.71E-03		
U-238	-3.6331E-08	264.33	0.00	3.72E-03	3.71E-03	3.72E-03		
Y-90	1.8241E+00	264.33	528.66	0.00E+00	4.82E+02	9.64E+02		
Other Radionuclides					5.09E+02	1.02E+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 %:	20.0000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	134.93	264.33
Bounding:		528.66

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.520 ITALY

SNF ID #: 477

Fuel Units & Descr: 48 - ELEMENT

Heavy Metal Mass: BOL=9.36kg; EOL=9.173kg

ROD Storage Site: INEEL

Fuel decay start date: 2010

Estimates as of: 2030

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

Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.43

II. Estimates

	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	178.70	357.41	0.00E+00	4.72E-07	9.45E-07	Avg. MeV	
Am-241	3.1429E-03	178.70	357.41	0.00E+00	5.62E-01	1.12E+00	0.0150	3.582E+13
Am-242m	1.3195E-06	178.70	357.41	0.00E+00	2.36E-04	4.72E-04	0.0250	7.456E+12
Am-243	1.4753E-07	178.70	357.41	0.00E+00	2.64E-05	5.27E-05	0.0375	6.459E+12
C-14	1.2847E-04	178.70	357.41	0.00E+00	2.30E-02	4.59E-02	0.0675	6.949E+12
Cl-36	2.8120E-06	178.70	357.41	0.00E+00	5.03E-04	1.01E-03	0.0850	4.195E+12
Cm-243	1.2465E-07	178.70	357.41	0.00E+00	2.23E-05	4.45E-05	0.1250	2.742E+12
Cm-244	9.5564E-07	178.70	357.41	0.00E+00	1.71E-04	3.42E-04	0.2250	3.602E+12
Co-60	1.7880E-01	178.70	357.41	0.00E+00	3.20E+01	6.39E+01	0.3750	1.579E+12
Cs-134	5.8692E-04	178.70	357.41	0.00E+00	1.05E-01	2.10E-01	0.5750	2.596E+13
Cs-135	3.2195E-05	178.70	357.41	0.00E+00	5.75E-03	1.15E-02	0.8500	2.926E+11
Cs-137	1.9489E+00	178.70	357.41	0.00E+00	3.48E+02	6.97E+02	1.2500	4.849E+12
Eu-154	4.5895E-03	178.70	357.41	0.00E+00	8.20E-01	1.64E+00	1.7500	7.519E+09
Eu-155	3.6045E-03	178.70	357.41	0.00E+00	6.44E-01	1.29E+00	2.2500	2.590E+07
Fe-55	1.4185E-02	178.70	357.41	0.00E+00	2.53E+00	5.07E+00	2.7500	2.853E+06
H-3	4.7895E-03	178.70	357.41	0.00E+00	8.56E-01	1.71E+00	3.5000	1.591E+03
I-129	7.3684E-07	178.70	357.41	0.00E+00	1.32E-04	2.63E-04	5.0000	1.915E+02
Kr-85	9.5820E-02	178.70	357.41	0.00E+00	1.71E+01	3.42E+01	7.0000	2.164E+01
Np-237	1.2552E-06	178.70	357.41	0.00E+00	2.24E-04	4.49E-04	11.0000	2.462E+00
Pa-231	7.0406E-09	178.70	357.41	0.00E+00	1.26E-06	2.52E-06		
Pb-210	5.8000E-14	178.70	357.41	0.00E+00	1.04E-11	2.07E-11		
Pm-147	4.0075E-02	178.70	357.41	0.00E+00	7.16E+00	1.43E+01		
Pu-238	9.2256E-04	178.70	357.41	0.00E+00	1.65E-01	3.30E-01		
Pu-239	5.5278E-03	178.70	357.41	0.00E+00	9.88E-01	1.98E+00		
Pu-240	2.1248E-03	178.70	357.41	0.00E+00	3.80E-01	7.59E-01		
Pu-241	4.9549E-02	178.70	357.41	0.00E+00	8.85E+00	1.77E+01		
Pu-242	2.3128E-07	178.70	357.41	0.00E+00	4.13E-05	8.27E-05		
Ra-226	2.4526E-13	178.70	357.41	0.00E+00	4.38E-11	8.77E-11		
Ra-228	2.4015E-10	178.70	357.41	0.00E+00	4.29E-08	8.58E-08		
Ru-106	3.0602E-06	178.70	357.41	0.00E+00	5.47E-04	1.09E-03		
Se-79	1.3015E-05	178.70	357.41	0.00E+00	2.33E-03	4.65E-03		
Sn-126	1.2165E-05	178.70	357.41	0.00E+00	2.17E-03	4.35E-03		
Sr-90	1.8226E+00	178.70	357.41	0.00E+00	3.26E+02	6.51E+02		
Tc-99	4.4241E-04	178.70	357.41	0.00E+00	7.91E-02	1.58E-01		
Th-229	3.0962E-10	178.70	357.41	0.00E+00	5.53E-08	1.11E-07		
Th-230	4.2346E-11	178.70	357.41	0.00E+00	7.57E-09	1.51E-08		
Th-232	2.5278E-10	178.70	357.41	0.00E+00	4.52E-08	9.03E-08		
Ti-208	1.5820E-08	178.70	357.41	0.00E+00	2.83E-06	5.65E-06		
U-232	4.2647E-08	178.70	357.41	0.00E+00	7.62E-06	1.52E-05		
U-233	1.2211E-07	178.70	357.41	0.00E+00	2.18E-05	4.36E-05		
U-234	1.9955E-07	178.70	357.41	0.00E+00	3.57E-05	7.13E-05		
U-235	-2.6194E-06	178.70	0.00	4.05E-03	3.58E-03	4.05E-03		
U-236	1.2693E-05	178.70	357.41	0.00E+00	2.27E-03	4.54E-03		
U-238	-3.6331E-08	178.70	0.00	2.52E-03	2.51E-03	2.52E-03		
Y-90	1.8241E+00	178.70	357.41	0.00E+00	3.26E+02	6.52E+02		
Other Radionuclides					3.44E+02	6.88E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+08	8.94E+08
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

Basic for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	91.22	178.70
Bounding:		357.41

Basic for burnup used in estimates:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.56	1.99
Bounding:	1.12	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

*Fuel decay start date: 1999
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"
0.64

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/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	4.1459E-09	765.88	1,531.76	0.00E+00	3.18E-06	6.35E-06	Avg. MeV	
Am-241	3.5850E-03	765.88	1,531.76	0.00E+00	2.75E+00	5.49E+00	0.0150	1.360E+14
Am-242m	1.2899E-06	765.88	1,531.76	0.00E+00	9.88E-04	1.98E-03	0.0250	2.827E+13
Am-243	1.4747E-07	765.88	1,531.76	0.00E+00	1.13E-04	2.26E-04	0.0375	2.452E+13
C-14	1.2839E-04	765.88	1,531.76	0.00E+00	9.83E-02	1.97E-01	0.0575	2.841E+13
Cl-36	2.8120E-06	765.88	1,531.76	0.00E+00	2.15E-03	4.31E-03	0.0850	1.592E+13
Cm-243	1.1038E-07	765.88	1,531.76	0.00E+00	8.45E-05	1.69E-04	0.1250	1.039E+13
Cm-244	7.8917E-07	765.88	1,531.76	0.00E+00	6.04E-04	1.21E-03	0.2250	1.369E+13
Co-60	9.2647E-02	765.88	1,531.76	0.00E+00	7.10E+01	1.42E+02	0.3750	5.979E+12
Cs-134	1.0940E-04	765.88	1,531.76	0.00E+00	8.38E-02	1.68E-01	0.5750	9.912E+13
Cs-135	3.2195E-05	765.88	1,531.76	0.00E+00	2.47E-02	4.93E-02	0.8500	1.064E+12
Cs-137	1.7368E+00	765.88	1,531.76	0.00E+00	1.33E+03	2.66E+03	1.2500	1.093E+13
Eu-154	3.0677E-03	765.88	1,531.76	0.00E+00	2.35E+00	4.70E+00	1.7500	2.770E+10
Eu-155	1.7925E-03	765.88	1,531.76	0.00E+00	1.37E+00	2.75E+00	2.2500	5.841E+07
Fe-55	3.7444E-03	765.88	1,531.76	0.00E+00	2.87E+00	5.74E+00	2.7500	9.876E+05
H-3	3.6180E-03	765.88	1,531.76	0.00E+00	2.77E+00	5.54E+00	3.5000	2.063E+03
I-129	7.3684E-07	765.88	1,531.76	0.00E+00	5.64E-04	1.13E-03	5.0000	8.029E+02
Kr-85	6.9368E-02	765.88	1,531.76	0.00E+00	5.31E+01	1.06E+02	7.0000	9.063E+01
Np-237	1.2662E-06	765.88	1,531.76	0.00E+00	9.70E-04	1.94E-03	11.0000	1.031E+01
Pa-231	9.1654E-09	765.88	1,531.76	0.00E+00	7.02E-06	1.40E-05		
Pb-210	1.3728E-13	765.88	1,531.76	0.00E+00	1.05E-10	2.10E-10		
Pm-147	1.0702E-02	765.88	1,531.76	0.00E+00	8.20E+00	1.64E+01		
Pu-238	8.8692E-04	765.88	1,531.76	0.00E+00	6.79E-01	1.36E+00		
Pu-239	5.5263E-03	765.88	1,531.76	0.00E+00	4.23E+00	8.47E+00		
Pu-240	2.1233E-03	765.88	1,531.76	0.00E+00	1.63E+00	3.25E+00		
Pu-241	3.8962E-02	765.88	1,531.76	0.00E+00	2.98E+01	5.97E+01		
Pu-242	2.3128E-07	765.88	1,531.76	0.00E+00	1.77E-04	3.54E-04		
Ra-226	4.6752E-13	765.88	1,531.76	0.00E+00	3.58E-10	7.16E-10		
Ra-228	2.4827E-10	765.88	1,531.76	0.00E+00	1.90E-07	3.80E-07		
Ru-106	9.8526E-08	765.88	1,531.76	0.00E+00	7.55E-05	1.51E-04		
Se-79	1.3015E-05	765.88	1,531.76	0.00E+00	9.97E-03	1.99E-02		
Sr-126	1.2165E-05	765.88	1,531.76	0.00E+00	9.32E-03	1.86E-02		
Sr-90	1.6195E+00	765.88	1,531.76	0.00E+00	1.24E+03	2.48E+03		
Tc-99	4.4241E-04	765.88	1,531.76	0.00E+00	3.39E-01	6.78E-01		
Th-229	4.2451E-10	765.88	1,531.76	0.00E+00	3.25E-07	6.50E-07		
Th-230	6.1398E-11	765.88	1,531.76	0.00E+00	4.70E-08	9.40E-08		
Th-232	2.5278E-10	765.88	1,531.76	0.00E+00	1.94E-07	3.87E-07		
Tl-208	1.5098E-08	765.88	1,531.76	0.00E+00	1.16E-05	2.31E-05		
U-232	4.0662E-08	765.88	1,531.76	0.00E+00	3.11E-05	6.23E-05		
U-233	1.2217E-07	765.88	1,531.76	0.00E+00	9.36E-05	1.87E-04		
U-234	2.2391E-07	765.88	1,531.76	0.00E+00	1.71E-04	3.43E-04		
U-235	-2.6194E-06	765.88	0.00	5.90E-03	3.90E-03	5.90E-03		
U-236	1.2695E-05	765.88	1,531.76	0.00E+00	9.72E-03	1.94E-02		
U-238	-3.6331E-08	765.88	0.00	3.67E-03	3.64E-03	3.67E-03		
Y-90	1.6195E+00	765.88	1,531.76	0.00E+00	1.24E+03	2.48E+03		
Other Radionuclides					1.32E+03	2.64E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.02640698	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	465.24	765.88	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,531.76	Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ITALY
SNF ID #: 1080

Fuel Units & Descr: 140 - ELEMENT

Heavy Metal Mass: BOL=26.894kg; EOL=25.312kg

ROD Storage Site: INEEL

Fuel decay start date: 2006
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"
1.26

II. Estimates

	m	x ₀	x ₁	b	y ₀	y ₁	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	1,510.19	3,020.38	0.00E+00	3.99E-08	7.98E-08	Avg. MeV	
Am-241	3.1429E-03	1,510.19	3,020.38	0.00E+00	4.75E+00	9.49E+00	0.0150	3.027E+14
Am-242m	1.3195E-06	1,510.19	3,020.38	0.00E+00	1.99E-03	3.99E-03	0.0250	6.301E+13
Am-243	1.4753E-07	1,510.19	3,020.38	0.00E+00	2.23E-04	4.46E-04	0.0375	5.458E+13
C-14	1.2847E-04	1,510.19	3,020.38	0.00E+00	1.94E-01	3.88E-01	0.0575	5.872E+13
Cl-36	2.8120E-06	1,510.19	3,020.38	0.00E+00	4.25E-03	8.49E-03	0.0850	3.545E+13
Cm-243	1.2465E-07	1,510.19	3,020.38	0.00E+00	1.88E-04	3.76E-04	0.1250	2.317E+13
Cm-244	9.5564E-07	1,510.19	3,020.38	0.00E+00	1.44E-03	2.89E-03	0.2250	3.044E+13
Co-60	1.7880E-01	1,510.19	3,020.38	0.00E+00	2.70E+02	5.40E+02	0.3750	1.334E+13
Cs-134	5.8692E-04	1,510.19	3,020.38	0.00E+00	8.86E-01	1.77E+00	0.5750	2.194E+14
Cs-135	3.2195E-05	1,510.19	3,020.38	0.00E+00	4.86E-02	9.72E-02	0.8500	2.473E+12
Cs-137	1.9489E+00	1,510.19	3,020.38	0.00E+00	2.94E+03	5.89E+03	1.2500	4.098E+13
Eu-154	4.5895E-03	1,510.19	3,020.38	0.00E+00	6.93E+00	1.39E+01	1.7500	6.354E+10
Eu-155	3.6045E-03	1,510.19	3,020.38	0.00E+00	5.44E+00	1.09E+01	2.2500	2.189E+08
Fe-55	1.4185E-02	1,510.19	3,020.38	0.00E+00	2.14E+01	4.28E+01	2.7500	2.411E+08
H-3	4.7895E-03	1,510.19	3,020.38	0.00E+00	7.23E+00	1.45E+01	3.5000	1.337E+04
I-129	7.3684E-07	1,510.19	3,020.38	0.00E+00	1.11E-03	2.23E-03	5.0000	1.588E+03
Kr-85	9.5820E-02	1,510.19	3,020.38	0.00E+00	1.45E+02	2.89E+02	7.0000	1.791E+02
Np-237	1.2552E-06	1,510.19	3,020.38	0.00E+00	1.90E-03	3.79E-03	11.0000	2.038E+01
Pa-231	7.0406E-09	1,510.19	3,020.38	0.00E+00	1.06E-05	2.13E-05		
Pb-210	5.8000E-14	1,510.19	3,020.38	0.00E+00	8.76E-11	1.75E-10		
Pm-147	4.0075E-02	1,510.19	3,020.38	0.00E+00	6.05E+01	1.21E+02		
Pu-238	9.2256E-04	1,510.19	3,020.38	0.00E+00	1.39E+00	2.79E+00		
Pu-239	5.5278E-03	1,510.19	3,020.38	0.00E+00	8.35E+00	1.67E+01		
Pu-240	2.1248E-03	1,510.19	3,020.38	0.00E+00	3.21E+00	6.42E+00		
Pu-241	4.9549E-02	1,510.19	3,020.38	0.00E+00	7.48E+01	1.50E+02		
Pu-242	2.3128E-07	1,510.19	3,020.38	0.00E+00	3.49E-04	6.99E-04		
Ra-226	2.4526E-13	1,510.19	3,020.38	0.00E+00	3.70E-10	7.41E-10		
Ra-228	2.4015E-10	1,510.19	3,020.38	0.00E+00	3.63E-07	7.25E-07		
Ru-106	3.0602E-06	1,510.19	3,020.38	0.00E+00	4.62E-03	9.24E-03		
Se-79	1.3015E-05	1,510.19	3,020.38	0.00E+00	1.97E-02	3.93E-02		
Sn-126	1.2165E-05	1,510.19	3,020.38	0.00E+00	1.84E-02	3.67E-02		
Sr-90	1.8226E+00	1,510.19	3,020.38	0.00E+00	2.75E+03	5.50E+03		
Tc-99	4.4241E-04	1,510.19	3,020.38	0.00E+00	6.68E-01	1.34E+00		
Th-229	3.0962E-10	1,510.19	3,020.38	0.00E+00	4.68E-07	9.35E-07		
Th-230	4.2346E-11	1,510.19	3,020.38	0.00E+00	6.40E-08	1.28E-07		
Th-232	2.5278E-10	1,510.19	3,020.38	0.00E+00	3.82E-07	7.63E-07		
Th-238	1.5820E-08	1,510.19	3,020.38	0.00E+00	2.39E-05	4.78E-05		
U-232	4.2647E-08	1,510.19	3,020.38	0.00E+00	6.44E-05	1.29E-04		
U-233	1.2211E-07	1,510.19	3,020.38	0.00E+00	1.84E-04	3.69E-04		
U-234	1.9955E-07	1,510.19	3,020.38	0.00E+00	3.01E-04	6.03E-04		
U-235	2.6194E-08	1,510.19	0.00	1.16E-02	7.68E-03	1.16E-02		
U-236	1.2693E-05	1,510.19	3,020.38	0.00E+00	1.92E-02	3.83E-02		
U-238	3.6331E-08	1,510.19	0.00	7.23E-03	7.17E-03	7.23E-03		
Y-90	1.8241E+00	1,510.19	3,020.38	0.00E+00	2.75E+03	5.51E+03		
Other Radionuclides					2.91E+03	5.82E+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 Claddings:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.026	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 917.38	Estimated 1,510.19	
Bounding:		3,020.38	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 JAPAN
 SNF ID #: 479
 Fuel Units & Descr: 73 - ELEMENT
 Heavy Metal Mass: BOL=14.235kg; EOL=14.089kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2010
 Estimates as of: 2030
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 8.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 0.66

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	139.37	278.75	0.00E+00	3.68E-07	7.37E-07	Avg. MeV	
Am-241	3.1429E-03	139.37	278.75	0.00E+00	4.38E-01	8.76E-01	0.0150	2.793E+13
Am-242m	1.3195E-06	139.37	278.75	0.00E+00	1.84E-04	3.68E-04	0.0250	5.815E+12
Am-243	1.4753E-07	139.37	278.75	0.00E+00	2.06E-05	4.11E-05	0.0375	5.037E+12
C-14	1.2847E-04	139.37	278.75	0.00E+00	1.79E-02	3.58E-02	0.0575	5.419E+12
Cl-36	2.8120E-06	139.37	278.75	0.00E+00	3.92E-04	7.84E-04	0.0850	3.272E+12
Cm-243	1.2465E-07	139.37	278.75	0.00E+00	1.74E-05	3.47E-05	0.1250	2.138E+12
Cm-244	9.5564E-07	139.37	278.75	0.00E+00	1.33E-04	2.66E-04	0.2250	2.809E+12
Co-60	1.7880E-01	139.37	278.75	0.00E+00	2.49E+01	4.98E+01	0.3750	1.231E+12
Cs-134	5.8692E-04	139.37	278.75	0.00E+00	8.18E-02	1.64E-01	0.5750	2.025E+13
Cs-135	3.2195E-05	139.37	278.75	0.00E+00	4.49E-03	8.97E-03	0.8500	2.282E+11
Cs-137	1.9489E+00	139.37	278.75	0.00E+00	2.72E+02	5.43E+02	1.2500	3.782E+12
Eu-154	4.5895E-03	139.37	278.75	0.00E+00	6.40E-01	1.28E+00	1.7500	5.864E+09
Eu-155	3.6045E-03	139.37	278.75	0.00E+00	5.02E-01	1.00E+00	2.2500	2.020E+07
Fe-55	1.4185E-02	139.37	278.75	0.00E+00	1.88E+00	3.65E+00	2.7500	2.226E+05
H-3	4.7895E-03	139.37	278.75	0.00E+00	6.68E-01	1.34E+00	3.5000	1.251E+03
I-129	7.3684E-07	139.37	278.75	0.00E+00	1.03E-04	2.06E-04	5.0000	1.537E+02
Kr-85	9.5820E-02	139.37	278.75	0.00E+00	1.34E+01	2.67E+01	7.0000	1.737E+01
Np-237	1.2552E-06	139.37	278.75	0.00E+00	1.75E-04	3.50E-04	11.0000	1.977E+00
Pa-231	7.0406E-09	139.37	278.75	0.00E+00	9.81E-07	1.96E-06		
Pb-210	5.8000E-14	139.37	278.75	0.00E+00	8.08E-12	1.62E-11		
Pm-147	4.0075E-02	139.37	278.75	0.00E+00	5.59E+00	1.12E+01		
Pu-238	9.2256E-04	139.37	278.75	0.00E+00	1.29E-01	2.57E-01		
Pu-239	5.5278E-03	139.37	278.75	0.00E+00	7.70E-01	1.54E+00		
Pu-240	2.1248E-03	139.37	278.75	0.00E+00	2.96E-01	5.92E-01		
Pu-241	4.9549E-02	139.37	278.75	0.00E+00	6.91E+00	1.38E+01		
Pu-242	2.3128E-07	139.37	278.75	0.00E+00	3.22E-05	6.45E-05		
Ra-226	2.4526E-13	139.37	278.75	0.00E+00	3.42E-11	6.84E-11		
Ra-228	2.4015E-10	139.37	278.75	0.00E+00	3.35E-08	6.69E-08		
Ru-106	3.0602E-06	139.37	278.75	0.00E+00	4.27E-04	8.53E-04		
Se-79	1.3015E-05	139.37	278.75	0.00E+00	1.81E-03	3.63E-03		
Sn-126	1.2165E-05	139.37	278.75	0.00E+00	1.70E-03	3.39E-03		
Sr-90	1.8226E+00	139.37	278.75	0.00E+00	2.54E+02	5.08E+02		
Tc-99	4.4241E-04	139.37	278.75	0.00E+00	6.17E-02	1.23E-01		
Th-229	3.0962E-10	139.37	278.75	0.00E+00	4.32E-08	8.63E-08		
Th-230	4.2346E-11	139.37	278.75	0.00E+00	5.90E-09	1.18E-08		
Th-232	2.5278E-10	139.37	278.75	0.00E+00	3.52E-08	7.05E-08		
Ti-208	1.5820E-08	139.37	278.75	0.00E+00	2.20E-06	4.41E-06		
U-232	4.2647E-08	139.37	278.75	0.00E+00	5.94E-06	1.19E-05		
U-233	1.2211E-07	139.37	278.75	0.00E+00	1.70E-05	3.40E-05		
U-234	1.9955E-07	139.37	278.75	0.00E+00	2.78E-05	5.56E-05		
U-235	-2.6194E-06	139.37	0.00	6.15E-03	5.79E-03	6.15E-03		
U-236	1.2693E-05	139.37	278.75	0.00E+00	1.77E-03	3.54E-03		
U-238	-3.6331E-08	139.37	0.00	3.83E-03	3.82E-03	3.83E-03		
Y-90	1.8241E+00	139.37	278.75	0.00E+00	2.54E+02	5.08E+02		
Other Radionuclides					2.68E+02	5.37E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	139.73	139.37
Bounding:		278.75

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: TRIGA STD S-20 KANSAS STATE UNIV
 SIF ID #: 253
 Fuel Unb'd & Decri: 163 - ELEMENT
 Heavy Metal Mass: BOL=51.783kg; EOL=30.481kg
 ROD Storage Site: NREL

II. Estimates
 Fuel decay start date: 2005
 Estimate as of: 2005
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Template BOL Heavy Metal Mass (LMT): 6.65
 Template Decay Time: 0.000165
 5 years

Estimated
 Canister usage:
 18.710
 1.47

Radionuclide	CLAIMED From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Photon/sec (bounding)
Ac-227	8.5173E-10	1.244.81	2.489.62	0.00E+00	1.05E-08	2.12E-06	Avg LMT	4.02E+14
Am-241	1.8331E-03	1.244.81	2.489.62	0.00E+00	2.28E+00	4.56E+00	0.0150	8.85E+13
Am-242m	1.4129E-06	1.244.81	2.489.62	0.00E+00	1.76E-03	3.52E-03	0.0250	7.50E+13
Am-243	1.4774E-07	1.244.81	2.489.62	0.00E+00	1.84E-04	3.68E-04	0.0375	7.38E+13
C-14	1.2871E-04	1.244.81	2.489.62	0.00E+00	1.60E-01	3.20E-01	0.0675	4.79E+13
Ck-38	2.8120E-06	1.244.81	2.489.62	0.00E+00	2.23E-04	4.47E-04	0.0850	3.48E+13
Cm-243	1.7940E-07	1.244.81	2.489.62	0.00E+00	2.11E-03	4.22E-03	0.1250	4.06E+13
Cm-244	1.6922E-06	1.244.81	2.489.62	0.00E+00	1.60E+03	3.20E+03	0.3750	2.04E+13
Co-60	9.0541E-02	1.244.81	2.489.62	0.00E+00	1.13E+02	2.25E+02	0.5750	2.74E+14
Co-134	3.2195E-06	1.244.81	2.489.62	0.00E+00	4.01E-02	8.02E-02	1.2500	1.79E+13
Co-137	2.7564E+00	1.244.81	2.489.62	0.00E+00	3.43E+03	6.86E+03	1.7500	1.59E+11
Eu-154	1.5389E-02	1.244.81	2.489.62	0.00E+00	1.91E+01	3.83E+01	2.2500	2.57E+11
Eu-155	2.8293E-02	1.244.81	2.489.62	0.00E+00	3.65E+01	7.30E+01	2.7500	2.03E+09
Fe-55	7.7159E-01	1.244.81	2.489.62	0.00E+00	8.60E+02	1.72E+03	5.0000	2.37E+08
H-3	1.1111E-02	1.244.81	2.489.62	0.00E+00	1.38E+01	2.77E+01	7.0000	1.489E+02
I-129	7.3684E-07	1.244.81	2.489.62	0.00E+00	9.17E-04	1.83E-03	11.0000	1.708E+01
K-85	2.5263E-01	1.244.81	2.489.62	0.00E+00	3.14E+02	6.29E+02		
Np-237	1.2427E-06	1.244.81	2.489.62	0.00E+00	1.55E-03	3.09E-03		
Np-231	3.6511E-09	1.244.81	2.489.62	0.00E+00	4.79E-06	9.59E-06		
Pb-210	7.3880E-15	1.244.81	2.489.62	0.00E+00	9.20E-12	1.84E-11		
Pm-147	2.1023E+00	1.244.81	2.489.62	0.00E+00	2.62E+03	5.23E+03		
Pu-238	1.0393E-03	1.244.81	2.489.62	0.00E+00	1.29E+00	2.59E+00		
Pu-239	5.5393E-03	1.244.81	2.489.62	0.00E+00	6.89E+00	1.38E+01		
Pu-240	2.1279E-03	1.244.81	2.489.62	0.00E+00	2.65E+00	5.30E+00		
Pu-241	1.0195E-01	1.244.81	2.489.62	0.00E+00	1.27E+02	2.54E+02		
Pu-242	2.3129E-07	1.244.81	2.489.62	0.00E+00	2.89E-04	5.78E-04		
Ra-226	5.2782E-14	1.244.81	2.489.62	0.00E+00	6.57E-11	1.31E-10		
Ra-228	1.8339E-10	1.244.81	2.489.62	0.00E+00	2.41E-07	4.81E-07		
Ru-106	9.1694E-02	1.244.81	2.489.62	0.00E+00	1.14E+02	2.28E+02		
Se-76	1.3018E-05	1.244.81	2.489.62	0.00E+00	1.62E-02	3.24E-02		
Sm-126	1.2167E-05	1.244.81	2.489.62	0.00E+00	1.51E-02	3.03E-02		
Sc-90	2.6045E+00	1.244.81	2.489.62	0.00E+00	3.24E+03	6.48E+03		
Tc-99	4.4241E-04	1.244.81	2.489.62	0.00E+00	5.51E-01	1.10E+00		
Th-229	1.3713E-10	1.244.81	2.489.62	0.00E+00	1.71E-07	3.41E-07		
Th-230	1.8090E-11	1.244.81	2.489.62	0.00E+00	2.25E-09	4.50E-08		
Th-232	2.5279E-10	1.244.81	2.489.62	0.00E+00	3.15E-07	6.29E-07		
Th-234	1.6947E-08	1.244.81	2.489.62	0.00E+00	2.11E-05	4.22E-05		
U-232	4.8737E-08	1.244.81	2.489.62	0.00E+00	6.07E-05	1.21E-04		
U-233	1.2203E-07	1.244.81	2.489.62	0.00E+00	1.52E-04	3.04E-04		
U-234	1.5825E-07	1.244.81	2.489.62	0.00E+00	1.98E-04	3.96E-04		
U-235	2.6194E-06	1.244.81	2.489.62	0.00E+00	1.05E-02	1.37E-02		
U-236	1.244.81	1.244.81	2.489.62	0.00E+00	1.58E-02	3.16E-02		
U-238	3.6331E-09	1.244.81	0.00	8.55E-03	8.50E-03	8.59E-03		
U-240	2.6060E+00	1.244.81	2.489.62	0.00E+00	3.24E+03	6.49E+03		
Other Radionuclides					4.49E+03	8.98E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LW AND U ZIRC HYDROIDE	SST
Fuel Cladding: SST	SST
BOL Hill Constraints: U	U
BOL Enrichment %: 20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

From SFD	Estimated
Nominal: 774.44	1.244.81
Bounding: 2.489.62	2.489.62

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

Checks

Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding: 2.30	1.15	1.61

Estimated EOL (HW/Given EOL Hill)
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MEXICO
SNF ID #: 482
Fuel Units & Descr: 151 - ELEMENT
Heavy Metal Mass: BOL=29.445kg; EOL=28.403kg
ROD Storage Site: INEEL

¹Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
1.36

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	2.6436E-09	994.60	1,989.21	0.00E+00	2.63E-06	5.26E-06	Avg. MeV		
Am-241	3.1429E-03	994.60	1,989.21	0.00E+00	3.13E+00	6.25E+00	0.0150	1.993E+14	
Am-242m	1.3195E-06	994.60	1,989.21	0.00E+00	1.31E-03	2.62E-03	0.0250	4.150E+13	
Am-243	1.4753E-07	994.60	1,989.21	0.00E+00	1.47E-04	2.93E-04	0.0375	3.595E+13	
C-14	1.2847E-04	994.60	1,989.21	0.00E+00	1.28E-01	2.56E-01	0.0575	3.867E+13	
Cl-36	2.8120E-06	994.60	1,989.21	0.00E+00	2.80E-03	5.59E-03	0.0850	2.335E+13	
Cm-243	1.2465E-07	994.60	1,989.21	0.00E+00	1.24E-04	2.48E-04	0.1250	1.526E+13	
Cm-244	9.5564E-07	994.60	1,989.21	0.00E+00	9.50E-04	1.90E-03	0.2250	2.005E+13	
Co-60	1.7880E-01	994.60	1,989.21	0.00E+00	1.78E+02	3.56E+02	0.3750	8.786E+12	
Cs-134	5.8692E-04	994.60	1,989.21	0.00E+00	5.84E-01	1.17E+00	0.5750	1.445E+14	
Cs-135	3.2195E-05	994.60	1,989.21	0.00E+00	3.20E-02	6.40E-02	0.8500	1.629E+12	
Cs-137	1.9489E+00	994.60	1,989.21	0.00E+00	1.94E+03	3.88E+03	1.2500	2.699E+13	
Eu-154	4.5895E-03	994.60	1,989.21	0.00E+00	4.56E+00	9.13E+00	1.7500	4.185E+10	
Eu-155	3.6045E-03	994.60	1,989.21	0.00E+00	3.59E+00	7.17E+00	2.2500	1.441E+08	
Fe-55	1.4185E-02	994.60	1,989.21	0.00E+00	1.41E+01	2.82E+01	2.7500	1.588E+06	
H-3	4.7895E-03	994.60	1,989.21	0.00E+00	4.78E+00	9.53E+00	3.5000	8.824E+03	
I-129	7.3684E-07	994.60	1,989.21	0.00E+00	7.33E-04	1.47E-03	5.0000	1.052E+03	
Kr-85	9.5820E-02	994.60	1,989.21	0.00E+00	9.53E+01	1.91E+02	7.0000	1.188E+02	
Np-237	1.2552E-06	994.60	1,989.21	0.00E+00	1.25E-03	2.50E-03	11.0000	1.352E+01	
Pa-231	7.0406E-09	994.60	1,989.21	0.00E+00	7.00E-06	1.40E-05			
Pb-210	5.8000E-14	994.60	1,989.21	0.00E+00	5.77E-11	1.15E-10			
Pm-147	4.0075E-02	994.60	1,989.21	0.00E+00	3.99E+01	7.97E+01			
Pu-238	9.2256E-04	994.60	1,989.21	0.00E+00	9.18E-01	1.84E+00			
Pu-239	5.5278E-03	994.60	1,989.21	0.00E+00	5.50E+00	1.10E+01			
Pu-240	2.1248E-03	994.60	1,989.21	0.00E+00	2.11E+00	4.23E+00			
Pu-241	4.9549E-02	994.60	1,989.21	0.00E+00	4.93E+01	9.86E+01			
Pu-242	2.3128E-07	994.60	1,989.21	0.00E+00	2.30E-04	4.60E-04			
Ra-226	2.4526E-13	994.60	1,989.21	0.00E+00	2.44E-10	4.88E-10			
Ra-228	2.4015E-10	994.60	1,989.21	0.00E+00	2.39E-07	4.78E-07			
Ru-106	3.0602E-06	994.60	1,989.21	0.00E+00	3.04E-03	6.09E-03			
Se-79	1.3015E-05	994.60	1,989.21	0.00E+00	1.29E-02	2.59E-02			
Sn-126	1.2165E-05	994.60	1,989.21	0.00E+00	1.21E-02	2.42E-02			
Sr-90	1.8226E+00	994.60	1,989.21	0.00E+00	1.81E+03	3.63E+03			
Tc-99	4.4241E-04	994.60	1,989.21	0.00E+00	4.40E-01	8.80E-01			
Th-229	3.0962E-10	994.60	1,989.21	0.00E+00	3.08E-07	6.16E-07			
Th-230	4.2346E-11	994.60	1,989.21	0.00E+00	4.21E-08	8.42E-08			
Th-232	2.5278E-10	994.60	1,989.21	0.00E+00	2.51E-07	5.03E-07			
Ti-208	1.5820E-08	994.60	1,989.21	0.00E+00	1.57E-05	3.15E-05			
U-232	4.2647E-08	994.60	1,989.21	0.00E+00	4.24E-05	8.48E-05			
U-233	1.2211E-07	994.60	1,989.21	0.00E+00	1.21E-04	2.43E-04			
U-234	1.9955E-07	994.60	1,989.21	0.00E+00	1.98E-04	3.97E-04			
U-235	-2.6194E-06	994.60	0.00	1.27E-02	1.01E-02	1.27E-02			
U-236	1.2693E-05	994.60	1,989.21	0.00E+00	1.26E-02	2.52E-02			
U-238	-3.6331E-08	994.60	0.00	7.92E-03	7.88E-03	7.92E-03			
Y-90	1.8241E+00	994.60	1,989.21	0.00E+00	1.81E+03	3.63E+03			
Other Radionuclides					1.92E+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 %:	20.00000041	10 to 20.1	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		994.60	
Bounding:		1,989.21	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.520 MNRC
SNF ID #: 254
Fuel Units & Descr: 96 - ELEMENT
Heavy Metal Mass: BOL=17.99kg; EOL=17.933kg
ROD Storage Site: INEEL

Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LWAU-Zrx, SST, 10 to 20%, U)
Template Burnup(MWd): 6.65
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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	350.58	701.16	0.00E+00	2.99E-07	5.97E-07	Avg. MeV	
Am-241	1.6331E-03	350.58	701.16	0.00E+00	6.43E-01	1.29E+00	0.0150	1.133E+14
Am-242m	1.4129E-06	350.58	701.16	0.00E+00	4.95E-04	9.91E-04	0.0250	2.494E+13
Am-243	1.4774E-07	350.58	701.16	0.00E+00	5.18E-05	1.04E-04	0.0375	2.124E+13
C-14	1.2871E-04	350.58	701.16	0.00E+00	4.51E-02	9.02E-02	0.0575	2.180E+13
Cl-36	2.8120E-06	350.58	701.16	0.00E+00	9.86E-04	1.97E-03	0.0850	1.350E+13
Cm-243	1.7940E-07	350.58	701.16	0.00E+00	6.29E-05	1.26E-04	0.1250	9.806E+12
Cm-244	1.6962E-06	350.58	701.16	0.00E+00	5.95E-04	1.19E-03	0.2250	1.145E+13
Co-60	1.2839E+00	350.58	701.16	0.00E+00	4.50E+02	9.00E+02	0.3750	5.813E+12
Cs-134	9.0541E-02	350.58	701.16	0.00E+00	3.17E+01	6.35E+01	0.5750	7.728E+13
Cs-135	3.2195E-05	350.58	701.16	0.00E+00	1.13E-02	2.26E-02	0.8500	3.317E+12
Cs-137	2.7564E+00	350.58	701.16	0.00E+00	9.66E+02	1.93E+03	1.2500	6.736E+13
Eu-154	1.5368E-02	350.58	701.16	0.00E+00	5.39E+00	1.08E+01	1.7500	4.490E+10
Eu-155	2.9293E-02	350.58	701.16	0.00E+00	1.03E+01	2.05E+01	2.2500	7.237E+10
Fe-55	7.7158E-01	350.58	701.16	0.00E+00	2.70E+02	5.41E+02	2.7500	5.743E+08
H-3	1.1111E-02	350.58	701.16	0.00E+00	3.90E+00	7.79E+00	3.5000	6.684E+07
I-129	7.3684E-07	350.58	701.16	0.00E+00	2.58E-04	5.17E-04	5.0000	3.787E-02
Kr-85	2.5263E-01	350.58	701.16	0.00E+00	8.86E+01	1.77E+02	7.0000	4.288E+01
Np-237	1.2427E-06	350.58	701.16	0.00E+00	4.36E-04	8.71E-04	11.0000	4.886E+00
Pa-231	3.8511E-09	350.58	701.16	0.00E+00	1.35E-06	2.70E-06		
Pb-210	7.3880E-15	350.58	701.16	0.00E+00	2.59E-12	5.18E-12		
Pm-147	2.1023E+00	350.58	701.16	0.00E+00	7.37E+02	1.47E+03		
Pu-238	1.0383E-03	350.58	701.16	0.00E+00	3.64E-01	7.28E-01		
Pu-239	5.5293E-03	350.58	701.16	0.00E+00	1.94E+00	3.88E+00		
Pu-240	2.1278E-03	350.58	701.16	0.00E+00	7.46E-01	1.49E+00		
Pu-241	1.0195E-01	350.58	701.16	0.00E+00	3.57E+01	7.15E+01		
Pu-242	2.3128E-07	350.58	701.16	0.00E+00	8.11E-05	1.62E-04		
Ra-226	5.2782E-14	350.58	701.16	0.00E+00	1.85E-11	3.70E-11		
Ra-228	1.9338E-10	350.58	701.16	0.00E+00	6.78E-08	1.36E-07		
Ru-106	9.1684E-02	350.58	701.16	0.00E+00	3.21E+01	6.43E+01		
Se-79	1.3018E-05	350.58	701.16	0.00E+00	4.56E-03	9.13E-03		
Sn-126	1.2167E-05	350.58	701.16	0.00E+00	4.27E-03	8.53E-03		
Sr-90	2.6045E+00	350.58	701.16	0.00E+00	9.13E+02	1.83E+03		
Tc-99	4.4241E-04	350.58	701.16	0.00E+00	1.55E-01	3.10E-01		
Th-229	1.3713E-10	350.58	701.16	0.00E+00	4.81E-08	9.61E-08		
Th-230	1.8090E-11	350.58	701.16	0.00E+00	6.34E-09	1.27E-08		
Th-232	2.5278E-10	350.58	701.16	0.00E+00	8.86E-08	1.77E-07		
Ti-208	1.6947E-08	350.58	701.16	0.00E+00	5.94E-06	1.19E-05		
U-232	4.8737E-08	350.58	701.16	0.00E+00	1.71E-05	3.42E-05		
U-233	1.2203E-07	350.58	701.16	0.00E+00	4.28E-05	8.56E-05		
U-234	1.5925E-07	350.58	701.16	0.00E+00	5.58E-05	1.12E-04		
U-235	2.6194E-06	350.58	0.00	7.58E-03	6.66E-03	7.58E-03		
U-236	1.2693E-05	350.58	701.16	0.00E+00	4.45E-03	8.90E-03		
U-238	-3.6331E-08	350.58	0.00	4.87E-03	4.86E-03	4.87E-03		
Y-90	2.6060E+00	350.58	701.16	0.00E+00	9.14E+02	1.83E+03		
Other Radionuclides					1.26E+03	2.53E+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 %:	19.48980681	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	350.58	54.99	
Bounding:		701.16	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	0.16	
Bounding:	1.14		0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MSU

SNF ID #: 873

Fuel Units & Descr: 48 - ELEMENT

Heavy Metal Mass: BOL=9.36kg; EOL=8.29kg

ROD Storage Site: INEEL

Fuel decay start date: 1982

Estimates as of: 2000

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: 35 years

Estimated

Canister usage:

18"x10"

0.43

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	1,021.81	2,043.62	0.00E+00	6.85E-06	1.37E-05	Avg. MeV	
Am-241	3.9068E-03	1,021.81	2,043.62	0.00E+00	3.99E+00	7.98E+00	0.0150	1.426E+14
Am-242m	1.2325E-06	1,021.81	2,043.62	0.00E+00	1.26E-03	2.52E-03	0.0250	2.964E+13
Am-243	1.4732E-07	1,021.81	2,043.62	0.00E+00	1.51E-04	3.01E-04	0.0375	2.575E+13
C-14	1.2824E-04	1,021.81	2,043.62	0.00E+00	1.31E-01	2.62E-01	0.0575	2.774E+13
Cl-36	2.8120E-06	1,021.81	2,043.62	0.00E+00	2.87E-03	5.75E-03	0.0850	1.869E+13
Cm-243	8.6556E-08	1,021.81	2,043.62	0.00E+00	8.84E-05	1.77E-04	0.1250	1.086E+13
Cm-244	5.3835E-07	1,021.81	2,043.62	0.00E+00	5.50E-04	1.10E-03	0.2250	1.438E+13
Co-60	2.4887E-02	1,021.81	2,043.62	0.00E+00	2.54E+01	5.09E+01	0.3750	6.271E+12
Cs-134	3.8030E-06	1,021.81	2,043.62	0.00E+00	3.89E-03	7.77E-03	0.5750	1.049E+14
Cs-135	3.2195E-05	1,021.81	2,043.62	0.00E+00	3.29E-02	6.58E-02	0.8500	1.073E+12
Cs-137	1.3788E+00	1,021.81	2,043.62	0.00E+00	1.41E+03	2.82E+03	1.2500	4.165E+12
Eu-154	1.3711E-03	1,021.81	2,043.62	0.00E+00	1.40E+00	2.80E+00	1.7500	2.786E+10
Eu-155	4.4361E-04	1,021.81	2,043.62	0.00E+00	4.53E-01	9.07E-01	2.2500	2.283E+07
Fe-55	2.6075E-04	1,021.81	2,043.62	0.00E+00	2.66E-01	5.33E-01	2.7500	1.049E+06
H-3	2.0647E-03	1,021.81	2,043.62	0.00E+00	2.11E+00	4.22E+00	3.5000	2.521E+03
I-129	7.3684E-07	1,021.81	2,043.62	0.00E+00	7.53E-04	1.51E-03	5.0000	1.061E+03
Kr-85	3.6346E-02	1,021.81	2,043.62	0.00E+00	3.71E+01	7.43E+01	7.0000	1.197E+02
Np-237	1.2844E-06	1,021.81	2,043.62	0.00E+00	1.31E-03	2.62E-03	11.0000	1.361E+01
Pa-231	1.2352E-08	1,021.81	2,043.62	0.00E+00	1.26E-05	2.52E-05		
Pb-210	3.5338E-13	1,021.81	2,043.62	0.00E+00	3.61E-10	7.22E-10		
Pm-147	7.6346E-04	1,021.81	2,043.62	0.00E+00	7.80E-01	1.56E+00		
Pu-238	8.1970E-04	1,021.81	2,043.62	0.00E+00	8.38E-01	1.68E+00		
Pu-239	5.5248E-03	1,021.81	2,043.62	0.00E+00	5.65E+00	1.13E+01		
Pu-240	2.1203E-03	1,021.81	2,043.62	0.00E+00	2.17E+00	4.33E+00		
Pu-241	2.4075E-02	1,021.81	2,043.62	0.00E+00	2.46E+01	4.92E+01		
Pu-242	2.3128E-07	1,021.81	2,043.62	0.00E+00	2.36E-04	4.73E-04		
Ra-226	9.6481E-13	1,021.81	2,043.62	0.00E+00	9.86E-10	1.97E-09		
Ra-228	2.5188E-10	1,021.81	2,043.62	0.00E+00	2.57E-07	5.15E-07		
Ru-106	1.0214E-10	1,021.81	2,043.62	0.00E+00	1.04E-07	2.09E-07		
Se-79	1.3014E-05	1,021.81	2,043.62	0.00E+00	1.33E-02	2.66E-02		
Sn-126	1.2164E-05	1,021.81	2,043.62	0.00E+00	1.24E-02	2.49E-02		
Sr-90	1.2762E+00	1,021.81	2,043.62	0.00E+00	1.30E+03	2.61E+03		
Tc-99	4.4241E-04	1,021.81	2,043.62	0.00E+00	4.52E-01	9.04E-01		
Th-229	5.9684E-10	1,021.81	2,043.62	0.00E+00	6.10E-07	1.22E-06		
Th-230	9.3880E-11	1,021.81	2,043.62	0.00E+00	9.59E-08	1.92E-07		
Th-232	2.5278E-10	1,021.81	2,043.62	0.00E+00	2.58E-07	5.17E-07		
Ti-208	1.3723E-08	1,021.81	2,043.62	0.00E+00	1.40E-05	2.80E-05		
U-232	3.6932E-08	1,021.81	2,043.62	0.00E+00	3.77E-05	7.55E-05		
U-233	1.2224E-07	1,021.81	2,043.62	0.00E+00	1.25E-04	2.50E-04		
U-234	2.5714E-07	1,021.81	2,043.62	0.00E+00	2.63E-04	5.26E-04		
U-235	-2.8194E-06	1,021.81	0.00	4.05E-03	1.37E-03	4.05E-03		
U-236	1.2695E-05	1,021.81	2,043.62	0.00E+00	1.30E-02	2.59E-02		
U-238	-3.6331E-08	1,021.81	0.00	2.52E-03	2.48E-03	2.52E-03		
Y-90	1.2785E+00	1,021.81	2,043.62	0.00E+00	1.30E+03	2.61E+03		
Other Radionuclides					1.41E+03	2.81E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,021.81	
Bounding:		2,043.62	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	3.20		
Bounding:	6.40		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:

Fuel Name: TRIGA STD 8.520 PENN. STATE UNIV.
 SNF ID #: 237
 Fuel Units & Descr: 203 - ELEMENT
 Heavy Metal Mass: BOL=39.991kg; EOL=37.575kg
 ROD Storage Site: NEEL

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"
 1.83

II. Estimates

	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,306.04	4,612.09	0.00E+00	1.96E-06	3.93E-06	Avg. MeV	
Am-241	1.8331E-03	2,306.04	4,612.09	0.00E+00	4.23E+00	8.45E+00	0.0150	7.45E+14
Am-242m	1.4129E-06	2,306.04	4,612.09	0.00E+00	3.26E-03	6.52E-03	0.0250	1.640E+14
Am-243	1.4774E-07	2,306.04	4,612.09	0.00E+00	3.41E-04	6.81E-04	0.0375	1.397E+14
C-14	1.2871E-04	2,306.04	4,612.09	0.00E+00	2.97E-01	5.94E-01	0.0575	1.434E+14
Cl-38	2.8120E-06	2,306.04	4,612.09	0.00E+00	6.48E-03	1.30E-02	0.0850	8.882E+13
Cm-243	1.7940E-07	2,306.04	4,612.09	0.00E+00	4.14E-04	8.27E-04	0.1250	6.450E+13
Cm-244	1.6962E-06	2,306.04	4,612.09	0.00E+00	3.91E-03	7.82E-03	0.2250	7.535E+13
Co-60	1.2839E+00	2,306.04	4,612.09	0.00E+00	2.96E+03	5.92E+03	0.3750	3.824E+13
Cs-134	9.0541E-02	2,306.04	4,612.09	0.00E+00	2.09E+02	4.18E+02	0.5750	5.083E+14
Cs-135	3.2195E-05	2,306.04	4,612.09	0.00E+00	7.42E-02	1.48E-01	0.8500	2.182E+13
Cs-137	2.7564E+00	2,306.04	4,612.09	0.00E+00	6.36E+03	1.27E+04	1.2500	4.431E+14
Eu-154	1.5368E-02	2,306.04	4,612.09	0.00E+00	3.54E+01	7.09E+01	1.7500	2.953E+11
Eu-155	2.9293E-02	2,306.04	4,612.09	0.00E+00	6.78E+01	1.35E+02	2.2500	4.760E+11
Fe-55	7.7158E-01	2,306.04	4,612.09	0.00E+00	1.78E+03	3.56E+03	2.7500	3.778E+09
H-3	1.1111E-02	2,306.04	4,612.09	0.00E+00	2.56E+01	5.12E+01	3.5000	4.398E+08
I-129	7.3684E-07	2,306.04	4,612.09	0.00E+00	1.70E-03	3.40E-03	5.0000	2.442E+03
Kr-85	2.5263E-01	2,306.04	4,612.09	0.00E+00	5.83E+02	1.17E+03	7.0000	2.764E+02
Np-237	1.2427E-06	2,306.04	4,612.09	0.00E+00	2.87E-03	5.73E-03	11.0000	3.149E+01
Pa-231	3.8511E-09	2,306.04	4,612.09	0.00E+00	8.88E-06	1.78E-05		
Pb-210	7.3880E-15	2,306.04	4,612.09	0.00E+00	1.70E-11	3.41E-11		
Pm-147	2.1023E+00	2,306.04	4,612.09	0.00E+00	4.85E+03	9.70E+03		
Pu-238	1.0383E-03	2,306.04	4,612.09	0.00E+00	2.39E+00	4.79E+00		
Pu-239	5.5293E-03	2,306.04	4,612.09	0.00E+00	1.28E+01	2.55E+01		
Pu-240	2.1278E-03	2,306.04	4,612.09	0.00E+00	4.91E+00	9.81E+00		
Pu-241	1.0195E-01	2,306.04	4,612.09	0.00E+00	2.35E+02	4.70E+02		
Pu-242	2.3128E-07	2,306.04	4,612.09	0.00E+00	5.33E-04	1.07E-03		
Ra-226	5.2782E-14	2,306.04	4,612.09	0.00E+00	1.22E-10	2.43E-10		
Ra-228	1.9338E-10	2,306.04	4,612.09	0.00E+00	4.46E-07	8.92E-07		
Ru-106	9.1684E-02	2,306.04	4,612.09	0.00E+00	2.11E+02	4.23E+02		
Se-79	1.3018E-05	2,306.04	4,612.09	0.00E+00	3.00E-02	6.00E-02		
Sn-126	1.2167E-05	2,306.04	4,612.09	0.00E+00	2.81E-02	5.61E-02		
Sr-90	2.6045E+00	2,306.04	4,612.09	0.00E+00	6.01E+03	1.20E+04		
Tc-99	4.4241E-04	2,306.04	4,612.09	0.00E+00	1.02E+00	2.04E+00		
Th-229	1.3713E-10	2,306.04	4,612.09	0.00E+00	3.16E-07	6.32E-07		
Th-230	1.8090E-11	2,306.04	4,612.09	0.00E+00	4.17E-08	8.34E-08		
Th-232	2.5278E-10	2,306.04	4,612.09	0.00E+00	5.83E-07	1.17E-06		
Ti-208	1.6947E-08	2,306.04	4,612.09	0.00E+00	3.91E-05	7.82E-05		
U-232	4.8737E-08	2,306.04	4,612.09	0.00E+00	1.12E-04	2.25E-04		
U-233	1.2203E-07	2,306.04	4,612.09	0.00E+00	2.81E-04	5.63E-04		
U-234	1.5925E-07	2,306.04	4,612.09	0.00E+00	3.67E-04	7.34E-04		
U-235	-2.6194E-06	2,306.04	0.00	1.71E-02	1.11E-02	1.71E-02		
U-236	1.2693E-05	2,306.04	4,612.09	0.00E+00	2.93E-02	5.85E-02		
U-238	-3.6331E-08	2,306.04	0.00	1.08E-02	1.07E-02	1.08E-02		
Y-90	2.6060E+00	2,306.04	4,612.09	0.00E+00	6.01E+03	1.20E+04		
Other Radionuclides					8.31E+03	1.66E+04		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
1.34E+02	2.58E+02	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.79695431	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		2,306.04
Bounding:		4,612.09

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.69	
Bounding:	3.38	

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: TRIGA STD 8.5/20 REED COLLEGE
SNF ID #: 775
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1.719kg; EOL=1.706kg
ROO Storage Site: INEEL

¹Fuel decay start date: 2026
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.12

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	12.89	25.77	0.00E+00	1.10E-08	2.20E-08	Avg. MeV	
Am-241	1.8331E-03	12.89	25.77	0.00E+00	2.36E-02	4.72E-02	0.0150	4.166E+12
Am-242m	1.4129E-06	12.89	25.77	0.00E+00	1.82E-05	3.64E-05	0.0250	9.166E+11
Am-243	1.4774E-07	12.89	25.77	0.00E+00	1.90E-06	3.81E-06	0.0375	7.806E+11
C-14	1.2871E-04	12.89	25.77	0.00E+00	1.66E-03	3.32E-03	0.0575	8.012E+11
Cl-36	2.8120E-06	12.89	25.77	0.00E+00	3.62E-05	7.25E-05	0.0650	4.964E+11
Cm-243	1.7940E-07	12.89	25.77	0.00E+00	2.31E-06	4.62E-06	0.1250	3.805E+11
Cm-244	1.6962E-06	12.89	25.77	0.00E+00	2.19E-05	4.37E-05	0.2250	4.211E+11
Co-60	1.2839E-00	12.89	25.77	0.00E+00	1.65E+01	3.31E+01	0.3750	2.137E+11
Cs-134	9.0641E-02	12.89	25.77	0.00E+00	1.17E+00	2.33E+00	0.5750	2.841E+12
Cs-135	3.2195E-05	12.89	25.77	0.00E+00	4.15E-04	8.30E-04	0.8500	1.219E+11
Cs-137	2.7564E+00	12.89	25.77	0.00E+00	3.55E+01	7.10E+01	1.2500	2.476E+12
Eu-154	1.5368E-02	12.89	25.77	0.00E+00	1.98E-01	3.96E-01	1.7500	1.650E+09
Eu-155	2.9293E-02	12.89	25.77	0.00E+00	3.78E-01	7.55E-01	2.2500	2.660E+09
Fe-55	7.7158E-01	12.89	25.77	0.00E+00	9.94E+00	1.99E+01	2.7500	2.111E+07
H-3	1.1111E-02	12.89	25.77	0.00E+00	1.43E-01	2.86E-01	3.5000	2.457E+06
I-129	7.3684E-07	12.89	25.77	0.00E+00	9.50E-06	1.90E-05	5.0000	1.457E+01
Kr-85	2.5263E-01	12.89	25.77	0.00E+00	3.26E+00	6.51E+00	7.0000	1.651E+00
Np-237	1.2427E-06	12.89	25.77	0.00E+00	1.60E-05	3.20E-05	11.0000	1.882E-01
Pa-231	3.8511E-09	12.89	25.77	0.00E+00	4.96E-08	9.93E-08		
Pb-210	7.3680E-15	12.89	25.77	0.00E+00	9.52E-14	1.90E-13		
Pm-147	2.1023E+00	12.89	25.77	0.00E+00	2.71E+01	5.42E+01		
Pu-238	1.0383E-03	12.89	25.77	0.00E+00	1.34E-02	2.68E-02		
Pu-239	5.5293E-03	12.89	25.77	0.00E+00	7.13E-02	1.43E-01		
Pu-240	2.1278E-03	12.89	25.77	0.00E+00	2.74E-02	5.48E-02		
Pu-241	1.0195E-01	12.89	25.77	0.00E+00	1.31E+00	2.63E+00		
Pu-242	2.3128E-07	12.89	25.77	0.00E+00	2.98E-06	5.96E-06		
Ra-226	5.2782E-14	12.89	25.77	0.00E+00	6.80E-13	1.36E-12		
Ra-228	1.9338E-10	12.89	25.77	0.00E+00	2.49E-09	4.98E-09		
Ru-106	9.1684E-02	12.89	25.77	0.00E+00	1.18E+00	2.36E+00		
Se-79	1.3018E-05	12.89	25.77	0.00E+00	1.68E-04	3.36E-04		
Sn-126	1.2167E-05	12.89	25.77	0.00E+00	1.57E-04	3.14E-04		
Sr-90	2.6045E+00	12.89	25.77	0.00E+00	3.36E+01	6.71E+01		
Tc-99	4.4241E-04	12.89	25.77	0.00E+00	5.70E-03	1.14E-02		
Th-229	1.3713E-10	12.89	25.77	0.00E+00	1.77E-09	3.53E-09		
Th-230	1.8090E-11	12.89	25.77	0.00E+00	2.33E-10	4.66E-10		
Th-232	2.5278E-10	12.89	25.77	0.00E+00	3.26E-09	6.52E-09		
Th-208	1.6947E-08	12.89	25.77	0.00E+00	2.18E-07	4.37E-07		
U-232	4.8737E-08	12.89	25.77	0.00E+00	6.28E-07	1.26E-06		
U-233	1.2203E-07	12.89	25.77	0.00E+00	1.57E-06	3.15E-06	Thermal Power	
U-234	1.5925E-07	12.89	25.77	0.00E+00	2.05E-06	4.10E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.6194E-06	12.89	0.00	7.49E-04	7.15E-04	7.49E-04	7.50E-01	1.50E+00
U-236	1.2693E-05	12.89	25.77	0.00E+00	1.64E-04	3.27E-04	Total	Total
U-238	-3.6331E-08	12.89	0.00	4.61E-04	4.61E-04	4.61E-04		
Y-90	2.6060E+00	12.89	25.77	0.00E+00	3.36E+01	6.72E+01		
Other Radionuclides					4.85E+01	9.29E+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 (very close to 20%)
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.15706806	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		12.89	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		25.77	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.22		1.00
Bounding:	0.44		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 5.520 SLOVENIA
 SIF ID #: 588
 Fuel Unit #: 123 - ELEMENT
 Heavy Metal Mass: BOL-23.4kg EOL-22.594kg
 ROD Storage Slot: INEEL

Fuel decay start date:
 Estimates as of:
 Template: TRIGA SS (LW/U-Zr, SST, 10 to 20%, U)

2010
 2030
 6.65
 0.00195

Estimated
 Canister usage:
 18.7119
 1.10

Template BOL Heavy Metal Mass (HMT):
 Template Decay Time:
 20 years

II. Estimates	m	x _e	y _e	b	y _e	y _e	Gamma Sources
Radionuclide	C/NW/D From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	2.6436E-08	768.65	1.537.30	0.00E+00	2.03E-06	4.05E-06	Avg. MW
Am-241	3.1429E-03	768.65	1.537.30	0.00E+00	2.42E+00	4.83E+00	0.0150
Am-242m	1.3195E-06	768.65	1.537.30	0.00E+00	1.01E-03	2.03E-03	0.0250
Am-243	1.4753E-07	768.65	1.537.30	0.00E+00	1.13E-04	2.27E-04	0.0075
C-14	1.2847E-04	768.65	1.537.30	0.00E+00	9.87E-02	1.97E-01	0.0075
C-36	2.8120E-06	768.65	1.537.30	0.00E+00	2.16E-03	4.32E-03	0.0850
Cm-243	1.2465E-07	768.65	1.537.30	0.00E+00	9.58E-05	1.92E-04	0.1250
Cm-244	9.5564E-07	768.65	1.537.30	0.00E+00	7.35E-04	1.47E-03	0.2250
Co-60	1.7890E-01	768.65	1.537.30	0.00E+00	1.37E+02	2.75E+02	0.5750
Co-134	5.9892E-04	768.65	1.537.30	0.00E+00	4.51E-01	9.02E-01	0.5750
Co-137	3.2195E-05	768.65	1.537.30	0.00E+00	2.47E-02	4.95E-02	0.8500
Eu-154	1.9489E+00	768.65	1.537.30	0.00E+00	1.50E+03	3.00E+03	1.2500
Eu-155	4.5895E-03	768.65	1.537.30	0.00E+00	3.53E+00	7.06E+00	1.7500
Fe-55	3.6045E-03	768.65	1.537.30	0.00E+00	2.77E+00	5.54E+00	2.2500
H-3	1.4185E-02	768.65	1.537.30	0.00E+00	1.09E+01	2.18E+01	2.7500
H-3	4.7895E-07	768.65	1.537.30	0.00E+00	3.88E+00	7.36E+00	3.5000
H-129	7.895E-07	768.65	1.537.30	0.00E+00	5.66E-04	1.13E-03	5.0000
Kr-85	8.5802E-02	768.65	1.537.30	0.00E+00	7.37E+01	1.47E+02	7.0000
Np-237	1.2582E-06	768.65	1.537.30	0.00E+00	9.85E-04	1.93E-03	11.0000
Pa-231	7.0408E-09	768.65	1.537.30	0.00E+00	5.41E-06	1.08E-05	
Pb-210	5.8000E-14	768.65	1.537.30	0.00E+00	4.46E-11	8.92E-11	
Pm-147	4.0075E-02	768.65	1.537.30	0.00E+00	3.08E+01	6.16E+01	
Pu-238	9.2256E-04	768.65	1.537.30	0.00E+00	7.09E-01	1.42E+00	
Pu-239	5.5278E-03	768.65	1.537.30	0.00E+00	4.25E+00	8.50E+00	
Pu-240	2.1248E-03	768.65	1.537.30	0.00E+00	1.63E+00	3.27E+00	
Pu-241	4.9549E-02	768.65	1.537.30	0.00E+00	3.81E+01	7.62E+01	
Pu-242	2.3129E-03	768.65	1.537.30	0.00E+00	1.78E-04	3.56E-04	
Ra-226	2.4628E-13	768.65	1.537.30	0.00E+00	1.89E-10	3.77E-10	
Ra-106	2.4015E-10	768.65	1.537.30	0.00E+00	1.85E-07	3.69E-07	
Ru-106	3.0602E-06	768.65	1.537.30	0.00E+00	2.35E-03	4.70E-03	
Sr-79	1.3015E-05	768.65	1.537.30	0.00E+00	1.00E-02	2.00E-02	
Sr-126	1.2165E-05	768.65	1.537.30	0.00E+00	9.35E-03	1.87E-02	
Sr-90	1.8236E+00	768.65	1.537.30	0.00E+00	1.40E+08	2.80E+03	
Tc-99	4.4241E-04	768.65	1.537.30	0.00E+00	3.40E-01	6.80E-01	
Th-229	4.2346E-11	768.65	1.537.30	0.00E+00	2.38E-07	4.76E-07	
Th-230	4.2346E-11	768.65	1.537.30	0.00E+00	3.25E-08	6.51E-08	
Th-232	2.5278E-10	768.65	1.537.30	0.00E+00	1.94E-07	3.89E-07	
Th-230	1.5820E-08	768.65	1.537.30	0.00E+00	1.22E-05	2.43E-05	
U-232	4.2847E-06	768.65	1.537.30	0.00E+00	3.28E-05	6.56E-05	
U-233	1.2211E-07	768.65	1.537.30	0.00E+00	9.39E-05	1.88E-04	
U-234	1.9956E-07	768.65	1.537.30	0.00E+00	1.53E-04	3.07E-04	
U-235	2.6194E-06	768.65	1.537.30	1.01E-02	8.04E-03	1.61E-02	
U-236	1.2683E-05	768.65	1.537.30	0.00E+00	9.78E-03	1.95E-02	
U-238	3.6331E-08	768.65	1.537.30	6.30E-03	6.27E-03	6.30E-03	
U-90	1.8241E+00	768.65	1.537.30	0.00E+00	1.40E+03	2.80E+03	
Other Radionuclides					1.48E+03	2.96E+03	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	1.92E+01	3.85E+01

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SPD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HMT Constituents:	U	U
BOL Enrichment %:	19.857782	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd/g)

Nominal	From SFD	Estimated
Bounding	768.65	1.537.30

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

Checks

Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding	0.96	1.53

Estimated EOL HMT/Given EOL HMT
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SLOVENIA
SNF ID #: 1079
Fuel Units & Descr: 149 - ELEMENT
Heavy Metal Mass: BOL=28.57kg; EOL=27.46kg
ROO Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
1.34

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	1,081.00	2,161.99	0.00E+00	2.86E-06	5.72E-06	Avg. MeV	
Am-241	3.1429E-03	1,081.00	2,161.99	0.00E+00	3.40E+00	6.79E+00	0.0150	2.167E+14
Am-242m	1.3195E-06	1,081.00	2,161.99	0.00E+00	1.43E-03	2.85E-03	0.0250	4.510E+13
Am-243	1.4753E-07	1,081.00	2,161.99	0.00E+00	1.59E-04	3.19E-04	0.0375	3.907E+13
C-14	1.2847E-04	1,081.00	2,161.99	0.00E+00	1.39E-01	2.78E-01	0.0575	4.203E+13
Cl-36	2.8120E-06	1,081.00	2,161.99	0.00E+00	3.04E-03	6.08E-03	0.0850	2.537E+13
Cm-243	1.2465E-07	1,081.00	2,161.99	0.00E+00	1.35E-04	2.69E-04	0.1250	1.858E+13
Cm-244	9.5564E-07	1,081.00	2,161.99	0.00E+00	1.03E-03	2.07E-03	0.2250	2.179E+13
Co-60	1.7880E-01	1,081.00	2,161.99	0.00E+00	1.93E+02	3.87E+02	0.3750	9.550E+12
Cs-134	5.8692E-04	1,081.00	2,161.99	0.00E+00	6.34E-01	1.27E+00	0.5750	1.571E+14
Cs-135	3.2195E-05	1,081.00	2,161.99	0.00E+00	3.48E-02	6.96E-02	0.8500	1.770E+12
Cs-137	1.9489E+00	1,081.00	2,161.99	0.00E+00	2.11E+03	4.21E+03	1.2500	2.934E+13
Eu-154	4.5895E-03	1,081.00	2,161.99	0.00E+00	4.96E+00	9.92E+00	1.7500	4.548E+10
Eu-155	3.6045E-03	1,081.00	2,161.99	0.00E+00	3.90E+00	7.79E+00	2.2500	1.567E+08
Fe-55	1.4185E-02	1,081.00	2,161.99	0.00E+00	1.53E+01	3.07E+01	2.7500	1.726E+06
H-3	4.7895E-03	1,081.00	2,161.99	0.00E+00	5.18E+00	1.04E+01	3.5000	9.585E+03
I-129	7.3684E-07	1,081.00	2,161.99	0.00E+00	7.97E-04	1.59E-03	5.0000	1.141E+03
Kr-85	9.5820E-02	1,081.00	2,161.99	0.00E+00	1.04E+02	2.07E+02	7.0000	1.289E+02
Np-237	1.2552E-06	1,081.00	2,161.99	0.00E+00	1.36E-03	2.71E-03	11.0000	1.466E+01
Pa-231	7.0406E-09	1,081.00	2,161.99	0.00E+00	7.61E-06	1.52E-05		
Pb-210	5.8000E-14	1,081.00	2,161.99	0.00E+00	6.27E-11	1.25E-10		
Pm-147	4.0075E-02	1,081.00	2,161.99	0.00E+00	4.33E+01	8.66E+01		
Pu-238	9.2256E-04	1,081.00	2,161.99	0.00E+00	9.97E-01	1.99E+00		
Pu-239	5.5278E-03	1,081.00	2,161.99	0.00E+00	5.88E+00	1.20E+01		
Pu-240	2.1248E-03	1,081.00	2,161.99	0.00E+00	2.30E+00	4.59E+00		
Pu-241	4.9549E-02	1,081.00	2,161.99	0.00E+00	5.36E+01	1.07E+02		
Pu-242	2.3128E-07	1,081.00	2,161.99	0.00E+00	2.50E-04	5.00E-04		
Ra-226	2.4526E-13	1,081.00	2,161.99	0.00E+00	2.65E-10	5.30E-10		
Ra-228	2.4015E-10	1,081.00	2,161.99	0.00E+00	2.60E-07	5.19E-07		
Ru-106	3.0602E-06	1,081.00	2,161.99	0.00E+00	3.31E-03	6.62E-03		
Se-79	1.3015E-05	1,081.00	2,161.99	0.00E+00	1.41E-02	2.81E-02		
Sn-126	1.2165E-05	1,081.00	2,161.99	0.00E+00	1.32E-02	2.63E-02		
Sr-90	1.8226E+00	1,081.00	2,161.99	0.00E+00	1.97E+03	3.94E+03		
Tc-99	4.4241E-04	1,081.00	2,161.99	0.00E+00	4.78E-01	9.56E-01		
Th-229	3.0962E-10	1,081.00	2,161.99	0.00E+00	3.35E-07	6.69E-07		
Th-230	4.2346E-11	1,081.00	2,161.99	0.00E+00	4.58E-08	9.16E-08		
Th-232	2.5278E-10	1,081.00	2,161.99	0.00E+00	2.73E-07	5.47E-07		
Ti-208	1.5820E-08	1,081.00	2,161.99	0.00E+00	1.71E-05	3.42E-05		
U-232	4.2647E-08	1,081.00	2,161.99	0.00E+00	4.61E-05	9.22E-05	Thermal Power	
U-233	1.2211E-07	1,081.00	2,161.99	0.00E+00	1.32E-04	2.64E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.9955E-07	1,081.00	2,161.99	0.00E+00	2.16E-04	4.31E-04		
U-235	-2.6194E-06	1,081.00	0.00	1.23E-02	9.45E-03	1.23E-02		
U-236	1.2693E-05	1,081.00	2,161.99	0.00E+00	1.37E-02	2.74E-02	2.70E+01	5.41E+01
U-238	-3.6331E-08	1,081.00	0.00	7.70E-03	7.66E-03	7.70E-03	Total	Total
Y-90	1.8241E+00	1,081.00	2,161.99	0.00E+00	1.97E+03	3.94E+03		
Other Radionuclides					2.08E+03	4.16E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,081.00	
Bounding:		2,161.99	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.11		
Bounding:	2.22		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SO. KOREA
SNF ID #: 484
Fuel Units & Descr: 104 - ELEMENT
Heavy Metal Mass: BOL=19.76kg; EOL=19.261kg
ROD Storage Site: INEEL

*Fuel decay start date: 1996
Estimates as of: 2030
Template: TRIGA-SS (LWU-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"
0.94

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	4.1459E-09	476.54	953.08	0.00E+00	1.98E-06	3.95E-06	Avg. MeV	
Am-241	3.5850E-03	476.54	953.08	0.00E+00	1.71E+00	3.42E+00	0.0150	8.460E+13
Am-242m	1.2899E-06	476.54	953.08	0.00E+00	6.15E-04	1.23E-03	0.0250	1.759E+13
Am-243	1.4747E-07	476.54	953.08	0.00E+00	7.03E-05	1.41E-04	0.0375	1.526E+13
C-14	1.2839E-04	476.54	953.08	0.00E+00	6.12E-02	1.22E-01	0.0575	1.643E+13
Cl-36	2.8120E-08	476.54	953.08	0.00E+00	1.34E-03	2.68E-03	0.0850	9.905E+12
Cm-243	1.1038E-07	476.54	953.08	0.00E+00	5.26E-05	1.05E-04	0.1250	6.462E+12
Cm-244	7.8917E-07	476.54	953.08	0.00E+00	3.76E-04	7.52E-04	0.2250	8.519E+12
Co-60	9.2647E-02	476.54	953.08	0.00E+00	4.41E+01	8.83E+01	0.3750	3.720E+12
Cs-134	1.0940E-04	476.54	953.08	0.00E+00	5.21E-02	1.04E-01	0.5750	6.167E+13
Cs-135	3.2195E-05	476.54	953.08	0.00E+00	1.53E-02	3.07E-02	0.8500	6.821E+11
Cs-137	1.7368E+00	476.54	953.08	0.00E+00	8.28E+02	1.66E+03	1.2500	6.789E+12
Eu-154	3.0677E-03	476.54	953.08	0.00E+00	1.46E+00	2.92E+00	1.7500	1.723E+10
Eu-155	1.7925E-03	476.54	953.08	0.00E+00	8.54E-01	1.71E+00	2.2500	3.634E+07
Fe-55	3.7444E-03	476.54	953.08	0.00E+00	1.78E+00	3.57E+00	2.7500	6.145E+05
H-3	3.6180E-03	476.54	953.08	0.00E+00	1.72E+00	3.45E+00	3.5000	1.300E+03
I-129	7.3684E-07	476.54	953.08	0.00E+00	3.51E-04	7.02E-04	5.0000	5.066E+02
Kr-85	8.9368E-02	476.54	953.08	0.00E+00	3.31E+01	6.61E+01	7.0000	5.720E+01
Np-237	1.2662E-06	476.54	953.08	0.00E+00	6.03E-04	1.21E-03	11.0000	6.506E+00
Pa-231	9.1654E-09	476.54	953.08	0.00E+00	4.37E-06	8.74E-06		
Pb-210	1.3728E-13	476.54	953.08	0.00E+00	6.54E-11	1.31E-10		
Pm-147	1.0702E-02	476.54	953.08	0.00E+00	5.10E+00	1.02E+01		
Pu-238	8.8692E-04	476.54	953.08	0.00E+00	4.23E-01	8.45E-01		
Pu-239	5.5263E-03	476.54	953.08	0.00E+00	2.63E+00	5.27E+00		
Pu-240	2.1233E-03	476.54	953.08	0.00E+00	1.01E+00	2.02E+00		
Pu-241	3.8962E-02	476.54	953.08	0.00E+00	1.86E+01	3.71E+01		
Pu-242	2.3128E-07	476.54	953.08	0.00E+00	1.10E-04	2.20E-04		
Ra-226	4.6752E-13	476.54	953.08	0.00E+00	2.23E-10	4.46E-10		
Ra-228	2.4827E-10	476.54	953.08	0.00E+00	1.18E-07	2.37E-07		
Ru-106	9.8526E-08	476.54	953.08	0.00E+00	4.70E-05	9.39E-05		
Se-79	1.3015E-05	476.54	953.08	0.00E+00	6.20E-03	1.24E-02		
Sn-126	1.2165E-05	476.54	953.08	0.00E+00	5.80E-03	1.16E-02		
Sr-90	1.6195E+00	476.54	953.08	0.00E+00	7.72E+02	1.54E+03		
Tc-99	4.4241E-04	476.54	953.08	0.00E+00	2.11E-01	4.22E-01		
Th-229	4.2451E-10	476.54	953.08	0.00E+00	2.02E-07	4.05E-07		
Th-230	6.1398E-11	476.54	953.08	0.00E+00	2.93E-08	5.85E-08		
Th-232	2.5278E-10	476.54	953.08	0.00E+00	1.20E-07	2.41E-07		
Ti-208	1.5098E-08	476.54	953.08	0.00E+00	7.19E-06	1.44E-05		
U-232	4.0662E-08	476.54	953.08	0.00E+00	1.94E-05	3.88E-05		
U-233	1.2217E-07	476.54	953.08	0.00E+00	5.82E-05	1.16E-04		
U-234	2.2391E-07	476.54	953.08	0.00E+00	1.07E-04	2.13E-04		
U-235	-2.6194E-06	476.54	0.00	8.54E-03	7.29E-03	8.54E-03		
U-236	1.2695E-05	476.54	953.08	0.00E+00	6.05E-03	1.21E-02		
U-238	-3.6331E-08	476.54	0.00	5.31E-03	5.30E-03	5.31E-03		
Y-90	1.6195E+00	476.54	953.08	0.00E+00	7.72E+02	1.54E+03		
Other Radionuclides					8.20E+02	1.64E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.61E+01	2.02E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
Nominal:	476.54	
Bounding:	953.08	

Checks		Estimated EOL HM/Given EOL HM
Nominal:	0.71	
Bounding:	1.41	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: TRIGA STD 8.5/20 TEXAS AAM
 SNF ID #: 258
 Fuel Units & Decay: 95 - ELEMENT
 Heavy Metal Mass: BOL=14.873kg EOL=14.34kg
 ROD Storage Size: IEEE1

Fuel decay start date: 2005
Estimates as of: 2000
Template: TRIGA-SS (UW/L-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.77

Radionuclide	Template	Nominal	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Total Photons/sec (Bounding)
Ac-227	8.5173E-10	511.19	1,022.38	0.00E+00	4.35E-07	8.71E-07	Avg. MeV	1.652E+14
Am-241	1.8531E-03	511.19	1,022.38	0.00E+00	8.37E-01	1.87E+00	0.0150	3.836E+13
Am-242m	1.4129E-06	511.19	1,022.38	0.00E+00	7.22E-04	1.44E-03	0.0250	3.086E+13
Am-243	1.4774E-07	511.19	1,022.38	0.00E+00	7.55E-05	1.51E-04	0.0375	3.178E+13
C-14	1.2871E-04	511.19	1,022.38	0.00E+00	6.58E-02	1.32E-01	0.0675	1.869E+13
Cl-36	2.8120E-06	511.19	1,022.38	0.00E+00	1.44E-03	2.87E-03	0.0850	1.430E+13
Co-243	1.7940E-07	511.19	1,022.38	0.00E+00	9.17E-05	1.83E-04	0.1250	1.670E+13
Co-244	1.6932E-06	511.19	1,022.38	0.00E+00	8.67E-04	1.73E-03	0.2250	1.870E+13
Co-60	1.2839E+00	511.19	1,022.38	0.00E+00	4.63E+02	9.26E+01	0.3750	1.127E+14
Co-134	9.0541E-02	511.19	1,022.38	0.00E+00	4.63E+01	9.26E+01	0.5750	1.127E+14
Co-135	3.2185E-05	511.19	1,022.38	0.00E+00	1.65E-02	3.29E-02	0.8500	4.830E+12
Co-137	2.7664E+00	511.19	1,022.38	0.00E+00	1.41E+03	2.82E+03	1.2500	9.822E+13
Eu-154	1.5368E-02	511.19	1,022.38	0.00E+00	7.85E+00	1.57E+01	1.7500	6.547E+08
Eu-155	6.1119	511.19	1,022.38	0.00E+00	1.50E+01	2.89E+01	2.2500	1.065E+11
Fe-55	7.7158E-01	511.19	1,022.38	0.00E+00	3.94E+02	7.89E+02	2.7500	8.374E+08
Fe-59	1.1111E-02	511.19	1,022.38	0.00E+00	5.68E+00	1.14E+01	5.0000	8.746E+07
Fe-65	7.3684E-07	511.19	1,022.38	0.00E+00	3.77E-04	7.53E-04	6.0000	6.450E+02
Fe-85	2.5563E-01	511.19	1,022.38	0.00E+00	1.29E+02	2.58E+02	11.0000	7.029E+00
Fe-237	1.2427E-06	511.19	1,022.38	0.00E+00	6.35E-04	1.27E-03		
Fe-238	1.0883E-03	511.19	1,022.38	0.00E+00	5.31E-01	1.06E+00		
Pu-239	5.5293E-03	511.19	1,022.38	0.00E+00	2.83E+00	5.65E+00		
Pu-240	2.1278E-03	511.19	1,022.38	0.00E+00	1.09E+00	2.18E+00		
Pu-241	1.0195E-01	511.19	1,022.38	0.00E+00	5.21E+01	1.04E+02		
Pu-242	2.3128E-07	511.19	1,022.38	0.00E+00	1.18E-04	2.36E-04		
Pu-246	5.2782E-14	511.19	1,022.38	0.00E+00	2.70E-11	5.40E-11		
Pu-238	1.8338E-10	511.19	1,022.38	0.00E+00	8.83E-08	1.88E-07		
Pu-106	8.1684E-02	511.19	1,022.38	0.00E+00	4.69E+01	9.37E+01		
Se-79	1.3018E-05	511.19	1,022.38	0.00E+00	6.65E-03	1.33E-02		
Se-126	1.2167E-06	511.19	1,022.38	0.00E+00	8.22E-03	1.24E-02		
Se-80	2.6045E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03		
Te-89	4.4241E-04	511.19	1,022.38	0.00E+00	2.26E-01	4.52E-01		
Th-229	1.3719E-10	511.19	1,022.38	0.00E+00	7.01E-08	1.40E-07		
Th-230	1.8690E-11	511.19	1,022.38	0.00E+00	9.25E-09	1.85E-08		
Th-232	2.5278E-10	511.19	1,022.38	0.00E+00	1.29E-07	2.58E-07		
Th-236	1.8847E-08	511.19	1,022.38	0.00E+00	8.68E-06	1.73E-05		
U-232	4.6737E-08	511.19	1,022.38	0.00E+00	2.49E-05	4.98E-05		
U-233	1.2203E-07	511.19	1,022.38	0.00E+00	6.24E-05	1.25E-04		
U-234	1.5825E-07	511.19	1,022.38	0.00E+00	8.14E-05	1.63E-04		
U-235	2.6194E-06	511.19	0.00	8.43E-03	5.09E-03	6.43E-03		
U-236	1.2632E-05	511.19	1,022.38	0.00E+00	6.49E-03	1.30E-02		
U-238	3.6531E-08	511.19	0.00	4.00E+03	3.98E-03	4.00E+03		
U-239	2.6060E+00	511.19	1,022.38	0.00E+00	1.84E+03	3.69E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			
Radionuclide	Template	Nominal	Bounding

Burnup Summary (MWd)			
Radionuclide	Template	Nominal	Bounding

Checks			
Radionuclide	Template	Nominal	Bounding

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 THAILAND
SNF ID #: 489
Fuel Units & Descr: 100 - ELEMENT
Heavy Metal Mass: BOL=19.5kg; EOL=19.3kg
ROD Storage Site: INEEL

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

Estimated
Canister usage:
18"x18"
0.90

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6436E-09	190.92	381.84	0.00E+00	5.05E-07	1.01E-08	Avg. MeV	
Am-241	3.1429E-03	190.92	381.84	0.00E+00	6.00E-01	1.20E+00	0.0150	3.827E+13
Am-242m	1.3195E-06	190.92	381.84	0.00E+00	2.52E-04	5.04E-04	0.0250	7.985E+12
Am-243	1.4753E-07	190.92	381.84	0.00E+00	2.82E-05	5.63E-05	0.0375	6.901E+12
C-14	1.2847E-04	190.92	381.84	0.00E+00	2.45E-02	4.91E-02	0.0575	7.424E+12
Cl-36	2.8120E-06	190.92	381.84	0.00E+00	5.37E-04	1.07E-03	0.0850	4.482E+12
Cm-243	1.2465E-07	190.92	381.84	0.00E+00	2.38E-05	4.76E-05	0.1250	2.929E+12
Cm-244	9.5564E-07	190.92	381.84	0.00E+00	1.82E-04	3.65E-04	0.2250	3.848E+12
Co-60	1.7880E-01	190.92	381.84	0.00E+00	3.41E+01	6.83E+01	0.3750	1.687E+12
Cs-134	5.8692E-04	190.92	381.84	0.00E+00	1.12E-01	2.24E-01	0.5750	2.774E+13
Cs-135	3.2195E-05	190.92	381.84	0.00E+00	6.15E-03	1.23E-02	0.8500	3.127E+11
Cs-137	1.9489E+00	190.92	381.84	0.00E+00	3.72E+02	7.44E+02	1.2500	5.181E+12
Eu-154	4.5895E-03	190.92	381.84	0.00E+00	8.76E-01	1.75E+00	1.7500	8.033E+09
Eu-155	3.6045E-03	190.92	381.84	0.00E+00	6.88E-01	1.38E+00	2.2500	2.787E+07
Fe-55	1.4185E-02	190.92	381.84	0.00E+00	2.71E+00	5.42E+00	2.7500	3.049E+05
H-3	4.7895E-03	190.92	381.84	0.00E+00	9.14E-01	1.83E+00	3.5000	1.714E+03
I-129	7.3684E-07	190.92	381.84	0.00E+00	1.41E-04	2.81E-04	5.0000	2.105E+02
Kr-85	9.5820E-02	190.92	381.84	0.00E+00	1.83E+01	3.66E+01	7.0000	2.388E+01
Np-237	1.2552E-06	190.92	381.84	0.00E+00	2.40E-04	4.79E-04	11.0000	2.709E+00
Pa-231	7.0406E-09	190.92	381.84	0.00E+00	1.34E-06	2.69E-06		
Pb-210	5.8000E-14	190.92	381.84	0.00E+00	1.11E-11	2.21E-11		
Pm-147	4.0075E-02	190.92	381.84	0.00E+00	7.65E+00	1.53E+01		
Pu-238	9.2256E-04	190.92	381.84	0.00E+00	1.78E-01	3.52E-01		
Pu-239	5.5278E-03	190.92	381.84	0.00E+00	1.06E+00	2.11E+00		
Pu-240	2.1248E-03	190.92	381.84	0.00E+00	4.06E-01	8.11E-01		
Pu-241	4.9549E-02	190.92	381.84	0.00E+00	9.46E+00	1.89E+01		
Pu-242	2.3128E-07	190.92	381.84	0.00E+00	4.42E-05	8.83E-05		
Ra-226	2.4526E-13	190.92	381.84	0.00E+00	4.68E-11	9.37E-11		
Ra-228	2.4015E-10	190.92	381.84	0.00E+00	4.58E-08	9.17E-08		
Ru-106	3.0602E-06	190.92	381.84	0.00E+00	5.84E-04	1.17E-03		
Se-79	1.3015E-05	190.92	381.84	0.00E+00	2.48E-03	4.97E-03		
Sn-126	1.2165E-05	190.92	381.84	0.00E+00	2.32E-03	4.65E-03		
Sr-90	1.8226E+00	190.92	381.84	0.00E+00	3.48E+02	6.96E+02		
Tc-99	4.4241E-04	190.92	381.84	0.00E+00	8.45E-02	1.69E-01		
Th-229	3.0962E-10	190.92	381.84	0.00E+00	5.91E-08	1.18E-07		
Th-230	4.2346E-11	190.92	381.84	0.00E+00	8.08E-09	1.62E-08		
Th-232	2.5278E-10	190.92	381.84	0.00E+00	4.83E-08	9.65E-08		
Ti-206	1.5820E-08	190.92	381.84	0.00E+00	3.02E-06	6.04E-06		
U-232	4.2647E-08	190.92	381.84	0.00E+00	8.14E-06	1.63E-05		
U-233	1.2211E-07	190.92	381.84	0.00E+00	2.33E-05	4.66E-05	Thermal Power	
U-234	1.9955E-07	190.92	381.84	0.00E+00	3.81E-05	7.62E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	2.6194E-06	190.92	0.00	8.43E-03	7.93E-03	8.43E-03	4.78E+00	9.55E+00
U-236	1.2693E-05	190.92	381.84	0.00E+00	2.42E-03	4.85E-03		
U-238	3.6331E-08	190.92	0.00	5.24E-03	5.24E-03	5.24E-03	Total	Total
Y-90	1.8241E+00	190.92	381.84	0.00E+00	3.48E+02	6.97E+02		
Other Radionuclides					3.68E+02	7.35E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		190.92
Bounding:		381.84

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/ Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 TURKEY
SNF ID #: 450
Fuel Units & Descr: 79 - ELEMENT
Heavy Metal Mass: BOL=15.405kg; EOL=15.247kg
ROD Storage Site: INEEL

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000185
Template Decay Time: 20 years

Estimated
Canister usage:
16"x10"
0.71

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	150.83	301.66	0.00E+00	3.99E-07	7.97E-07	Avg. MeV	
Am-241	3.1429E-03	150.83	301.66	0.00E+00	4.74E-01	9.48E-01	0.0150	3.023E+13
Am-242m	1.3195E-06	150.83	301.66	0.00E+00	1.99E-04	3.98E-04	0.0250	6.293E+12
Am-243	1.4753E-07	150.83	301.66	0.00E+00	2.23E-05	4.45E-05	0.0375	5.451E+12
C-14	1.2847E-04	150.83	301.66	0.00E+00	1.94E-02	3.88E-02	0.0575	5.865E+12
Cl-36	2.8120E-06	150.83	301.66	0.00E+00	4.24E-04	8.48E-04	0.0850	3.540E+12
Cm-243	1.2465E-07	150.83	301.66	0.00E+00	1.88E-05	3.76E-05	0.1250	2.314E+12
Cm-244	9.5564E-07	150.83	301.66	0.00E+00	1.44E-04	2.88E-04	0.2250	3.040E+12
Co-60	1.7880E-01	150.83	301.66	0.00E+00	2.70E+01	5.39E+01	0.3750	1.332E+12
Cs-134	5.8692E-04	150.83	301.66	0.00E+00	8.85E-02	1.77E-01	0.5750	2.191E+13
Cs-135	3.2195E-05	150.83	301.66	0.00E+00	4.86E-03	9.71E-03	0.8500	2.470E+11
Cs-137	1.9489E+00	150.83	301.66	0.00E+00	2.94E+02	5.88E+02	1.2500	4.093E+12
Eu-154	4.5895E-03	150.83	301.66	0.00E+00	6.82E-01	1.38E+00	1.7500	6.346E+09
Eu-155	3.6045E-03	150.83	301.66	0.00E+00	5.44E-01	1.09E+00	2.2500	2.186E+07
Fe-55	1.4185E-02	150.83	301.66	0.00E+00	2.14E+00	4.28E+00	2.7500	2.408E+05
H-3	4.7895E-03	150.83	301.66	0.00E+00	7.22E-01	1.44E+00	3.5000	1.354E+03
I-129	7.3684E-07	150.83	301.66	0.00E+00	1.11E-04	2.22E-04	5.0000	1.663E+02
Kr-85	9.5820E-02	150.83	301.66	0.00E+00	1.45E+01	2.89E+01	7.0000	1.880E+01
Np-237	1.2552E-06	150.83	301.66	0.00E+00	1.89E-04	3.79E-04	11.0000	2.140E+00
Pa-231	7.0406E-09	150.83	301.66	0.00E+00	1.06E-06	2.12E-06		
Pb-210	5.8000E-14	150.83	301.66	0.00E+00	8.75E-12	1.75E-11		
Pm-147	4.0075E-02	150.83	301.66	0.00E+00	6.04E+00	1.21E+01		
Pu-238	9.2256E-04	150.83	301.66	0.00E+00	1.39E-01	2.78E-01		
Pu-239	5.5278E-03	150.83	301.66	0.00E+00	8.34E-01	1.67E+00		
Pu-240	2.1248E-03	150.83	301.66	0.00E+00	3.20E-01	6.41E-01		
Pu-241	4.8549E-02	150.83	301.66	0.00E+00	7.47E+00	1.49E+01		
Pu-242	2.3128E-07	150.83	301.66	0.00E+00	3.49E-05	6.98E-05		
Ra-226	2.4526E-13	150.83	301.66	0.00E+00	3.70E-11	7.40E-11		
Ra-228	2.4015E-10	150.83	301.66	0.00E+00	3.62E-08	7.24E-08		
Ru-106	3.0602E-06	150.83	301.66	0.00E+00	4.62E-04	9.23E-04		
Se-79	1.3015E-05	150.83	301.66	0.00E+00	1.96E-03	3.93E-03		
Sn-126	1.2165E-05	150.83	301.66	0.00E+00	1.83E-03	3.67E-03		
Sr-90	1.8226E+00	150.83	301.66	0.00E+00	2.75E+02	5.50E+02		
Tc-99	4.4241E-04	150.83	301.66	0.00E+00	6.67E-02	1.33E-01		
Th-229	3.0962E-10	150.83	301.66	0.00E+00	4.67E-08	9.34E-08		
Th-230	4.2346E-11	150.83	301.66	0.00E+00	6.39E-09	1.28E-08		
Th-232	2.5278E-10	150.83	301.66	0.00E+00	3.81E-08	7.63E-08		
Ti-208	1.5820E-08	150.83	301.66	0.00E+00	2.39E-06	4.77E-06		
U-232	4.2647E-08	150.83	301.66	0.00E+00	6.43E-06	1.29E-05		
U-233	1.2211E-07	150.83	301.66	0.00E+00	1.84E-05	3.68E-05		
U-234	1.9955E-07	150.83	301.66	0.00E+00	3.01E-05	6.02E-05		
U-235	-2.6194E-06	150.83	0.00	6.66E-03	6.26E-03	6.66E-03		
U-236	1.2693E-05	150.83	301.66	0.00E+00	1.91E-03	3.83E-03		
U-238	-3.6331E-08	150.83	0.00	4.14E-03	4.14E-03	4.14E-03		
Y-90	1.8241E+00	150.83	301.66	0.00E+00	2.75E+02	5.50E+02		
Other Radionuclides					2.90E+02	5.81E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		150.83
Bounding:		301.66

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF AZ
SNF ID #: 59
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16.38kg; EOL=15.75kg
RCD 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"
0.76

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	601.40	1,202.81	0.00E+00	5.12E-07	1.02E-06	Avg. MeV	
Am-241	1.8331E-03	601.40	1,202.81	0.00E+00	1.10E+00	2.20E+00	0.0150	1.944E+14
Am-242m	1.4129E-06	601.40	1,202.81	0.00E+00	8.50E-04	1.70E-03	0.0250	4.278E+13
Am-243	1.4774E-07	601.40	1,202.81	0.00E+00	8.89E-05	1.78E-04	0.0375	3.643E+13
C-14	1.2871E-04	601.40	1,202.81	0.00E+00	7.74E-02	1.55E-01	0.0675	3.739E+13
Cl-36	2.8120E-06	601.40	1,202.81	0.00E+00	1.69E-03	3.38E-03	0.0850	2.316E+13
Cm-243	1.7940E-07	601.40	1,202.81	0.00E+00	1.08E-04	2.16E-04	0.1250	1.682E+13
Cm-244	1.6962E-06	601.40	1,202.81	0.00E+00	1.02E-03	2.04E-03	0.2250	1.965E+13
Co-60	1.2839E+00	601.40	1,202.81	0.00E+00	7.72E+02	1.54E+03	0.3750	9.972E+12
Cs-134	9.0541E-02	601.40	1,202.81	0.00E+00	5.45E+01	1.09E+02	0.5750	1.326E+14
Cs-135	3.2195E-05	601.40	1,202.81	0.00E+00	1.94E-02	3.87E-02	0.8500	5.890E+12
Cs-137	2.7564E+00	601.40	1,202.81	0.00E+00	1.66E+03	3.32E+03	1.2500	1.155E+14
Eu-154	1.5368E-02	601.40	1,202.81	0.00E+00	9.24E+00	1.85E+01	1.7500	7.702E+10
Eu-155	2.9293E-02	601.40	1,202.81	0.00E+00	1.76E+01	3.52E+01	2.2500	1.241E+11
Fe-55	7.7158E-01	601.40	1,202.81	0.00E+00	4.64E+02	9.28E+02	2.7500	9.852E+08
H-3	1.1111E-02	601.40	1,202.81	0.00E+00	6.68E+00	1.34E+01	3.5000	1.147E+08
I-129	7.3684E-07	601.40	1,202.81	0.00E+00	4.43E-04	8.86E-04	5.0000	6.405E+02
Kr-85	2.5263E-01	601.40	1,202.81	0.00E+00	1.52E+02	3.04E+02	7.0000	7.251E+01
Np-237	1.2427E-06	601.40	1,202.81	0.00E+00	7.47E-04	1.49E-03	11.0000	8.260E+00
Pa-231	3.8511E-09	601.40	1,202.81	0.00E+00	2.32E-08	4.63E-08		
Pb-210	7.3880E-15	601.40	1,202.81	0.00E+00	4.44E-12	8.89E-12		
Pm-147	2.1023E+00	601.40	1,202.81	0.00E+00	1.26E+03	2.53E+03		
Pu-238	1.0383E-03	601.40	1,202.81	0.00E+00	6.24E-01	1.25E+00		
Pu-239	5.5293E-03	601.40	1,202.81	0.00E+00	3.33E+00	6.66E+00		
Pu-240	2.1278E-03	601.40	1,202.81	0.00E+00	1.28E+00	2.56E+00		
Pu-241	1.0195E-01	601.40	1,202.81	0.00E+00	6.13E+01	1.23E+02		
Pu-242	2.3128E-07	601.40	1,202.81	0.00E+00	1.39E-04	2.78E-04		
Ra-226	5.2782E-14	601.40	1,202.81	0.00E+00	3.17E-11	6.35E-11		
Ra-228	1.9338E-10	601.40	1,202.81	0.00E+00	1.16E-07	2.33E-07		
Ru-106	9.1684E-02	601.40	1,202.81	0.00E+00	5.51E+01	1.10E+02		
Se-79	1.3018E-05	601.40	1,202.81	0.00E+00	7.83E-03	1.57E-02		
Sn-126	1.2167E-05	601.40	1,202.81	0.00E+00	7.32E-03	1.46E-02		
Sr-90	2.6045E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03		
Tc-99	4.4241E-04	601.40	1,202.81	0.00E+00	2.66E-01	5.32E-01		
Th-229	1.3713E-10	601.40	1,202.81	0.00E+00	8.25E-08	1.65E-07		
Th-230	1.8090E-11	601.40	1,202.81	0.00E+00	1.09E-08	2.18E-08		
Th-232	2.5278E-10	601.40	1,202.81	0.00E+00	1.52E-07	3.04E-07		
Ti-206	1.6947E-08	601.40	1,202.81	0.00E+00	1.02E-05	2.04E-05		
U-232	4.8737E-08	601.40	1,202.81	0.00E+00	2.93E-05	5.86E-05		
U-233	1.2203E-07	601.40	1,202.81	0.00E+00	7.34E-05	1.47E-04		
U-234	1.5825E-07	601.40	1,202.81	0.00E+00	9.58E-05	1.92E-04		
U-235	-2.6194E-08	601.40	0.00	7.08E-03	5.50E-03	7.08E-03		
U-236	1.2693E-05	601.40	1,202.81	0.00E+00	7.63E-03	1.53E-02		
U-238	-3.6331E-08	601.40	0.00	4.40E-03	4.38E-03	4.40E-03		
Y-90	2.6060E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03		
Other Radionuclides					2.17E+03	4.34E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		601.40
Bounding:		1,202.81

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.08	
Bounding:	2.15	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF AZ
SNF ID #: 875
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=1.497kg; EOL=1.497kg
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"
0.07

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	8.5173E-10	28.58	57.15	0.00E+00	2.43E-08	4.87E-08	Avg. MeV	
Am-241	1.8331E-03	28.58	57.15	0.00E+00	5.24E-02	1.05E-01	0.0150	9.238E+12
Am-242m	1.4129E-06	28.58	57.15	0.00E+00	4.04E-05	8.08E-05	0.0250	2.033E+12
Am-243	1.4774E-07	28.58	57.15	0.00E+00	4.22E-06	8.44E-06	0.0375	1.731E+12
C-14	1.2871E-04	28.58	57.15	0.00E+00	3.68E-03	7.36E-03	0.0575	1.777E+12
Cl-36	2.8120E-06	28.58	57.15	0.00E+00	8.04E-05	1.61E-04	0.0850	1.101E+12
Cm-243	1.7940E-07	28.58	57.15	0.00E+00	5.13E-06	1.03E-05	0.1250	7.993E+11
Cm-244	1.8962E-06	28.58	57.15	0.00E+00	4.85E-05	9.69E-05	0.2250	9.337E+11
Co-60	1.2839E+00	28.58	57.15	0.00E+00	3.67E+01	7.34E+01	0.3750	4.738E+11
Cs-134	9.0541E-02	28.58	57.15	0.00E+00	2.59E+00	5.17E+00	0.5750	6.299E+12
Cs-135	3.2195E-05	28.58	57.15	0.00E+00	9.20E-04	1.84E-03	0.8500	2.704E+11
Cs-137	2.7564E+00	28.58	57.15	0.00E+00	7.88E+01	1.58E+02	1.2500	5.491E+12
Eu-154	1.5368E-02	28.58	57.15	0.00E+00	4.39E-01	8.78E-01	1.7500	3.860E+09
Eu-155	2.9293E-02	28.58	57.15	0.00E+00	8.37E-01	1.67E+00	2.2500	5.899E+09
Fe-55	7.7158E-01	28.58	57.15	0.00E+00	2.20E+01	4.41E+01	2.7500	4.681E+07
H-3	1.1111E-02	28.58	57.15	0.00E+00	3.18E-01	6.35E-01	3.5000	5.448E+06
I-129	7.3684E-07	28.58	57.15	0.00E+00	2.11E-05	4.21E-05	5.0000	3.090E+01
Kr-85	2.5263E-01	28.58	57.15	0.00E+00	7.22E+00	1.44E+01	7.0000	3.499E+00
Np-237	1.2427E-06	28.58	57.15	0.00E+00	3.55E-05	7.10E-05	11.0000	3.967E-01
Pa-231	3.8511E-09	28.58	57.15	0.00E+00	1.10E-07	2.20E-07		
Pb-210	7.3880E-15	28.58	57.15	0.00E+00	2.11E-13	4.22E-13		
Pm-147	2.1023E+00	28.58	57.15	0.00E+00	6.01E+01	1.20E+02		
Pu-238	1.0383E-03	28.58	57.15	0.00E+00	2.97E-02	5.93E-02		
Pu-239	5.5293E-03	28.58	57.15	0.00E+00	1.58E-01	3.16E-01		
Pu-240	2.1278E-03	28.58	57.15	0.00E+00	6.08E-02	1.22E-01		
Pu-241	1.0195E-01	28.58	57.15	0.00E+00	2.91E+00	5.83E+00		
Pu-242	2.3128E-07	28.58	57.15	0.00E+00	6.61E-06	1.32E-05		
Ra-226	5.2782E-14	28.58	57.15	0.00E+00	1.51E-12	3.02E-12		
Ra-228	1.9338E-10	28.58	57.15	0.00E+00	5.53E-09	1.11E-08		
Ru-106	9.1684E-02	28.58	57.15	0.00E+00	2.62E+00	5.24E+00		
Se-79	1.3018E-05	28.58	57.15	0.00E+00	3.72E-04	7.44E-04		
Sn-126	1.2167E-05	28.58	57.15	0.00E+00	3.48E-04	6.95E-04		
Sr-90	2.6045E+00	28.58	57.15	0.00E+00	7.44E+01	1.49E+02		
Tc-99	4.4241E-04	28.58	57.15	0.00E+00	1.26E-02	2.53E-02		
Th-229	1.3713E-10	28.58	57.15	0.00E+00	3.92E-09	7.84E-09		
Th-230	1.8090E-11	28.58	57.15	0.00E+00	5.17E-10	1.03E-09		
Th-232	2.5278E-10	28.58	57.15	0.00E+00	7.22E-09	1.44E-08		
Ti-208	1.6947E-08	28.58	57.15	0.00E+00	4.84E-07	9.69E-07		
U-232	4.8737E-08	28.58	57.15	0.00E+00	1.39E-06	2.79E-06		
U-233	1.2203E-07	28.58	57.15	0.00E+00	3.49E-06	6.97E-06		
U-234	1.5925E-07	28.58	57.15	0.00E+00	4.55E-06	9.10E-06		
U-235	-2.6194E-06	28.58	0.00	5.95E-04	5.20E-04	5.95E-04		
U-236	1.2693E-05	28.58	57.15	0.00E+00	3.63E-04	7.25E-04		
U-238	-3.6331E-08	28.58	0.00	4.11E-04	4.09E-04	4.11E-04		
Y-90	2.6060E+00	28.58	57.15	0.00E+00	7.45E+01	1.49E+02		
Other Radionuclides					1.03E+02	2.06E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			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 %:	18.3974673	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		28.58	
Bounding:		57.15	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF IL
 SNF ID #: 449
 Fuel Units & Descr: 139 - ELEMENT
 Heavy Metal Mass: BOL=27.8kg; EOL=26.41kg
 ROD Storage Site: INEEL

Fuel decay start date: 2035
 Estimates as of: 2030
 Template: TRIGA-SS (LW/J-Zr, SST, 10 to 20% U)
 Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 1.25

II. Estimates

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources
							Photon Energy Group Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,326.90	2,653.81	0.00E+00	1.13E-06	2.26E-06	Avg. MeV
Am-241	1.8331E-03	1,326.90	2,653.81	0.00E+00	2.43E+00	4.86E+00	0.0150 4.289E+14
Am-242m	1.4129E-06	1,326.90	2,653.81	0.00E+00	1.87E-03	3.75E-03	0.0250 9.436E+13
Am-243	1.4774E-07	1,326.90	2,653.81	0.00E+00	1.96E-04	3.92E-04	0.0375 8.037E+13
C-14	1.2871E-04	1,326.90	2,653.81	0.00E+00	1.71E-01	3.42E-01	0.0575 8.250E+13
Cl-36	2.8120E-06	1,326.90	2,653.81	0.00E+00	3.73E-03	7.46E-03	0.0850 5.111E+13
Cm-243	1.7940E-07	1,326.90	2,653.81	0.00E+00	2.38E-04	4.76E-04	0.1250 3.711E+13
Cm-244	1.6962E-06	1,326.90	2,653.81	0.00E+00	2.25E-03	4.50E-03	0.2250 4.336E+13
Co-60	1.2839E+00	1,326.90	2,653.81	0.00E+00	1.70E+03	3.41E+03	0.3750 2.200E+13
Cs-134	9.0541E-02	1,326.90	2,653.81	0.00E+00	1.20E+02	2.40E+02	0.5750 2.925E+13
Cs-135	3.2195E-05	1,326.90	2,653.81	0.00E+00	4.27E-02	8.54E-02	0.8500 1.256E+13
Cs-137	2.7564E+00	1,326.90	2,653.81	0.00E+00	3.66E+03	7.31E+03	1.2500 2.549E+14
Eu-154	1.5368E-02	1,326.90	2,653.81	0.00E+00	2.04E+01	4.08E+01	1.7500 1.699E+11
Eu-155	2.9293E-02	1,326.90	2,653.81	0.00E+00	3.89E+01	7.77E+01	2.2500 2.739E+11
Fe-55	7.7158E-01	1,326.90	2,653.81	0.00E+00	1.02E+03	2.05E+03	2.7500 2.174E+09
H-3	1.1111E-02	1,326.90	2,653.81	0.00E+00	1.47E+01	2.95E+01	3.5000 2.530E+08
I-129	7.3684E-07	1,326.90	2,653.81	0.00E+00	9.78E-04	1.96E-03	5.0000 1.408E+03
Kr-85	2.5263E-01	1,326.90	2,653.81	0.00E+00	3.35E+02	6.70E+02	7.0000 1.594E+02
Np-237	1.2427E-06	1,326.90	2,653.81	0.00E+00	1.65E-03	3.30E-03	11.0000 1.816E+01
Pb-210	3.8511E-09	1,326.90	2,653.81	0.00E+00	5.11E-06	1.02E-05	
Pb-210	7.3880E-15	1,326.90	2,653.81	0.00E+00	9.80E-12	1.96E-11	
Pm-147	2.1023E+00	1,326.90	2,653.81	0.00E+00	2.79E+03	5.58E+03	
Pu-238	1.0383E-03	1,326.90	2,653.81	0.00E+00	1.38E+00	2.76E+00	
Pu-239	5.5293E-03	1,326.90	2,653.81	0.00E+00	7.34E+00	1.47E+01	
Pu-240	2.1278E-03	1,326.90	2,653.81	0.00E+00	2.82E+00	5.65E+00	
Pu-241	1.0195E-01	1,326.90	2,653.81	0.00E+00	1.35E+02	2.71E+02	
Pu-242	2.3128E-07	1,326.90	2,653.81	0.00E+00	3.07E-04	6.14E-04	
Ra-226	5.2782E-14	1,326.90	2,653.81	0.00E+00	7.00E-11	1.40E-10	
Ra-228	1.9338E-10	1,326.90	2,653.81	0.00E+00	2.57E-07	5.13E-07	
Ra-108	9.1684E-02	1,326.90	2,653.81	0.00E+00	1.22E+02	2.43E+02	
Se-79	1.3018E-05	1,326.90	2,653.81	0.00E+00	1.73E-02	3.45E-02	
Sn-126	1.2167E-05	1,326.90	2,653.81	0.00E+00	1.61E-02	3.23E-02	
Sr-90	2.6045E+00	1,326.90	2,653.81	0.00E+00	3.46E+03	6.91E+03	
Tc-99	4.4241E-04	1,326.90	2,653.81	0.00E+00	5.87E-01	1.17E+00	
Th-229	1.3713E-10	1,326.90	2,653.81	0.00E+00	1.82E-07	3.64E-07	
Th-230	1.8090E-11	1,326.90	2,653.81	0.00E+00	2.40E-08	4.80E-08	
Th-232	2.5278E-10	1,326.90	2,653.81	0.00E+00	3.35E-07	6.71E-07	
Ti-208	1.6947E-08	1,326.90	2,653.81	0.00E+00	2.25E-05	4.50E-05	
U-232	4.8737E-08	1,326.90	2,653.81	0.00E+00	6.47E-05	1.29E-04	
U-233	1.2203E-07	1,326.90	2,653.81	0.00E+00	1.62E-04	3.24E-04	
U-234	1.5925E-07	1,326.90	2,653.81	0.00E+00	2.11E-04	4.23E-04	
U-235	-2.6194E-06	1,326.90	0.00	1.20E-02	8.54E-03	1.20E-02	
U-236	1.2693E-05	1,326.90	2,653.81	0.00E+00	1.68E-02	3.37E-02	
U-238	-3.6331E-08	1,326.90	0.00	7.47E-03	7.43E-03	7.47E-03	
Y-90	2.6060E+00	1,326.90	2,653.81	0.00E+00	3.46E+03	6.92E+03	
Other Radionuclides					4.78E+03	9.57E+03	

Thermal Power
 Nominal Heat Bounding
 Output Heat Output
 (Watts) (Watts)
 7.72E+01 1.54E+02
 Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Claddings:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		1,326.90
Bounding:		2,653.81

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF TX AUSTIN
 SNF ID #: 265
 Fuel Units & Descr: 156 - ELEMENT
 Heavy Metal Mass: BOL=30.124kg; EOL=29.765kg
 ROD Storage Site: INEL

Fuel decay start date: 2035
 Estimates as of: 2030
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 1.41

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	342.51	685.03	0.00E+00	2.92E-07	5.83E-07	Avg. MeV	
Am-241	1.8331E-03	342.51	685.03	0.00E+00	6.28E-01	1.26E+00	0.0150	1.107E+14
Am-242m	1.4129E-06	342.51	685.03	0.00E+00	4.84E-04	9.68E-04	0.0250	2.436E+13
Am-243	1.4774E-07	342.51	685.03	0.00E+00	5.06E-05	1.01E-04	0.0375	2.075E+13
C-14	1.2871E-04	342.51	685.03	0.00E+00	4.41E-02	8.82E-02	0.0575	2.129E+13
Cl-36	2.8120E-06	342.51	685.03	0.00E+00	9.63E-04	1.93E-03	0.0850	1.319E+13
Cm-243	1.7940E-07	342.51	685.03	0.00E+00	6.14E-05	1.23E-04	0.1250	9.580E+12
Cm-244	1.6962E-06	342.51	685.03	0.00E+00	5.81E-04	1.16E-03	0.2250	1.119E+13
Co-60	1.2839E+00	342.51	685.03	0.00E+00	4.40E+02	8.80E+02	0.3750	5.679E+12
Cs-134	9.0541E-02	342.51	685.03	0.00E+00	3.10E+01	6.20E+01	0.5750	7.550E+13
Cs-135	3.2195E-05	342.51	685.03	0.00E+00	1.10E-02	2.21E-02	0.8500	3.240E+12
Cs-137	2.7564E+00	342.51	685.03	0.00E+00	9.44E+02	1.89E+03	1.2500	6.581E+13
Eu-154	1.5368E-02	342.51	685.03	0.00E+00	5.26E+00	1.05E+01	1.7500	4.387E+10
Eu-155	2.9293E-02	342.51	685.03	0.00E+00	1.00E+01	2.01E+01	2.2500	7.071E+10
Fe-55	7.7158E-01	342.51	685.03	0.00E+00	2.84E+02	5.29E+02	2.7500	5.811E+08
H-3	1.1111E-02	342.51	685.03	0.00E+00	3.81E+00	7.61E+00	3.5000	6.530E+07
I-129	7.3684E-07	342.51	685.03	0.00E+00	2.52E-04	5.05E-04	5.0000	3.778E+02
Kr-85	2.5263E-01	342.51	685.03	0.00E+00	8.65E+01	1.73E+02	7.0000	4.279E+01
Np-237	1.2427E-06	342.51	685.03	0.00E+00	4.26E-04	8.51E-04	11.0000	4.876E+00
Pa-231	3.8511E-09	342.51	685.03	0.00E+00	1.32E-06	2.64E-06		
Pb-210	7.3880E-15	342.51	685.03	0.00E+00	2.53E-12	5.06E-12		
Pm-147	2.1023E+00	342.51	685.03	0.00E+00	7.20E+02	1.44E+03		
Pu-238	1.0383E-03	342.51	685.03	0.00E+00	3.56E-01	7.11E-01		
Pu-239	5.5293E-03	342.51	685.03	0.00E+00	1.89E+00	3.79E+00		
Pu-240	2.1278E-03	342.51	685.03	0.00E+00	7.29E-01	1.46E+00		
Pu-241	1.0195E-01	342.51	685.03	0.00E+00	3.49E+01	6.98E+01		
Pu-242	2.3128E-07	342.51	685.03	0.00E+00	7.92E-05	1.58E-04		
Ra-226	5.2782E-14	342.51	685.03	0.00E+00	1.81E-11	3.62E-11		
Ra-228	1.9338E-10	342.51	685.03	0.00E+00	6.62E-08	1.32E-07		
Ru-106	9.1684E-02	342.51	685.03	0.00E+00	3.14E+01	6.28E+01		
Se-79	1.3018E-05	342.51	685.03	0.00E+00	4.46E-03	8.92E-03		
Sn-126	1.2167E-05	342.51	685.03	0.00E+00	4.17E-03	8.33E-03		
Sr-90	2.6045E+00	342.51	685.03	0.00E+00	8.92E+02	1.78E+03		
Tc-99	4.4241E-04	342.51	685.03	0.00E+00	1.52E-01	3.03E-01		
Th-229	1.3713E-10	342.51	685.03	0.00E+00	4.70E-08	9.39E-08		
Th-230	1.8090E-11	342.51	685.03	0.00E+00	6.20E-09	1.24E-08		
Th-232	2.5278E-10	342.51	685.03	0.00E+00	8.66E-08	1.73E-07		
Ti-208	1.6947E-08	342.51	685.03	0.00E+00	5.80E-06	1.16E-05		
U-232	4.8737E-08	342.51	685.03	0.00E+00	1.67E-05	3.34E-05	Thermal Power	
U-233	1.2203E-07	342.51	685.03	0.00E+00	4.18E-05	8.36E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	342.51	685.03	0.00E+00	5.45E-05	1.09E-04	1.89E+01	3.89E+01
U-235	-2.6194E-06	342.51	0.00	1.29E-02	1.20E-02	1.29E-02	Total	Total
U-236	1.2693E-05	342.51	685.03	0.00E+00	4.35E-03	8.70E-03		
U-238	-3.6331E-08	342.51	0.00	8.12E-03	8.11E-03	8.12E-03		
Y-90	2.6060E+00	342.51	685.03	0.00E+00	8.93E+02	1.79E+03		
Other Radionuclides					1.23E+03	2.47E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
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 %:	19.78958118	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		342.51 685.03	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	0.33 0.67		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF UTAH
 SNF ID #: 261
 Fuel Units & Descr: 85 - ELEMENT
 Heavy Metal Mass: BOL=14.773kg; EOL=14.518kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 2035
 Estimate 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"
 0.77

II. Estimates	m	X ₀	X ₀	b	Y ₀	Y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	243.42	486.85	0.00E+00	2.07E-07	4.15E-07	Avg. MeV	
Am-241	1.8331E-03	243.42	486.85	0.00E+00	4.46E-01	8.92E-01	0.0150	7.869E+13
Am-242m	1.4129E-06	243.42	486.85	0.00E+00	3.44E-04	6.88E-04	0.0250	1.731E+13
Am-243	1.4774E-07	243.42	486.85	0.00E+00	3.60E-05	7.19E-05	0.0375	1.474E+13
C-14	1.2871E-04	243.42	486.85	0.00E+00	3.13E-02	6.27E-02	0.0575	1.513E+13
Cl-36	2.8120E-06	243.42	486.85	0.00E+00	6.85E-04	1.37E-03	0.0850	9.378E+12
Cm-243	1.7940E-07	243.42	486.85	0.00E+00	4.37E-05	8.73E-05	0.1250	6.809E+12
Cm-244	1.6962E-06	243.42	486.85	0.00E+00	4.13E-04	8.26E-04	0.2250	7.954E+12
Co-60	1.2839E+00	243.42	486.85	0.00E+00	3.13E+02	6.25E+02	0.3750	4.038E+12
Cs-134	9.0541E-02	243.42	486.85	0.00E+00	2.20E+01	4.41E+01	0.5750	5.366E+13
Cs-135	3.2195E-05	243.42	486.85	0.00E+00	7.84E-03	1.57E-02	0.8500	2.303E+12
Cs-137	2.7564E+00	243.42	486.85	0.00E+00	6.71E+02	1.34E+03	1.2500	4.677E+13
Eu-154	1.5368E-02	243.42	486.85	0.00E+00	3.74E+00	7.48E+00	1.7500	3.118E+10
Eu-155	2.9293E-02	243.42	486.85	0.00E+00	7.13E+00	1.43E+01	2.2500	5.025E+10
Fe-55	7.7158E-01	243.42	486.85	0.00E+00	1.88E+02	3.76E+02	2.7500	3.988E+08
H-3	1.1111E-02	243.42	486.85	0.00E+00	2.70E+00	5.41E+00	3.5000	4.641E+07
I-129	7.3684E-07	243.42	486.85	0.00E+00	1.79E-04	3.59E-04	5.0000	2.643E+02
Kr-85	2.5263E-01	243.42	486.85	0.00E+00	6.15E+01	1.23E+02	7.0000	2.993E+01
Np-237	1.2427E-06	243.42	486.85	0.00E+00	3.03E-04	6.05E-04	11.0000	3.411E+00
Pa-231	3.8511E-09	243.42	486.85	0.00E+00	9.37E-07	1.87E-06		
Pb-210	7.3880E-15	243.42	486.85	0.00E+00	1.80E-12	3.60E-12		
Pm-147	2.1023E+00	243.42	486.85	0.00E+00	5.12E+02	1.02E+03		
Pu-238	1.0383E-03	243.42	486.85	0.00E+00	2.53E-01	5.06E-01		
Pu-239	5.5293E-03	243.42	486.85	0.00E+00	1.35E+00	2.69E+00		
Pu-240	2.1278E-03	243.42	486.85	0.00E+00	5.18E-01	1.04E+00		
Pu-241	1.0195E-01	243.42	486.85	0.00E+00	2.48E+01	4.96E+01		
Pu-242	2.3128E-07	243.42	486.85	0.00E+00	5.63E-05	1.13E-04		
Ra-226	5.2782E-14	243.42	486.85	0.00E+00	1.28E-11	2.57E-11		
Ra-228	1.9338E-10	243.42	486.85	0.00E+00	4.71E-08	9.41E-08		
Ru-106	9.1684E-02	243.42	486.85	0.00E+00	2.23E+01	4.46E+01		
Se-79	1.3018E-05	243.42	486.85	0.00E+00	3.17E-03	6.34E-03		
Sn-126	1.2167E-05	243.42	486.85	0.00E+00	2.96E-03	5.92E-03		
Sr-90	2.6045E+00	243.42	486.85	0.00E+00	6.34E+02	1.27E+03		
Tc-99	4.4241E-04	243.42	486.85	0.00E+00	1.08E-01	2.15E-01		
Th-229	1.3713E-10	243.42	486.85	0.00E+00	3.34E-08	6.68E-08		
Th-230	1.8090E-11	243.42	486.85	0.00E+00	4.40E-09	8.81E-09		
Th-232	2.5278E-10	243.42	486.85	0.00E+00	6.15E-08	1.23E-07		
Th-208	1.6947E-08	243.42	486.85	0.00E+00	4.13E-06	8.25E-06		
U-232	4.8737E-08	243.42	486.85	0.00E+00	1.19E-05	2.37E-05		
U-233	1.2203E-07	243.42	486.85	0.00E+00	2.97E-05	5.94E-05		
U-234	1.5925E-07	243.42	486.85	0.00E+00	3.89E-05	7.75E-05		
U-235	-2.6194E-06	243.42	0.00	6.35E-03	5.72E-03	6.35E-03		
U-236	1.2693E-05	243.42	486.85	0.00E+00	3.09E-03	6.18E-03		
U-238	-3.6331E-08	243.42	0.00	3.98E-03	3.97E-03	3.98E-03		
Y-90	2.6060E+00	243.42	486.85	0.00E+00	6.34E+02	1.27E+03		
Other Radionuclides					6.78E+02	1.76E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.899888	10 to 20.1

Basic for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		243.42
Bounding:		486.85

Basic for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.48	
Bounding:	0.97	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UC @ Berkeley
SNF ID #: 874
Fuel Units & Descr: 111 - ELEMENT
Heavy Metal Mass: BOL=21.845kg; EOL=19.17kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1982
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
²Template Burnup (MWd): 8.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
1.00

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.7038E-09	2,362.94	4,725.88	0.00E+00	1.58E-05	3.17E-05	Avg. MeV	
Am-241	3.9068E-03	2,362.94	4,725.88	0.00E+00	9.23E+00	1.85E+01	0.0150	3.299E+14
Am-242m	1.2325E-06	2,362.94	4,725.88	0.00E+00	2.91E-03	5.82E-03	0.0250	6.854E+13
Am-243	1.4732E-07	2,362.94	4,725.88	0.00E+00	3.48E-04	6.96E-04	0.0375	5.955E+13
C-14	1.2824E-04	2,362.94	4,725.88	0.00E+00	3.03E-01	6.06E-01	0.0575	8.418E+13
Ci-36	2.8120E-06	2,362.94	4,725.88	0.00E+00	6.64E-03	1.33E-02	0.0850	3.861E+13
Cm-243	8.8556E-08	2,362.94	4,725.88	0.00E+00	2.05E-04	4.09E-04	0.1250	2.512E+13
Cm-244	5.3835E-07	2,362.94	4,725.88	0.00E+00	1.27E-03	2.54E-03	0.2250	3.325E+13
Co-60	2.4887E-02	2,362.94	4,725.88	0.00E+00	5.88E+01	1.18E+02	0.3750	1.450E+13
Cs-134	3.8030E-06	2,362.94	4,725.88	0.00E+00	8.99E-03	1.80E-02	0.5750	2.425E+14
Cs-135	3.2195E-05	2,362.94	4,725.88	0.00E+00	7.61E-02	1.52E-01	0.8500	2.482E+12
Cs-137	1.3788E+00	2,362.94	4,725.88	0.00E+00	3.26E+03	6.52E+03	1.2500	9.832E+12
Eu-154	1.3711E-03	2,362.94	4,725.88	0.00E+00	3.24E+00	6.48E+00	1.7500	6.442E+10
Eu-155	4.4361E-04	2,362.94	4,725.88	0.00E+00	1.05E+00	2.10E+00	2.2500	5.278E+07
Fe-55	2.6075E-04	2,362.94	4,725.88	0.00E+00	6.18E-01	1.23E+00	2.7500	2.427E+06
H-3	2.0647E-03	2,362.94	4,725.88	0.00E+00	4.88E+00	9.76E+00	3.5000	5.829E+03
I-129	7.3684E-07	2,362.94	4,725.88	0.00E+00	1.74E-03	3.48E-03	5.0000	2.454E+03
Kr-85	3.6346E-02	2,362.94	4,725.88	0.00E+00	8.59E+01	1.72E+02	7.0000	2.768E+02
Np-237	1.2844E-06	2,362.94	4,725.88	0.00E+00	3.03E-03	6.07E-03	11.0000	3.147E+01
Pa-231	1.2352E-08	2,362.94	4,725.88	0.00E+00	2.92E-05	5.84E-05		
Pb-210	3.5338E-13	2,362.94	4,725.88	0.00E+00	8.35E-10	1.67E-09		
Pm-147	7.6346E-04	2,362.94	4,725.88	0.00E+00	1.80E+00	3.61E+00		
Pu-238	8.1970E-04	2,362.94	4,725.88	0.00E+00	1.94E+00	3.87E+00		
Pu-239	5.5248E-03	2,362.94	4,725.88	0.00E+00	1.31E+01	2.61E+01		
Pu-240	2.1203E-03	2,362.94	4,725.88	0.00E+00	5.01E+00	1.00E+01		
Pu-241	2.4075E-02	2,362.94	4,725.88	0.00E+00	5.69E+01	1.14E+02		
Pu-242	2.3128E-07	2,362.94	4,725.88	0.00E+00	5.46E-04	1.09E-03		
Ra-226	9.6481E-13	2,362.94	4,725.88	0.00E+00	2.28E-09	4.56E-09		
Ra-228	2.5188E-10	2,362.94	4,725.88	0.00E+00	5.95E-07	1.19E-06		
Ru-106	1.0214E-10	2,362.94	4,725.88	0.00E+00	2.41E-07	4.83E-07		
Se-79	1.3014E-05	2,362.94	4,725.88	0.00E+00	3.08E-02	6.15E-02		
Sn-126	1.2164E-05	2,362.94	4,725.88	0.00E+00	2.87E-02	5.75E-02		
Sr-90	1.2762E+00	2,362.94	4,725.88	0.00E+00	3.02E+03	6.03E+03		
Tc-99	4.4241E-04	2,362.94	4,725.88	0.00E+00	1.05E+00	2.09E+00		
Th-229	5.9684E-10	2,362.94	4,725.88	0.00E+00	1.41E-06	2.82E-06		
Th-230	9.3880E-11	2,362.94	4,725.88	0.00E+00	2.22E-07	4.44E-07		
Th-232	2.5278E-10	2,362.94	4,725.88	0.00E+00	5.97E-07	1.19E-06		
Ti-208	1.3723E-08	2,362.94	4,725.88	0.00E+00	3.24E-05	6.49E-05		
U-232	3.6932E-08	2,362.94	4,725.88	0.00E+00	8.73E-05	1.75E-04		
U-233	1.2224E-07	2,362.94	4,725.88	0.00E+00	2.89E-04	5.78E-04		
U-234	2.5714E-07	2,362.94	4,725.88	0.00E+00	6.08E-04	1.22E-03		
U-235	-2.6194E-06	2,362.94	0.00	9.35E-03	3.17E-03	9.35E-03		
U-236	1.2695E-05	2,362.94	4,725.88	0.00E+00	3.00E-02	6.00E-02		
U-238	-3.6331E-08	2,362.94	0.00	5.82E-03	5.73E-03	5.82E-03		
Y-90	1.2765E+00	2,362.94	4,725.88	0.00E+00	3.02E+03	6.03E+03		
Other Radionuclides					3.25E+03	6.50E+03		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,362.94	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,725.88	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	3.20		1.00
Bounding:	6.40		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 5/20 UNIV OF MARYLAND
 SWF ID #: 280
 Fuel Units & Design: SS - ELEMENT
 Heavy Metal Mass: BOL-17.205kg; EOL-16.469kg
 ROD Storage Site: NREL

Fuel decay start date:
 Estimate as of: 2035
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)

Template BOL Heavy Metal Mass (MHT): 6.65
 Template Decay Time: 0.000195
 5 years

Estimated
 Canister usage:
 187-110
 0.94

Radionuclide	C/NMND From Template	Nominal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Total Photon/sec (Bouding)
Ac-227	8.5173E-10	683.59	1,367.19	0.00E+00	5.82E-07	1.16E-06	Avg. MW	2.210E+14
Am-241	1.8331E-03	683.59	1,367.19	0.00E+00	1.25E+00	2.51E+00	0.0150	4.862E+13
Am-242m	1.4129E-06	683.59	1,367.19	0.00E+00	9.66E-04	1.93E-03	0.0250	4.141E+13
Am-243	1.4747E-07	683.59	1,367.19	0.00E+00	1.01E-04	2.02E-04	0.0075	4.250E+13
C-14	1.2871E-04	683.59	1,367.19	0.00E+00	8.80E-02	1.76E-01	0.0575	2.633E+13
C-36	2.6120E-06	683.59	1,367.19	0.00E+00	1.92E-03	3.84E-03	0.0850	2.633E+13
Cm-243	1.7940E-07	683.59	1,367.19	0.00E+00	1.23E-04	2.46E-04	0.1250	2.234E+13
Cm-244	1.6962E-06	683.59	1,367.19	0.00E+00	1.16E-03	2.32E-03	0.2250	1.133E+13
Ce-134	1.2839E-06	683.59	1,367.19	0.00E+00	8.78E-02	1.76E+03	0.3750	1.507E+14
Ce-135	9.0541E-02	683.59	1,367.19	0.00E+00	6.19E+01	1.24E+02	0.8500	6.467E+12
Ce-137	2.7564E+00	683.59	1,367.19	0.00E+00	2.20E-02	4.40E-02	1.2500	8.755E+10
Eu-154	1.5368E-02	683.59	1,367.19	0.00E+00	1.89E-03	3.77E+03	1.7500	1.313E+14
Eu-155	2.9293E-02	683.59	1,367.19	0.00E+00	2.00E-01	4.00E+01	2.2500	1.411E+11
Fe-55	7.7158E-01	683.59	1,367.19	0.00E+00	5.27E-02	1.05E+03	2.7500	1.120E+09
H-3	1.1111E-02	683.59	1,367.19	0.00E+00	7.60E+00	1.52E+01	3.5000	1.303E+08
H-129	7.3684E-07	683.59	1,367.19	0.00E+00	5.04E-04	1.01E-03	5.0000	7.272E+02
Kr-95	2.5563E-01	683.59	1,367.19	0.00E+00	1.73E-02	3.45E+02	7.0000	8.232E+01
Np-237	1.2427E-06	683.59	1,367.19	0.00E+00	8.50E-04	1.70E-03	11.0000	9.378E+00
Pa-231	3.8511E-09	683.59	1,367.19	0.00E+00	2.63E-06	5.27E-06		
Pb-210	7.3890E-15	683.59	1,367.19	0.00E+00	5.05E-12	1.01E-11		
Pm-147	2.1023E+00	683.59	1,367.19	0.00E+00	1.44E+03	2.87E+03		
Pu-238	1.0383E-03	683.59	1,367.19	0.00E+00	7.10E-01	1.42E+00		
Pu-239	5.5293E-03	683.59	1,367.19	0.00E+00	3.78E+00	7.56E+00		
Pu-240	2.1276E-03	683.59	1,367.19	0.00E+00	1.45E+00	2.91E+00		
Pu-241	1.0195E-01	683.59	1,367.19	0.00E+00	6.97E-01	1.39E+02		
Pu-242	2.3128E-07	683.59	1,367.19	0.00E+00	1.59E-04	3.16E-04		
Ra-226	5.2726E-14	683.59	1,367.19	0.00E+00	3.61E-11	7.22E-11		
Ra-228	1.3539E-10	683.59	1,367.19	0.00E+00	1.32E-07	2.64E-07		
Rn-106	9.1684E-02	683.59	1,367.19	0.00E+00	6.27E+01	1.25E+02		
Se-79	1.3018E-05	683.59	1,367.19	0.00E+00	8.90E-03	1.78E-02		
Se-126	1.2167E-06	683.59	1,367.19	0.00E+00	8.32E-03	1.66E-02		
Sr-90	2.6045E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03		
Tc-99	4.4241E-04	683.59	1,367.19	0.00E+00	3.02E-01	6.05E-01		
Th-229	1.3713E-10	683.59	1,367.19	0.00E+00	9.37E-08	1.87E-07		
Th-230	1.8090E-11	683.59	1,367.19	0.00E+00	1.24E-08	2.47E-08		
Th-232	2.5278E-01	683.59	1,367.19	0.00E+00	1.73E-07	3.46E-07		
Th-230	1.6947E-08	683.59	1,367.19	0.00E+00	1.16E-05	2.32E-05		
U-232	4.8737E-08	683.59	1,367.19	0.00E+00	3.33E-06	6.66E-06		
U-233	1.2203E-07	683.59	1,367.19	0.00E+00	8.34E-06	1.67E-04		
U-234	1.5925E-07	683.59	1,367.19	0.00E+00	1.09E-04	2.18E-04		
U-235	-2.6194E-06	683.59	0.00	7.44E-03	5.65E-03	1.14E-03		
U-236	1.2693E-06	683.59	1,367.19	0.00E+00	8.69E-03	1.74E-02		
U-238	-3.6331E-06	683.59	0.00	4.63E-03	4.60E-03	4.63E-03		
U-90	2.6060E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03		
Other Radionuclides					2.46E+03	4.92E+03		

Thermal Power	
Nominal Heat Output (Watts)	3.98E+01
Bounding Heat Output (Watts)	7.96E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			
Reactor Moderator: Fuel Cladding: BOL HLL Constituents: BOL Enrichment %:	From SFD	Used	Basic for Parameter Differences:
	LW AND U ZIRCONIUM SST U 20	LW AND U ZIRCONIUM SST U 10 to 20.1	

Burnup Summary (MWd/t)			
Nominal: Bounding:	From SFD	Estimated	Basic for burnup used in estimate:
	683.59 1,367.19	683.59 1,367.19	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			
Nominal: Bounding:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HML/Given EOL HML
	1.17 2.33		1.00

*Reactor shutdown, core removal, storage, shipping or other data confirming final 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/HML).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: TRIGA STD 8.520 UNIV. OF CAL-IRVINE
 SNF ID #: 264
 Fuel Units & Descr: 104 - ELEMENT
 Heavy Metal Mass: BOL-19.928kg; EOL-19.77kg
 ROD Storage Site: NEEEL

II. Estimates

Estimated
 Canister usage:
 18"x10"
 0.94

Fuel decay start date: 2005
 2030
 Estimates as of: 2005
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Template Burnup (MWd/g): 6.85
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Gamma Sources
Ac-227	8.5173E-10	148.92	297.84	0.00E+00	1.27E-07	2.54E-07	Photon Energy Group Avg. MeV
Am-241	1.8331E-03	148.92	297.84	0.00E+00	2.73E-01	5.46E-01	Total Photons/sec (bounding)
Am-242m	1.4129E-06	148.92	297.84	0.00E+00	2.10E-04	4.21E-04	0.0150
Am-243	1.4774E-07	148.92	297.84	0.00E+00	2.20E-05	4.40E-05	0.0250
C-14	1.2871E-04	148.92	297.84	0.00E+00	1.92E-02	3.83E-02	0.0375
Cl-36	2.8120E-06	148.92	297.84	0.00E+00	4.19E-04	8.38E-04	0.0575
Co-60	1.7940E-07	148.92	297.84	0.00E+00	2.67E-05	5.34E-05	0.0850
Co-60	1.6932E-06	148.92	297.84	0.00E+00	2.53E-04	5.06E-04	0.1250
Co-134	1.2839E+00	148.92	297.84	0.00E+00	1.91E+02	3.82E+02	0.2250
Cs-135	3.2195E-05	148.92	297.84	0.00E+00	1.35E+01	2.70E+01	0.3750
Cs-137	2.7564E+00	148.92	297.84	0.00E+00	4.79E+03	9.59E+03	0.8500
Eu-154	1.5388E-02	148.92	297.84	0.00E+00	4.10E+02	8.21E+02	1.2500
Eu-155	2.9293E-02	148.92	297.84	0.00E+00	2.29E+00	4.58E+00	1.7500
Fe-55	7.7158E-01	148.92	297.84	0.00E+00	4.36E+00	8.72E+00	2.2500
H-3	1.1111E-02	148.92	297.84	0.00E+00	1.65E+00	3.31E+00	2.7500
I-129	7.3684E-07	148.92	297.84	0.00E+00	1.10E-12	2.20E-12	3.5000
K-85	2.5933E-01	148.92	297.84	0.00E+00	3.13E+02	6.26E+02	5.0000
Np-237	1.2427E-06	148.92	297.84	0.00E+00	1.85E-04	3.70E-04	7.0000
Pb-210	3.6511E-09	148.92	297.84	0.00E+00	5.74E-07	1.15E-06	11.0000
Pm-147	2.1023E+00	148.92	297.84	0.00E+00	1.10E-12	2.20E-12	
Pu-238	1.0363E-03	148.92	297.84	0.00E+00	1.55E-01	3.09E-01	
Pu-239	5.5293E-03	148.92	297.84	0.00E+00	8.23E-01	1.65E+00	
Pu-240	2.1278E-03	148.92	297.84	0.00E+00	3.17E-01	6.34E-01	
Pu-241	1.0195E-01	148.92	297.84	0.00E+00	1.52E+01	3.04E+01	
Pu-242	1.2128E-07	148.92	297.84	0.00E+00	3.44E-05	6.89E-05	
Ra-226	5.2728E-14	148.92	297.84	0.00E+00	7.86E-12	1.57E-11	
Ra-228	1.9338E-10	148.92	297.84	0.00E+00	2.88E-08	5.76E-08	
Ru-106	9.1684E-02	148.92	297.84	0.00E+00	1.37E+01	2.73E+01	
Se-79	1.3018E-05	148.92	297.84	0.00E+00	1.94E-03	3.88E-03	
Sm-126	1.2167E-05	148.92	297.84	0.00E+00	1.81E-03	3.62E-03	
Sr-90	2.6045E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02	
Tc-99	4.4241E-04	148.92	297.84	0.00E+00	6.50E-02	1.30E-01	
Th-229	1.3713E-10	148.92	297.84	0.00E+00	2.04E-08	4.08E-08	
Th-230	1.8090E-11	148.92	297.84	0.00E+00	2.69E-09	5.39E-09	
Th-232	2.5278E-10	148.92	297.84	0.00E+00	3.78E-08	7.53E-08	
Th-236	1.6947E-08	148.92	297.84	0.00E+00	2.52E-06	5.05E-06	
U-232	4.8737E-08	148.92	297.84	0.00E+00	7.26E-06	1.45E-05	
U-233	1.2203E-07	148.92	297.84	0.00E+00	1.82E-05	3.63E-05	
U-234	1.5925E-07	148.92	297.84	0.00E+00	2.37E-05	4.74E-05	
U-235	-2.6194E-06	148.92	0.00	8.61E-03	8.22E-03	8.61E-03	
U-236	1.2603E-05	148.92	297.84	0.00E+00	1.80E-03	3.76E-03	
U-238	-3.8331E-08	148.92	0.00	5.35E-03	5.35E-03	5.35E-03	
V-60	2.6050E+00	148.92	297.84	0.00E+00	5.37E+02	1.07E+03	

Basis for Parameter Differences:	
Reactor Moderator:	LW AND U ZIRC HYDROIDE LW AND U ZIRC HYDROIDE
Fuel Cladding:	SST SST
BOL NM Constituents:	U U
BOL Enrichment %:	20.00002088 10 to 20.1

Burnup Summary (MWd/g)	
Nominal:	Estimated
Bounding:	148.92 297.84

Basis for burnup used in estimate:	
Nominal:	148.92
Bounding:	297.84

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

Checks	
Nominal:	Estimated Burnup/ Given Burnup
Bounding:	0.22 0.44

Estimated EOL NM/ Given EOL NM 1.00

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV. OF WISCONSIN
 SNF ID #: 262
 Fuel Units & Descr: 128 - ELEMENT
 Heavy Metal Mass: BOL=24.96kg; EOL=22.182kg
 ROD Storage Site: INEEL

Fuel decay start date: 2035
 Estimate as of: 2030
 Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
 Template Burnup (MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.000195
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 1.15

II. Estimates	m	x _n	x ₀	b	y _n	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,651.52	5,303.03	0.00E+00	2.26E-08	4.52E-08	Avg. MeV	
Am-241	1.8331E-03	2,651.52	5,303.03	0.00E+00	4.86E+00	9.72E+00	0.0150	8.571E+14
Am-242m	1.4129E-06	2,651.52	5,303.03	0.00E+00	3.75E-03	7.49E-03	0.0250	1.888E+14
Am-243	1.4774E-07	2,651.52	5,303.03	0.00E+00	3.92E-04	7.83E-04	0.0375	1.606E+14
C-14	1.2871E-04	2,651.52	5,303.03	0.00E+00	3.41E-01	6.83E-01	0.0575	1.649E+14
Cl-36	2.8120E-06	2,651.52	5,303.03	0.00E+00	7.46E-03	1.49E-02	0.0850	1.021E+14
Cm-243	1.7940E-07	2,651.52	5,303.03	0.00E+00	4.76E-04	9.51E-04	0.1250	7.418E+13
Cm-244	1.6962E-08	2,651.52	5,303.03	0.00E+00	4.50E-03	9.00E-03	0.2250	8.664E+13
Co-60	1.2839E+00	2,651.52	5,303.03	0.00E+00	3.40E+03	6.81E+03	0.3750	4.397E+13
Cs-134	9.0541E-02	2,651.52	5,303.03	0.00E+00	2.40E+02	4.80E+02	0.5750	5.845E+14
Cs-135	3.2195E-05	2,651.52	5,303.03	0.00E+00	8.54E-02	1.71E-01	0.8500	2.509E+13
Cs-137	2.7564E+00	2,651.52	5,303.03	0.00E+00	7.31E+03	1.46E+04	1.2500	5.094E+14
Eu-154	1.5368E-02	2,651.52	5,303.03	0.00E+00	4.07E+01	8.15E+01	1.7500	3.396E+11
Eu-155	2.9239E-02	2,651.52	5,303.03	0.00E+00	7.77E+01	1.55E+02	2.2500	5.474E+11
Fe-55	7.7158E-01	2,651.52	5,303.03	0.00E+00	2.05E+03	4.09E+03	2.7500	4.344E+09
H-3	1.1111E-02	2,651.52	5,303.03	0.00E+00	2.95E+01	5.89E+01	3.5000	5.055E+08
I-129	7.3684E-07	2,651.52	5,303.03	0.00E+00	1.95E-03	3.91E-03	5.0000	2.795E+03
Kr-85	2.5263E-01	2,651.52	5,303.03	0.00E+00	6.70E+02	1.34E+03	7.0000	3.163E+02
Np-237	1.2427E-06	2,651.52	5,303.03	0.00E+00	3.30E-03	6.59E-03	11.0000	3.603E+01
Pa-231	3.8511E-09	2,651.52	5,303.03	0.00E+00	1.02E-06	2.04E-06		
Pb-210	7.3880E-15	2,651.52	5,303.03	0.00E+00	1.96E-11	3.92E-11		
Pm-147	2.1023E+00	2,651.52	5,303.03	0.00E+00	5.57E+03	1.11E+04		
Pu-238	1.0383E-03	2,651.52	5,303.03	0.00E+00	2.75E+00	5.51E+00		
Pu-239	5.5293E-03	2,651.52	5,303.03	0.00E+00	1.47E+01	2.93E+01		
Pu-240	2.1278E-03	2,651.52	5,303.03	0.00E+00	5.64E+00	1.13E+01		
Pu-241	1.0195E-01	2,651.52	5,303.03	0.00E+00	2.70E+02	5.41E+02		
Pu-242	2.3128E-07	2,651.52	5,303.03	0.00E+00	6.13E-04	1.23E-03		
Ra-226	5.2782E-14	2,651.52	5,303.03	0.00E+00	1.40E-10	2.80E-10		
Ra-228	1.9338E-10	2,651.52	5,303.03	0.00E+00	5.13E-07	1.03E-06		
Ru-106	9.1684E-02	2,651.52	5,303.03	0.00E+00	2.43E+02	4.86E+02		
Se-79	1.3018E-05	2,651.52	5,303.03	0.00E+00	3.45E-02	6.90E-02		
Sn-126	1.2187E-05	2,651.52	5,303.03	0.00E+00	3.23E-02	6.45E-02		
Sr-90	2.6045E+00	2,651.52	5,303.03	0.00E+00	6.91E+03	1.38E+04		
Tc-99	4.4241E-04	2,651.52	5,303.03	0.00E+00	1.17E+00	2.35E+00		
Th-229	1.3713E-10	2,651.52	5,303.03	0.00E+00	3.64E-07	7.27E-07		
Th-230	1.8090E-11	2,651.52	5,303.03	0.00E+00	4.80E-08	9.59E-08		
Th-232	2.5278E-10	2,651.52	5,303.03	0.00E+00	6.70E-07	1.34E-06		
Ti-208	1.6947E-06	2,651.52	5,303.03	0.00E+00	4.49E-05	8.99E-05		
U-232	4.8737E-06	2,651.52	5,303.03	0.00E+00	1.29E-04	2.58E-04		
U-233	1.2203E-07	2,651.52	5,303.03	0.00E+00	3.24E-04	6.47E-04		
U-234	1.5925E-07	2,651.52	5,303.03	0.00E+00	4.22E-04	8.44E-04		
U-235	2.6194E-06	2,651.52	0.00	1.08E-02	3.84E-03	1.08E-02		
U-236	1.2693E-05	2,651.52	5,303.03	0.00E+00	3.37E-02	6.73E-02		
U-238	3.6331E-06	2,651.52	0.00	6.71E-03	6.61E-03	6.71E-03		
Y-90	2.6060E+00	2,651.52	5,303.03	0.00E+00	6.91E+03	1.38E+04		
Other Radionuclides					9.56E+03	1.91E+04		

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)^a

	From SFD	Estimated
Nominal:		2,651.52
Bounding:		5,303.03

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.12	
Bounding:	6.23	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 USGS
SNF ID #: 964
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.184kg; EOL=0.183kg
ROD Storage Site: INEEL

Fuel decay start date: 2005
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zr, SST, 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.01

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.76	1.53	0.00E+00	6.50E-10	1.30E-09	Avg. MeV	
Am-241	1.8331E-03	0.76	1.53	0.00E+00	1.40E-03	2.80E-03	0.0150	2.469E+11
Am-242m	1.4129E-06	0.76	1.53	0.00E+00	1.08E-06	2.16E-06	0.0250	5.432E+10
Am-243	1.4774E-07	0.76	1.53	0.00E+00	1.13E-07	2.26E-07	0.0375	4.826E+10
C-14	1.2871E-04	0.76	1.53	0.00E+00	9.83E-05	1.97E-04	0.0575	4.748E+10
Cl-36	2.8120E-06	0.76	1.53	0.00E+00	2.15E-06	4.30E-06	0.0850	2.942E+10
Cm-243	1.7940E-07	0.76	1.53	0.00E+00	1.37E-07	2.74E-07	0.1250	2.136E+10
Cm-244	1.8962E-06	0.76	1.53	0.00E+00	1.30E-06	2.59E-06	0.2250	2.495E+10
Co-60	1.2839E+00	0.76	1.53	0.00E+00	9.81E-01	1.96E+00	0.3750	1.266E+10
Cs-134	9.0541E-02	0.76	1.53	0.00E+00	6.91E-02	1.38E-01	0.5750	1.683E+11
Cs-135	3.2195E-05	0.76	1.53	0.00E+00	2.46E-05	4.92E-05	0.8500	7.225E+09
Cs-137	2.7564E+00	0.76	1.53	0.00E+00	2.11E+00	4.21E+00	1.2500	1.467E+11
Eu-154	1.5368E-02	0.76	1.53	0.00E+00	1.17E-02	2.35E-02	1.7500	9.781E+07
Eu-155	2.9293E-02	0.76	1.53	0.00E+00	2.24E-02	4.47E-02	2.2500	1.577E+08
Fe-55	7.7158E-01	0.76	1.53	0.00E+00	5.89E-01	1.17E+00	2.7500	1.251E+06
H-3	1.1111E-02	0.76	1.53	0.00E+00	8.49E-03	1.70E-02	3.5000	1.456E+05
I-129	7.3684E-07	0.76	1.53	0.00E+00	5.63E-07	1.13E-06	5.0000	9.154E-01
Kr-85	2.5263E-01	0.76	1.53	0.00E+00	1.93E-01	3.86E-01	7.0000	1.038E-01
Np-237	1.2427E-06	0.76	1.53	0.00E+00	9.49E-07	1.90E-06	11.0000	1.184E-02
Pa-231	3.8511E-09	0.76	1.53	0.00E+00	2.94E-09	5.88E-09		
Pb-210	7.3880E-15	0.76	1.53	0.00E+00	5.64E-15	1.13E-14		
Pm-147	2.1023E+00	0.76	1.53	0.00E+00	1.61E+00	3.21E+00		
Pu-238	1.0383E-03	0.76	1.53	0.00E+00	7.93E-04	1.59E-03		
Pu-239	5.5293E-03	0.76	1.53	0.00E+00	4.22E-03	8.45E-03		
Pu-240	2.1278E-03	0.76	1.53	0.00E+00	1.62E-03	3.25E-03		
Pu-241	1.0195E-01	0.76	1.53	0.00E+00	7.79E-02	1.56E-01		
Pu-242	2.3128E-07	0.76	1.53	0.00E+00	1.77E-07	3.53E-07		
Ra-226	5.2782E-14	0.76	1.53	0.00E+00	4.03E-14	8.06E-14		
Ra-228	1.8338E-10	0.76	1.53	0.00E+00	1.48E-10	2.95E-10		
Ru-106	9.1684E-02	0.76	1.53	0.00E+00	7.00E-02	1.40E-01		
Se-79	1.3018E-05	0.76	1.53	0.00E+00	9.94E-06	1.99E-05		
Sn-126	1.2167E-05	0.76	1.53	0.00E+00	9.29E-06	1.86E-05		
Sr-90	2.8045E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00		
Tc-99	4.4241E-04	0.76	1.53	0.00E+00	3.38E-04	6.76E-04		
Th-229	1.3713E-10	0.76	1.53	0.00E+00	1.05E-10	2.09E-10		
Th-230	1.8090E-11	0.76	1.53	0.00E+00	1.38E-11	2.76E-11		
Th-232	2.5278E-10	0.76	1.53	0.00E+00	1.93E-10	3.86E-10		
Ti-208	1.6947E-08	0.76	1.53	0.00E+00	1.29E-08	2.59E-08		
U-232	4.8737E-08	0.76	1.53	0.00E+00	3.72E-08	7.44E-08	Thermal Power	
U-233	1.2203E-07	0.76	1.53	0.00E+00	9.32E-08	1.86E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	0.76	1.53	0.00E+00	1.22E-07	2.43E-07	4.44E-02	8.89E-02
U-235	-2.6194E-06	0.76	0.00	7.79E-05	7.59E-05	7.79E-05	Total	Total
U-236	1.2693E-05	0.76	1.53	0.00E+00	9.69E-06	1.94E-05		
U-238	-3.6331E-08	0.76	0.00	4.97E-05	4.97E-05	4.97E-05		
Y-90	2.6060E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00		
Other Radionuclides					2.75E+00	5.51E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.58243102	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		0.76
Bounding:		1.53

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.12	
Bounding:	0.24	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 WSU

SNF ID #: 268

Fuel Units & Descr: 137 - ELEMENT

Heavy Metal Mass: BOL=26.715kg; EOL=23.482kg

ROD Storage Site: INEEL

Fuel decay start date: 2035

Estimate as of: 2030

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

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.000195

Template Decay Time: 5 years

Estimated

Canister usage:

18"x10"

1.23

II. Estimates

Radionuclide	m	x_m	x_b	b	y_b	y_b	Gamma Sources	
	CLMWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ¹	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	3,088.44	6,172.87	0.00E+00	2.63E-06	5.26E-06	Avg. MeV	
Am-241	1.8331E-03	3,088.44	6,172.87	0.00E+00	5.66E+00	1.13E+01	0.0150	9.977E+14
Am-242m	1.4129E-06	3,088.44	6,172.87	0.00E+00	4.36E-03	8.72E-03	0.0250	2.195E+14
Am-243	1.4774E-07	3,088.44	6,172.87	0.00E+00	4.56E-04	9.12E-04	0.0375	1.869E+14
C-14	1.2871E-04	3,088.44	6,172.87	0.00E+00	3.97E-01	7.94E-01	0.0575	1.919E+14
Cl-36	2.8120E-06	3,088.44	6,172.87	0.00E+00	8.68E-03	1.74E-02	0.0850	1.189E+14
Cm-243	1.7940E-07	3,088.44	6,172.87	0.00E+00	5.54E-04	1.11E-03	0.1250	8.633E+13
Cm-244	1.6962E-06	3,088.44	6,172.87	0.00E+00	5.24E-03	1.05E-02	0.2250	1.008E+14
Co-60	1.2839E+00	3,088.44	6,172.87	0.00E+00	3.96E+03	7.93E+03	0.3750	5.118E+13
Cs-134	9.0541E-02	3,088.44	6,172.87	0.00E+00	2.79E+02	5.59E+02	0.5750	6.804E+14
Cs-135	3.2195E-05	3,088.44	6,172.87	0.00E+00	9.94E-02	1.99E-01	0.8500	2.920E+13
Cs-137	2.7564E+00	3,088.44	6,172.87	0.00E+00	8.51E+03	1.70E+04	1.2500	5.930E+14
Eu-154	1.5368E-02	3,088.44	6,172.87	0.00E+00	4.74E+01	9.49E+01	1.7500	3.953E+11
Eu-155	2.9293E-02	3,088.44	6,172.87	0.00E+00	9.04E+01	1.81E+02	2.2500	6.371E+11
Fe-55	7.7158E-01	3,088.44	6,172.87	0.00E+00	2.38E+03	4.76E+03	2.7500	5.056E+09
H-3	1.1111E-02	3,088.44	6,172.87	0.00E+00	3.43E+01	6.86E+01	3.5000	5.884E+08
I-129	7.3684E-07	3,088.44	6,172.87	0.00E+00	2.27E-03	4.55E-03	5.0000	3.252E+03
Kr-85	2.5263E-01	3,088.44	6,172.87	0.00E+00	7.80E+02	1.56E+03	7.0000	3.680E+02
Np-237	1.2427E-06	3,088.44	6,172.87	0.00E+00	3.84E-03	7.67E-03	11.0000	4.192E+01
Pa-231	3.8511E-09	3,088.44	6,172.87	0.00E+00	1.19E-05	2.38E-05		
Pb-210	7.3880E-15	3,088.44	6,172.87	0.00E+00	2.28E-11	4.56E-11		
Pm-147	2.1023E+00	3,088.44	6,172.87	0.00E+00	6.49E+03	1.30E+04		
Pu-238	1.0383E-03	3,088.44	6,172.87	0.00E+00	3.20E+00	6.41E+00		
Pu-239	5.5293E-03	3,088.44	6,172.87	0.00E+00	1.71E+01	3.41E+01		
Pu-240	2.1278E-03	3,088.44	6,172.87	0.00E+00	6.57E+00	1.31E+01		
Pu-241	1.0195E-01	3,088.44	6,172.87	0.00E+00	3.15E+02	6.29E+02		
Pu-242	2.3128E-07	3,088.44	6,172.87	0.00E+00	7.14E-04	1.43E-03		
Ra-226	5.2782E-14	3,088.44	6,172.87	0.00E+00	1.63E-10	3.26E-10		
Ra-228	1.9338E-10	3,088.44	6,172.87	0.00E+00	5.97E-07	1.19E-06		
Ru-106	9.1684E-02	3,088.44	6,172.87	0.00E+00	2.83E+02	5.66E+02		
Se-79	1.3018E-05	3,088.44	6,172.87	0.00E+00	4.02E-02	8.04E-02		
Sn-126	1.2167E-05	3,088.44	6,172.87	0.00E+00	3.76E-02	7.51E-02		
Sr-90	2.6045E+00	3,088.44	6,172.87	0.00E+00	8.04E+03	1.61E+04		
Tc-99	4.4241E-04	3,088.44	6,172.87	0.00E+00	1.37E+00	2.73E+00		
Th-229	1.3713E-10	3,088.44	6,172.87	0.00E+00	4.23E-07	8.46E-07		
Th-230	1.8090E-11	3,088.44	6,172.87	0.00E+00	5.58E-08	1.12E-07		
Th-232	2.5278E-10	3,088.44	6,172.87	0.00E+00	7.80E-07	1.56E-06		
Th-238	1.6947E-08	3,088.44	6,172.87	0.00E+00	5.23E-05	1.05E-04		
U-232	4.8737E-08	3,088.44	6,172.87	0.00E+00	1.50E-04	3.01E-04		
U-233	1.2203E-07	3,088.44	6,172.87	0.00E+00	3.77E-04	7.53E-04		
U-234	1.5925E-07	3,088.44	6,172.87	0.00E+00	4.92E-04	9.83E-04		
U-235	-2.6194E-06	3,088.44	0.00	1.14E-02	3.35E-03	1.14E-02		
U-236	1.2683E-05	3,088.44	6,172.87	0.00E+00	3.92E-02	7.84E-02		
U-238	-3.6331E-08	3,088.44	0.00	7.20E-03	7.09E-03	7.20E-03		
Y-90	2.6060E+00	3,088.44	6,172.87	0.00E+00	8.04E+03	1.61E+04		
Other Radionuclides					1.11E+04	2.23E+04		

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 %:	19.8	10 to 20.1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		3,088.44	
		6,172.87	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	3.39	6.78	
			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ZAIRE
SNF ID #: 486
Fuel Units & Descr: 80 - ELEMENT
Heavy Metal Mass: BOL=15.448kg; EOL=15.288kg
ROD Storage Site: INEEL

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

Estimated
Canister usage:
16"x10"
0.72

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	152.74	305.47	0.00E+00	4.04E-07	8.08E-07	Avg. MeV	
Am-241	3.1429E-03	152.74	305.47	0.00E+00	4.80E-01	9.60E-01	0.0150	3.061E+13
Am-242m	1.3195E-06	152.74	305.47	0.00E+00	2.02E-04	4.03E-04	0.0250	6.372E+12
Am-243	1.4753E-07	152.74	305.47	0.00E+00	2.25E-05	4.51E-05	0.0375	5.520E+12
C-14	1.2847E-04	152.74	305.47	0.00E+00	1.96E-02	3.92E-02	0.0575	5.939E+12
Cl-36	2.8120E-06	152.74	305.47	0.00E+00	4.30E-04	8.59E-04	0.0850	3.585E+12
Cm-243	1.2465E-07	152.74	305.47	0.00E+00	1.90E-05	3.81E-05	0.1250	2.343E+12
Cm-244	9.5564E-07	152.74	305.47	0.00E+00	1.46E-04	2.92E-04	0.2250	3.079E+12
Co-60	1.7880E-01	152.74	305.47	0.00E+00	2.73E+01	5.46E+01	0.3750	1.349E+12
Cs-134	5.8692E-04	152.74	305.47	0.00E+00	8.96E-02	1.79E-01	0.5750	2.219E+13
Cs-135	3.2195E-05	152.74	305.47	0.00E+00	4.92E-03	9.83E-03	0.8500	2.501E+11
Cs-137	1.9489E+00	152.74	305.47	0.00E+00	2.98E+02	5.95E+02	1.2500	4.145E+12
Eu-154	4.5895E-03	152.74	305.47	0.00E+00	7.01E-01	1.40E+00	1.7500	6.426E+09
Eu-155	3.6045E-03	152.74	305.47	0.00E+00	5.51E-01	1.10E+00	2.2500	2.213E+07
Fe-55	1.4185E-02	152.74	305.47	0.00E+00	2.17E+00	4.33E+00	2.7500	2.439E+05
H-3	4.7895E-03	152.74	305.47	0.00E+00	7.32E-01	1.46E+00	3.5000	1.371E+03
I-129	7.3684E-07	152.74	305.47	0.00E+00	1.13E-04	2.25E-04	5.0000	1.883E+02
Kr-85	9.5820E-02	152.74	305.47	0.00E+00	1.46E+01	2.93E+01	7.0000	1.903E+01
Np-237	1.2552E-06	152.74	305.47	0.00E+00	1.92E-04	3.83E-04	11.0000	2.166E+00
Pa-231	7.0406E-09	152.74	305.47	0.00E+00	1.08E-06	2.15E-06		
Pb-210	5.8000E-14	152.74	305.47	0.00E+00	8.86E-12	1.77E-11		
Pm-147	4.0075E-02	152.74	305.47	0.00E+00	6.12E+00	1.22E+01		
Pu-238	9.2256E-04	152.74	305.47	0.00E+00	1.41E-01	2.82E-01		
Pu-239	5.5278E-03	152.74	305.47	0.00E+00	8.44E-01	1.69E+00		
Pu-240	2.1248E-03	152.74	305.47	0.00E+00	3.25E-01	6.49E-01		
Pu-241	4.9549E-02	152.74	305.47	0.00E+00	7.57E+00	1.51E+01		
Pu-242	2.3128E-07	152.74	305.47	0.00E+00	3.53E-05	7.06E-05		
Ra-226	2.4526E-13	152.74	305.47	0.00E+00	3.75E-11	7.49E-11		
Ra-228	2.4015E-10	152.74	305.47	0.00E+00	3.67E-08	7.34E-08		
Ru-106	3.0602E-06	152.74	305.47	0.00E+00	4.67E-04	9.35E-04		
Se-79	1.3015E-05	152.74	305.47	0.00E+00	1.99E-03	3.98E-03		
Sn-126	1.2165E-05	152.74	305.47	0.00E+00	1.86E-03	3.72E-03		
Sr-90	1.8226E+00	152.74	305.47	0.00E+00	2.78E+02	5.57E+02		
Tc-99	4.4241E-04	152.74	305.47	0.00E+00	6.76E-02	1.35E-01		
Th-229	3.0962E-10	152.74	305.47	0.00E+00	4.73E-08	9.45E-08		
Th-230	4.2346E-11	152.74	305.47	0.00E+00	6.47E-09	1.29E-08		
Th-232	2.5278E-10	152.74	305.47	0.00E+00	3.86E-08	7.72E-08		
Th-208	1.5820E-08	152.74	305.47	0.00E+00	2.42E-06	4.83E-06		
U-232	4.2647E-08	152.74	305.47	0.00E+00	6.51E-06	1.30E-05		
U-233	1.2211E-07	152.74	305.47	0.00E+00	1.87E-05	3.73E-05		
U-234	1.9955E-07	152.74	305.47	0.00E+00	3.05E-05	6.10E-05		
U-235	-2.6194E-06	152.74	0.00	6.68E-03	6.28E-03	6.68E-03		
U-236	1.2693E-05	152.74	305.47	0.00E+00	1.94E-03	3.88E-03		
U-238	-3.6331E-08	152.74	0.00	4.15E-03	4.15E-03	4.15E-03		
Y-90	1.8241E+00	152.74	305.47	0.00E+00	2.79E+02	5.57E+02		
Other Radionuclides					2.94E+02	5.88E+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 %:	20.00000041	10 to 20.1	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		152.74	
Bounding:		305.47	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.29		
Bounding:	0.58		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRU SCRAP SNF (MOX)
 SNF ID #: 368

Fuel Units & Desor: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = 106.335kg
 ROD Storage Site: NEEL

Estimated Canister usage: HMC 1.00

'Fuel decay start date: 1994 2030
 Estimates as of: Template: FFTF (FAST, SST, 10 to 30%, Pu & U) 50112
 Template Burnup(MWd): 50112
 Template BOL Heavy Metal Mass (WT): 0.0329181
 Template Decay Time: 35 years

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Gamma Sources
Ac-227	6.1822E-12	106,140.24	106,140.24	0.00E+00	6.56E-07	6.56E-07	Avg. MeV	Total Photons/sec (bounding)
Am-241	1.1066E-01	106,140.24	106,140.24	4.10E+02	1.22E+04	1.22E+04	0.0150	3.432E+18
Am-242m	1.9247E-03	106,140.24	106,140.24	0.00E+00	2.04E+02	2.04E+02	0.0250	6.897E+14
Am-243	1.0740E-04	106,140.24	106,140.24	0.00E+00	1.14E+01	1.14E+01	0.0375	8.019E+14
C-14	2.6042E-05	106,140.24	106,140.24	0.00E+00	2.76E+00	2.76E+00	0.0575	7.887E+14
Ci-36	3.4243E-10	106,140.24	106,140.24	0.00E+00	3.63E-05	3.63E-05	0.0850	3.841E+14
Cm-243	4.0629E-04	106,140.24	106,140.24	0.00E+00	4.31E+01	4.31E+01	0.1250	2.703E+14
Cm-244	1.6024E-03	106,140.24	106,140.24	0.00E+00	1.70E+02	1.70E+02	0.2250	3.100E+14
Co-60	3.4275E-03	106,140.24	106,140.24	0.00E+00	3.64E+02	3.64E+02	0.3750	1.344E+15
Cs-134	1.5506E-03	106,140.24	106,140.24	0.00E+00	1.65E+02	1.65E+02	0.5750	5.444E+15
Cs-135	4.7683E-05	106,140.24	106,140.24	0.00E+00	5.06E+00	5.06E+00	0.8500	5.688E+13
Cs-137	1.4007E-05	106,140.24	106,140.24	0.00E+00	1.49E+05	1.49E+05	1.2500	6.808E+13
Eu-154	1.6184E-02	106,140.24	106,140.24	0.00E+00	1.72E+03	1.72E+03	1.7500	1.540E+12
Eu-155	1.3774E-02	106,140.24	106,140.24	0.00E+00	1.48E+03	1.48E+03	2.2500	3.048E+08
Fe-55	3.8028E-04	106,140.24	106,140.24	0.00E+00	4.04E+01	4.04E+01	2.7500	1.757E+09
H-3	3.8454E-03	106,140.24	106,140.24	0.00E+00	4.08E+02	4.08E+02	3.5000	6.515E+08
I-129	1.2891E-06	106,140.24	106,140.24	0.00E+00	1.37E+01	1.37E+01	5.0000	2.062E+08
Kr-85	2.7848E-02	106,140.24	106,140.24	0.00E+00	2.96E+03	2.96E+03	7.0000	2.355E+05
Np-237	3.7516E-06	106,140.24	106,140.24	0.00E+00	3.98E-01	3.98E-01	11.0000	2.695E+04
Pa-231	1.2488E-11	106,140.24	106,140.24	0.00E+00	1.33E-06	1.33E-06		
Pb-210	2.4206E-12	106,140.24	106,140.24	0.00E+00	2.57E-07	2.57E-07		
Pm-147	1.5671E-02	106,140.24	106,140.24	0.00E+00	1.66E+03	1.66E+03		
Pu-238	1.4877E-02	106,140.24	106,140.24	0.00E+00	1.58E+03	1.58E+03		
Pu-239	3.5520E-02	106,140.24	106,140.24	0.00E+00	0.00E+00	3.37E+03		
Pu-240	2.0690E-02	106,140.24	106,140.24	1.71E+03	3.91E+03	3.91E+03		
Pu-241	-1.4799E-00	106,140.24	0.00	7.68E+04	0.00E+00	7.68E+04		
Pu-242	1.1252E-05	106,140.24	106,140.24	4.58E-01	1.65E+00	1.65E+00		
Re-226	7.8524E-12	106,140.24	106,140.24	0.00E+00	8.33E-07	8.33E-07		
Ra-226	2.4096E-16	106,140.24	106,140.24	0.00E+00	2.56E-11	2.56E-11		
Ru-106	1.5066E-05	106,140.24	106,140.24	0.00E+00	1.50E+00	1.60E+00		
Sr-79	1.0127E-05	106,140.24	106,140.24	0.00E+00	1.07E+00	1.07E+00		
Sn-126	4.9922E-05	106,140.24	106,140.24	0.00E+00	4.66E+00	4.66E+00		
Sn-90	5.0088E-01	106,140.24	106,140.24	0.00E+00	5.32E+04	5.32E+04		
Tc-99	3.9412E-04	106,140.24	106,140.24	0.00E+00	4.18E+01	4.18E+01		
Th-229	2.7219E-12	106,140.24	106,140.24	0.00E+00	2.89E-07	2.89E-07		
Th-230	1.0441E-09	106,140.24	106,140.24	0.00E+00	1.11E-04	1.11E-04		
Th-232	3.1689E-16	106,140.24	106,140.24	0.00E+00	3.96E-11	3.96E-11		
Th-236	4.6636E-07	106,140.24	106,140.24	0.00E+00	4.95E-02	4.95E-02		
U-232	1.2638E-06	106,140.24	106,140.24	0.00E+00	1.34E-01	1.34E-01		
U-233	5.7451E-10	106,140.24	106,140.24	0.00E+00	6.10E-05	6.10E-05		
U-234	4.3044E-06	106,140.24	106,140.24	0.00E+00	4.57E-01	4.57E-01		
U-235	-7.7765E-09	106,140.24	0.00	6.91E-04	0.00E+00	6.91E-04		
U-236	1.8050E-07	106,140.24	106,140.24	0.00E+00	1.92E-02	1.92E-02		
U-238	-1.7974E-07	106,140.24	0.00	5.03E-02	3.13E-02	5.03E-02		
Y-90	5.0088E-01	106,140.24	106,140.24	0.00E+00	5.32E+04	5.32E+04		
Other Radionuclides					1.50E+05	1.50E+05		

III. Template Selection Summary, Burnup Summary, and Checks			
Template Selection Summary			
	From SFD	Used	
Reactor Moderator:	FAST	FAST	
Fuel Cladding:	UNKNOWN	SST	
BOL HML Constituents:	Pu and U	Pu and U	
BOL Enrichment %:		10 to 30	

Basis for Parameter Differences:
This Template was used for the following reason:
This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).

Burnup Summary (MWd) ^a	
From SFD	Estimated
Nominal:	106,140.24
Bounding:	106,140.24

Checks	
Nominal:	Estimated Burnup/ Given Burnup
Bounding:	3.28
	3.28

*Reactor shutdown, core removal, storage, shipping or other data 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: TRU SCRAP SNF (U METAL)
 SNF ID #: 904
 Fuel Units & Descr: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL = ; EOL=106.336kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1994
 Estimates as of: 2030
 Template: FERMI (Fast, Zirc, 10 to 40%, U)
²Template Burnup(MWd): 58.5725048
 Template BOL Heavy Metal Mass (MT): 0.018774
 Template Decay Time: 35 years

Estimated
 Canister usage:
 HIC
 4.00

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.6110E-08	93,768.99	93,768.99	0.00E+00	9.01E-03	9.01E-03	Avg. MeV	
Am-241	6.5601E-07	93,768.99	93,768.99	0.00E+00	6.15E-02	6.15E-02	0.0150	6.205E+15
Am-242m	0.0000E+00	93,768.99	93,768.99	0.00E+00	0.00E+00	0.00E+00	0.0250	1.289E+15
Am-243	8.3770E-15	93,768.99	93,768.99	0.00E+00	7.86E-10	7.86E-10	0.0375	1.134E+15
C-14	2.1714E-05	93,768.99	93,768.99	0.00E+00	2.04E+00	2.04E+00	0.0575	1.201E+15
Cl-36	5.5188E-08	93,768.99	93,768.99	0.00E+00	5.17E-03	5.17E-03	0.0850	7.264E+14
Cm-243	1.5496E-14	93,768.99	93,768.99	0.00E+00	1.45E-09	1.45E-09	0.1250	4.705E+14
Cm-244	5.2375E-16	93,768.99	93,768.99	0.00E+00	4.91E-11	4.91E-11	0.2250	6.235E+14
Co-60	2.0947E-03	93,768.99	93,768.99	0.00E+00	1.96E+02	1.96E+02	0.3750	2.717E+14
Cs-134	6.2448E-07	93,768.99	93,768.99	0.00E+00	5.86E-02	5.86E-02	0.5750	4.799E+15
Cs-135	4.4996E-05	93,768.99	93,768.99	0.00E+00	4.22E+00	4.22E+00	0.8500	4.432E+13
Cs-137	1.3775E+00	93,768.99	93,768.99	0.00E+00	1.29E+05	1.29E+05	1.2500	2.940E+13
Eu-154	1.8510E-04	93,768.99	93,768.99	0.00E+00	1.74E+01	1.74E+01	1.7500	1.144E+12
Eu-155	1.4163E-03	93,768.99	93,768.99	0.00E+00	1.33E+02	1.33E+02	2.2500	2.017E+08
Fe-55	1.4179E-05	93,768.99	93,768.99	0.00E+00	1.33E+00	1.33E+00	2.7500	1.944E+07
H-3	3.5383E-03	93,768.99	93,768.99	0.00E+00	3.32E+02	3.32E+02	3.5000	1.608E+04
I-129	1.1426E-06	93,768.99	93,768.99	0.00E+00	1.07E-01	1.07E-01	5.0000	5.319E+03
Kr-85	3.8604E-02	93,768.99	93,768.99	0.00E+00	3.62E+03	3.62E+03	7.0000	4.316E+02
Np-237	3.3099E-06	93,768.99	93,768.99	0.00E+00	3.10E-01	3.10E-01	11.0000	3.760E+01
Pa-231	1.8953E-07	93,768.99	93,768.99	0.00E+00	1.78E-02	1.78E-02		
Pb-210	8.9531E-12	93,768.99	93,768.99	0.00E+00	8.40E-07	8.40E-07		
Pm-147	1.1588E-03	93,768.99	93,768.99	0.00E+00	1.09E+02	1.09E+02		
Pu-238	1.7146E-04	93,768.99	93,768.99	0.00E+00	1.61E+01	1.61E+01		
Pu-239	1.9464E-02	93,768.99	93,768.99	0.00E+00	1.83E+03	1.83E+03		
Pu-240	6.7919E-05	93,768.99	93,768.99	0.00E+00	6.37E+00	6.37E+00		
Pu-241	4.1774E-06	93,768.99	93,768.99	0.00E+00	3.92E-01	3.92E-01		
Pu-242	4.3751E-13	93,768.99	93,768.99	0.00E+00	4.10E-08	4.10E-08		
Ra-226	2.4219E-11	93,768.99	93,768.99	0.00E+00	2.27E-06	2.27E-06		
Ra-228	2.3572E-11	93,768.99	93,768.99	0.00E+00	2.21E-06	2.21E-06		
Ru-106	3.0951E-10	93,768.99	93,768.99	0.00E+00	2.90E-05	2.90E-05		
Se-79	1.6488E-05	93,768.99	93,768.99	0.00E+00	1.55E+00	1.55E+00		
Sn-126	3.7564E-05	93,768.99	93,768.99	0.00E+00	3.52E+00	3.52E+00		
Sr-90	1.2052E+00	93,768.99	93,768.99	0.00E+00	1.13E+05	1.13E+05		
Tc-99	4.4825E-04	93,768.99	93,768.99	0.00E+00	4.20E+01	4.20E+01		
Th-229	4.6478E-11	93,768.99	93,768.99	0.00E+00	4.36E-06	4.36E-06		
Th-230	2.2259E-09	93,768.99	93,768.99	0.00E+00	2.09E-04	2.09E-04		
Th-232	2.3691E-11	93,768.99	93,768.99	0.00E+00	2.22E-06	2.22E-06		
Ti-208	5.8256E-09	93,768.99	93,768.99	0.00E+00	5.46E-04	5.46E-04		
U-232	1.5759E-08	93,768.99	93,768.99	0.00E+00	1.48E-03	1.48E-03		
U-233	1.0110E-08	93,768.99	93,768.99	0.00E+00	9.48E-04	9.48E-04		
U-234	4.9001E-06	93,768.99	93,768.99	0.00E+00	4.59E-01	4.59E-01		
U-235	-2.3191E-06	93,768.99	0.00	1.18E-01	0.00E+00	1.18E-01		
U-236	1.2633E-05	93,768.99	93,768.99	0.00E+00	1.18E+00	1.18E+00		
U-238	-9.5407E-08	93,768.99	0.00	5.32E-02	4.42E-02	5.32E-02		
Y-90	1.2053E+00	93,768.99	93,768.99	0.00E+00	1.13E+05	1.13E+05		
Other Radionuclides					1.28E+05	1.28E+05		

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 cladding (unknown) and enrichment (unknown).
Fuel Cladding:	UNKNOWN	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:		10 to 40	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		93,768.99	Nominal burnup set equal to bounding burnup.
Bounding:		93,768.99	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:	141.08		1.69
Bounding:	141.08		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TURKEY POINT
SNF ID #: 271
Fuel Units & Descr: 5 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=2285kg; EOL=2221.6kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1977
Estimate 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) 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	1.0733E-09	63,036.30	63,666.96	0.00E+00	6.77E-05	6.83E-05	Avg. MeV	
Am-241	1.4751E-01	63,036.30	63,666.96	0.00E+00	9.30E+03	9.39E+03	0.0150	2.423E+15
Am-242m	2.6809E-04	63,036.30	63,666.96	0.00E+00	1.69E+01	1.71E+01	0.0250	4.855E+14
Am-243	6.2484E-04	63,036.30	63,666.96	0.00E+00	3.94E+01	3.98E+01	0.0375	4.575E+14
C-14	4.7820E-05	63,036.30	63,666.96	0.00E+00	3.01E+00	3.04E+00	0.0575	5.724E+14
Cl-36	8.0297E-07	63,036.30	63,666.96	0.00E+00	5.06E-02	5.11E-02	0.0850	2.675E+14
Cm-243	1.7426E-04	63,036.30	63,666.96	0.00E+00	1.10E+01	1.11E+01	0.1250	1.779E+14
Cm-244	2.7616E-02	63,036.30	63,666.96	0.00E+00	1.74E+03	1.76E+03	0.2250	2.284E+14
Co-60	3.5610E-04	63,036.30	63,666.96	0.00E+00	2.24E+01	2.27E+01	0.3750	9.863E+13
Cs-134	2.6260E-07	63,036.30	63,666.96	0.00E+00	1.66E-02	1.67E-02	0.5750	2.323E+15
Cs-135	1.4433E-05	63,036.30	63,666.96	0.00E+00	9.10E-01	9.19E-01	0.8500	2.268E+13
Cs-137	9.8870E-01	63,036.30	63,666.96	0.00E+00	6.23E+04	6.29E+04	1.2500	1.443E+13
Eu-154	6.0320E-03	63,036.30	63,666.96	0.00E+00	3.80E+02	3.84E+02	1.7500	6.344E+11
Eu-155	2.1770E-04	63,036.30	63,666.96	0.00E+00	1.37E+01	1.39E+01	2.2500	1.043E+08
Fe-55	7.9266E-07	63,036.30	63,666.96	0.00E+00	5.00E-02	5.05E-02	2.7500	3.675E+08
H-3	6.9486E-03	63,036.30	63,666.96	0.00E+00	5.64E+02	5.70E+02	3.5000	2.622E+07
I-129	9.8288E-07	63,036.30	63,666.96	0.00E+00	6.20E-02	6.26E-02	5.0000	1.121E+07
Kr-85	1.0707E-02	63,036.30	63,666.96	0.00E+00	6.75E+02	6.82E+02	7.0000	1.291E+08
Np-237	1.1927E-05	63,036.30	63,666.96	0.00E+00	7.52E-01	7.59E-01	11.0000	1.483E+05
Pa-231	1.4703E-09	63,036.30	63,666.96	0.00E+00	9.27E-05	9.36E-05		
Pb-210	1.6828E-10	63,036.30	63,666.96	0.00E+00	1.06E-05	1.07E-05		
Pm-147	6.9606E-06	63,036.30	63,666.96	0.00E+00	4.39E-01	4.43E-01		
Pu-238	6.6263E-02	63,036.30	63,666.96	0.00E+00	4.18E+03	4.22E+03		
Pu-239	1.1618E-02	63,036.30	63,666.96	0.00E+00	7.32E+02	7.40E+02		
Pu-240	1.5142E-02	63,036.30	63,666.96	0.00E+00	9.55E+02	9.64E+02		
Pu-241	4.3766E-01	63,036.30	63,666.96	0.00E+00	2.76E+04	2.79E+04		
Pu-242	6.4260E-05	63,036.30	63,666.96	0.00E+00	4.05E+00	4.09E+00		
Ra-226	3.8501E-10	63,036.30	63,666.96	0.00E+00	2.43E-05	2.45E-05		
Ra-228	5.2955E-12	63,036.30	63,666.96	0.00E+00	3.34E-07	3.37E-07		
Ru-106	2.0413E-14	63,036.30	63,666.96	0.00E+00	1.29E-09	1.30E-09		
Se-79	1.2376E-05	63,036.30	63,666.96	0.00E+00	7.80E-01	7.88E-01		
Sn-126	2.5210E-05	63,036.30	63,666.96	0.00E+00	1.59E+00	1.61E+00		
Sr-90	6.4163E-01	63,036.30	63,666.96	0.00E+00	4.04E+04	4.09E+04		
Tc-99	3.9357E-04	63,036.30	63,666.96	0.00E+00	2.48E+01	2.51E+01		
Th-229	1.5644E-10	63,036.30	63,666.96	0.00E+00	9.86E-08	9.96E-08		
Th-230	2.7972E-08	63,036.30	63,666.96	0.00E+00	1.76E-03	1.78E-03		
Th-232	5.3036E-12	63,036.30	63,666.96	0.00E+00	3.34E-07	3.38E-07		
Ti-208	1.5136E-07	63,036.30	63,666.96	0.00E+00	9.54E-03	9.64E-03		
U-232	4.1005E-07	63,036.30	63,666.96	0.00E+00	2.58E-02	2.61E-02	Thermal Power	
U-233	2.5856E-08	63,036.30	63,666.96	0.00E+00	1.63E-03	1.65E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.2665E-05	63,036.30	63,666.96	0.00E+00	3.32E+00	3.35E+00	1.14E+03	1.15E+03
U-235	-1.4487E-06	63,036.30	0.00	1.26E-01	3.51E-02	1.26E-01	Total	Total
U-236	7.5888E-08	63,036.30	63,666.96	0.00E+00	4.78E-01	4.83E-01		
U-238	-2.6129E-07	63,036.30	0.00	7.48E-01	7.32E-01	7.48E-01		
Y-90	6.4180E-01	63,036.30	63,666.96	0.00E+00	4.05E+04	4.09E+04		
Other Radionuclides					6.01E+04	6.07E+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:	U	U
BOL Enrichment %:	2.55999934	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	63,036.30	60,290.40
Bounding:	63,666.96	120,580.80

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.79	0.98
Bounding:	0.80	1.89

Estimated EOL HM/Given EOL HM

1.00

³Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: US/UK FUEL PINS
SNF ID #: 356
Fuel Units & Descr: 66 - ROD
Heavy Metal Mass: BOL = : EOL=8.039kg
ROD Storage Site: INEEL

*Fuel decay start date: 1994
Estimates as of: 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"x10"
0.51

II. Estimates	m	X _n	X _n	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 Avg. MeV Total Photons/sec (bounding)
Ac-227	2.3072E-06	7,639.69	7,639.69	0.00E+00	1.76E-02	1.76E-02	0.0150
Am-241	8.4448E+00	7,639.69	7,639.69	0.00E+00	6.45E+04	6.45E+04	0.0250
Am-242m	1.6848E-02	7,639.69	7,639.69	0.00E+00	1.29E+02	1.29E+02	0.0375
Am-243	1.6320E-02	7,639.69	7,639.69	0.00E+00	1.25E+02	1.25E+02	0.0575
C-14	1.2090E-01	7,639.69	7,639.69	0.00E+00	9.24E+02	9.24E+02	0.0850
Cl-36	2.2849E-03	7,639.69	7,639.69	0.00E+00	1.75E+01	1.75E+01	0.1250
Cm-243	8.6624E-04	7,639.69	7,639.69	0.00E+00	6.62E+00	6.62E+00	0.2250
Cm-244	1.6848E-01	7,639.69	7,639.69	0.00E+00	1.29E+03	1.29E+03	0.3750
Co-60	2.8086E+01	7,639.69	7,639.69	0.00E+00	2.15E+05	2.15E+05	0.5750
Cs-134	3.4148E-04	7,639.69	7,639.69	0.00E+00	2.61E+00	2.61E+00	0.8500
Cs-135	4.3976E-04	7,639.69	7,639.69	0.00E+00	3.36E+00	3.36E+00	1.2500
Cs-137	2.1049E+01	7,639.69	7,639.69	0.00E+00	1.61E+05	1.61E+05	1.7500
Eu-154	1.2500E+00	7,639.69	7,639.69	0.00E+00	9.55E+03	9.55E+03	2.2500
Eu-155	6.8986E-02	7,639.69	7,639.69	0.00E+00	5.27E+02	5.27E+02	2.7500
Fe-55	2.9308E-01	7,639.69	7,639.69	0.00E+00	2.24E+03	2.24E+03	3.5000
H-3	2.4311E-01	7,639.69	7,639.69	0.00E+00	1.86E+03	1.86E+03	5.0000
I-129	1.0618E-05	7,639.69	7,639.69	0.00E+00	8.11E-02	8.11E-02	7.0000
Kr-85	5.9882E-01	7,639.69	7,639.69	0.00E+00	4.57E+03	4.57E+03	11.0000
Np-237	1.5668E-04	7,639.69	7,639.69	0.00E+00	1.20E+00	1.20E+00	
Pa-231	2.8656E-06	7,639.69	7,639.69	0.00E+00	2.19E-02	2.19E-02	
Pb-210	2.3918E-08	7,639.69	7,639.69	0.00E+00	1.83E-04	1.83E-04	
Pm-147	1.8900E-02	7,639.69	7,639.69	0.00E+00	1.29E+02	1.29E+02	
Pu-238	-8.6120E-01	7,639.69	0.00	2.07E+03	0.00E+00	2.07E+03	
Pu-239	-8.4402E-02	7,639.69	0.00	2.50E+02	0.00E+00	2.50E+02	
Pu-240	-3.0095E-01	7,639.69	0.00	3.19E+02	0.00E+00	3.19E+02	
Pu-241	-1.0411E+02	7,639.69	0.00	8.22E+04	0.00E+00	8.22E+04	
Pu-242	-1.1381E-04	7,639.69	0.00	1.38E+00	5.12E-01	1.38E+00	
Ra-226	6.4400E-08	7,639.69	7,639.69	0.00E+00	4.92E-04	4.92E-04	
Ra-228	5.9952E-07	7,639.69	7,639.69	0.00E+00	4.58E-03	4.58E-03	
Ru-106	8.5526E-07	7,639.69	7,639.69	0.00E+00	6.53E-03	6.53E-03	
Se-79	1.9181E-04	7,639.69	7,639.69	0.00E+00	1.47E+00	1.47E+00	
Sn-126	1.6671E-04	7,639.69	7,639.69	0.00E+00	1.27E+00	1.27E+00	
Sr-90	1.9799E+01	7,639.69	7,639.69	0.00E+00	1.51E+05	1.51E+05	
Tc-99	6.7678E-03	7,639.69	7,639.69	0.00E+00	5.17E+01	5.17E+01	
Th-229	1.7488E-06	7,639.69	7,639.69	0.00E+00	1.34E-02	1.34E-02	
Th-230	5.8704E-06	7,639.69	7,639.69	0.00E+00	4.48E-02	4.48E-02	
Th-232	6.0208E-07	7,639.69	7,639.69	0.00E+00	4.60E-03	4.60E-03	
Th-208	8.7573E-05	7,639.69	7,639.69	0.00E+00	6.69E-01	6.69E-01	
U-232	2.3706E-04	7,639.69	7,639.69	0.00E+00	1.81E+00	1.81E+00	
U-233	3.6128E-04	7,639.69	7,639.69	0.00E+00	2.76E+00	2.76E+00	
U-234	1.2788E-02	7,639.69	7,639.69	0.00E+00	9.77E+01	9.77E+01	
U-235	5.7486E-04	7,639.69	7,639.69	6.62E-03	4.40E+00	4.40E+00	
U-236	2.3485E-04	7,639.69	7,639.69	0.00E+00	1.79E+00	1.79E+00	
U-238	1.1581E-04	7,639.69	7,639.69	8.61E-04	8.86E-01	8.86E-01	
Y-90	1.9804E+01	7,639.69	7,639.69	0.00E+00	1.51E+05	1.51E+05	
Other Radionuclides					4.71E+05	4.71E+05	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	GRAPHITE	(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)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		7,639.69	Nominal burnup set equal to bounding burnup.
Bounding:		7,639.69	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: VBWR (GENEVA)
SNF ID #: 285
Fuel Units & Descr: 4 - 6 X 6 ROD ARRAY
Heavy Metal Mass: BOL=12.536kg; EOL=12.392kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1981
Estimate 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"
0.31

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	4.5940E-08	135.65	271.30	0.00E+00	6.23E-06	1.25E-05	Avg. MeV	
Am-241	1.1471E-04	135.65	271.30	0.00E+00	1.56E-02	3.11E-02	0.0150	9.903E+12
Am-242m	7.4210E-09	135.65	271.30	0.00E+00	1.01E-06	2.01E-06	0.0250	2.057E+12
Am-243	9.8236E-10	135.65	271.30	0.00E+00	1.33E-07	2.67E-07	0.0375	1.788E+12
C-14	2.2928E-04	135.65	271.30	0.00E+00	3.11E-02	6.22E-02	0.0575	1.919E+12
Cl-36	1.2260E-08	135.65	271.30	0.00E+00	1.66E-04	3.33E-04	0.0850	1.159E+12
Cm-243	1.2000E-10	135.65	271.30	0.00E+00	1.63E-08	3.26E-08	0.1250	7.514E+11
Cm-244	7.3577E-10	135.65	271.30	0.00E+00	9.98E-08	2.00E-07	0.2250	9.989E+11
Co-60	1.3732E-03	135.65	271.30	0.00E+00	1.86E-01	3.73E-01	0.3750	4.356E+11
Cs-134	1.2709E-10	135.65	271.30	0.00E+00	1.72E-08	3.45E-08	0.5750	7.328E+12
Cs-135	3.0316E-05	135.65	271.30	0.00E+00	4.11E-03	8.22E-03	0.8500	7.117E+10
Cs-137	7.2579E-01	135.65	271.30	0.00E+00	9.85E+01	1.97E+02	1.2500	5.151E+10
Eu-154	5.9750E-05	135.65	271.30	0.00E+00	8.11E-03	1.62E-02	1.7500	1.831E+09
Eu-155	1.0577E-05	135.65	271.30	0.00E+00	1.43E-03	2.87E-03	2.2500	3.463E+08
Fe-55	4.1631E-07	135.65	271.30	0.00E+00	5.65E-05	1.13E-04	2.7500	1.551E+05
H-3	4.6722E-04	135.65	271.30	0.00E+00	6.34E-02	1.27E-01	3.5000	3.325E+01
I-129	7.3195E-07	135.65	271.30	0.00E+00	9.93E-05	1.99E-04	5.0000	1.402E+01
Kr-85	5.9418E-03	135.65	271.30	0.00E+00	8.06E-01	1.61E+00	7.0000	1.585E+00
Np-237	1.1499E-08	135.65	271.30	0.00E+00	1.56E-04	3.12E-04	11.0000	1.803E-01
Pa-231	7.0899E-08	135.65	271.30	0.00E+00	9.62E-06	1.92E-05		
Pb-210	2.2363E-12	135.65	271.30	0.00E+00	3.03E-10	6.07E-10		
Pm-147	4.2296E-07	135.65	271.30	0.00E+00	5.74E-05	1.15E-04		
Pu-238	2.3295E-04	135.65	271.30	0.00E+00	3.16E-02	6.32E-02		
Pu-239	6.6722E-04	135.65	271.30	0.00E+00	9.05E-02	1.81E-01		
Pu-240	8.6556E-05	135.65	271.30	0.00E+00	1.17E-02	2.35E-02		
Pu-241	1.6889E-04	135.65	271.30	0.00E+00	2.29E-02	4.58E-02		
Pu-242	1.9717E-09	135.65	271.30	0.00E+00	2.67E-07	5.35E-07		
Ra-226	4.5740E-12	135.65	271.30	0.00E+00	6.20E-10	1.24E-09		
Ra-228	8.3511E-12	135.65	271.30	0.00E+00	1.13E-09	2.27E-09		
Ru-106	2.0516E-19	135.65	271.30	0.00E+00	2.78E-17	5.57E-17		
Se-79	1.3220E-05	135.65	271.30	0.00E+00	1.79E-03	3.59E-03		
Sn-126	1.1489E-05	135.65	271.30	0.00E+00	1.56E-03	3.12E-03		
Sr-90	6.6872E-01	135.65	271.30	0.00E+00	9.07E+01	1.81E+02		
Tc-99	4.6639E-04	135.65	271.30	0.00E+00	6.33E-02	1.27E-01		
Th-229	2.3727E-11	135.65	271.30	0.00E+00	3.22E-09	6.44E-09		
Th-230	2.7354E-10	135.65	271.30	0.00E+00	3.71E-08	7.42E-08		
Th-232	8.3594E-12	135.65	271.30	0.00E+00	1.13E-09	2.27E-09		
Ti-208	1.6228E-08	135.65	271.30	0.00E+00	2.20E-06	4.40E-06		
U-232	4.3960E-08	135.65	271.30	0.00E+00	5.96E-06	1.19E-05		
U-233	3.3344E-09	135.65	271.30	0.00E+00	4.52E-07	9.05E-07		
U-234	4.0749E-07	135.65	271.30	0.00E+00	5.53E-05	1.11E-04		
U-235	-2.7781E-08	135.65	0.00	5.99E-03	5.62E-03	5.99E-03		
U-236	1.6190E-05	135.65	271.30	0.00E+00	2.20E-03	4.39E-03		
U-238	-2.8547E-09	135.65	0.00	3.28E-03	3.28E-03	3.28E-03		
Y-90	6.6889E-01	135.65	271.30	0.00E+00	9.07E+01	1.81E+02		
Other Radionuclides					1.23E+02	2.46E+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.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	22.12897667	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		135.65	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		271.30	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.23		1.00
Bounding:	0.46		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO
SNF ID #: 285
Fuel Units & Descr: 20 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=9146.286kg; EOL=8832.178kg
ROD Storage Site: NEEL

Fuel decay start date: 1983
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:
Bare Fuel Transfer

II. Estimates	m	x ₁	x ₂	b	y ₁	y ₂	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	300,603.76	601,207.51	0.00E+00	2.64E-04	5.28E-04	Avg. MeV	
Am-241	1.4352E-01	300,603.76	601,207.51	0.00E+00	4.31E+04	8.63E+04	0.0150	3.235E+16
Am-242m	2.8698E-04	300,603.76	601,207.51	0.00E+00	8.63E+01	1.73E+02	0.0250	6.523E+15
Am-243	6.2565E-04	300,603.76	601,207.51	0.00E+00	1.88E+02	3.76E+02	0.0375	6.221E+15
C-14	4.7901E-05	300,603.76	601,207.51	0.00E+00	1.44E+01	2.88E+01	0.0575	7.189E+15
Cl-36	8.0297E-07	300,603.76	601,207.51	0.00E+00	2.41E-01	4.83E-01	0.0850	3.820E+15
Cm-243	2.5081E-04	300,603.76	601,207.51	0.00E+00	7.54E+01	1.51E+02	0.1250	2.512E+15
Cm-244	4.9015E-02	300,603.76	601,207.51	0.00E+00	1.47E+04	2.95E+04	0.2250	3.104E+15
Co-60	2.5581E-03	300,603.76	601,207.51	0.00E+00	7.69E+02	1.54E+03	0.3750	1.335E+15
Cs-134	4.0536E-05	300,603.76	601,207.51	0.00E+00	1.22E+01	2.44E+01	0.5750	3.104E+16
Cs-135	1.4433E-05	300,603.76	601,207.51	0.00E+00	4.34E+00	8.68E+00	0.8500	4.294E+14
Cs-137	1.3979E+00	300,603.76	601,207.51	0.00E+00	4.20E+05	8.40E+05	1.2500	4.218E+14
Eu-154	2.0203E-02	300,603.76	601,207.51	0.00E+00	6.07E+03	1.21E+04	1.7500	1.263E+13
Eu-155	1.7684E-03	300,603.76	601,207.51	0.00E+00	5.32E+02	1.06E+03	2.2500	2.034E+09
Fe-55	4.3136E-05	300,603.76	601,207.51	0.00E+00	1.30E+01	2.59E+01	2.7500	4.167E+09
H-3	2.0769E-02	300,603.76	601,207.51	0.00E+00	6.24E+03	1.25E+04	3.5000	4.291E+08
I-129	9.8288E-07	300,603.76	601,207.51	0.00E+00	2.95E-01	5.91E-01	5.0000	1.835E+06
Kr-85	2.8214E-02	300,603.76	601,207.51	0.00E+00	8.48E+03	1.70E+04	7.0000	2.115E+07
Np-237	1.1218E-05	300,603.76	601,207.51	0.00E+00	3.37E+00	6.74E+00	11.0000	2.429E+06
Pa-231	1.3036E-09	300,603.76	601,207.51	0.00E+00	3.82E-04	7.64E-04		
Pb-210	8.5078E-11	300,603.76	601,207.51	0.00E+00	2.56E-05	5.11E-05		
Pm-147	3.6531E-04	300,603.76	601,207.51	0.00E+00	1.10E+02	2.20E+02		
Pu-238	7.4564E-02	300,603.76	601,207.51	0.00E+00	2.24E+04	4.48E+04		
Pu-239	1.1623E-02	300,603.76	601,207.51	0.00E+00	3.49E+03	6.99E+03		
Pu-240	1.5132E-02	300,603.76	601,207.51	0.00E+00	4.55E+03	9.10E+03		
Pu-241	9.0036E-01	300,603.76	601,207.51	0.00E+00	2.71E+05	5.41E+05		
Pu-242	6.4260E-05	300,603.76	601,207.51	0.00E+00	1.93E+01	3.86E+01		
Ra-226	2.2804E-10	300,603.76	601,207.51	0.00E+00	8.85E-05	1.77E-04		
Ra-228	5.2713E-12	300,603.76	601,207.51	0.00E+00	1.58E-06	3.17E-06		
Ru-106	6.1160E-10	300,603.76	601,207.51	0.00E+00	1.84E-04	3.68E-04		
Se-79	1.2377E-05	300,603.76	601,207.51	0.00E+00	3.72E+00	7.44E+00		
Sn-126	2.5210E-05	300,603.76	601,207.51	0.00E+00	7.58E+00	1.52E+01		
Sr-90	9.1667E-01	300,603.76	601,207.51	0.00E+00	2.76E+05	5.51E+05		
Tc-99	3.9357E-04	300,603.76	601,207.51	0.00E+00	1.18E+02	2.37E+02		
Th-229	1.2057E-10	300,603.76	601,207.51	0.00E+00	3.62E-05	7.25E-05		
Th-230	2.1043E-08	300,603.76	601,207.51	0.00E+00	6.33E-03	1.27E-02		
Th-232	5.2972E-12	300,603.76	601,207.51	0.00E+00	1.59E-06	3.18E-06		
Th-208	1.7474E-07	300,603.76	601,207.51	0.00E+00	5.25E-02	1.05E-01		
U-232	4.7368E-07	300,603.76	601,207.51	0.00E+00	1.42E-01	2.85E-01		
U-233	2.5097E-08	300,603.76	601,207.51	0.00E+00	7.54E-03	1.51E-02		
U-234	5.0000E-05	300,603.76	601,207.51	0.00E+00	1.50E+01	3.01E+01		
U-235	-1.4489E-06	300,603.76	0.00	5.90E-01	1.55E-01	5.90E-01		
U-236	7.5824E-06	300,603.76	601,207.51	0.00E+00	2.28E+00	4.56E+00		
U-238	-2.6129E-07	300,603.76	0.00	2.98E+00	2.90E+00	2.98E+00		
Y-90	9.1699E-01	300,603.76	601,207.51	0.00E+00	2.76E+05	5.51E+05		
Other Radionuclides					4.04E+05	8.07E+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 %:	2.985167273	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	268,593.68	300,603.76	
Bounding:	268,637.57	601,207.51	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.94	1.12	
Bounding:	1.88	2.08	

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO
SNF ID #: 700
Fuel Units & Descr: 12 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=5488.2kg, EOL=5313.52kg
ROD Storage Site: INEEL

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:
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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	166,112.80	332,225.60	0.00E+00	1.46E-04	2.92E-04	Avg. MeV	
Am-241	1.4352E-01	166,112.80	332,225.60	0.00E+00	2.38E+04	4.77E+04	0.0150	1.788E+16
Am-242m	2.8698E-04	166,112.80	332,225.60	0.00E+00	4.77E+01	9.53E+01	0.0250	3.605E+15
Am-243	6.2565E-04	166,112.80	332,225.60	0.00E+00	1.04E+02	2.08E+02	0.0375	3.438E+15
C-14	4.7901E-05	166,112.80	332,225.60	0.00E+00	7.96E+00	1.59E+01	0.0575	3.972E+15
Cl-36	8.0297E-07	166,112.80	332,225.60	0.00E+00	1.33E-01	2.67E-01	0.0850	2.000E+15
Cm-243	2.5081E-04	166,112.80	332,225.60	0.00E+00	4.17E+01	8.33E+01	0.1250	1.388E+15
Cm-244	4.9015E-02	166,112.80	332,225.60	0.00E+00	8.14E+03	1.63E+04	0.2250	1.715E+15
Co-60	2.5581E-03	166,112.80	332,225.60	0.00E+00	4.25E+02	8.50E+02	0.3750	7.375E+14
Cs-134	4.0536E-05	166,112.80	332,225.60	0.00E+00	6.73E+00	1.35E+01	0.5750	1.715E+16
Cs-135	1.4433E-05	166,112.80	332,225.60	0.00E+00	2.40E+00	4.80E+00	0.8500	2.373E+14
Cs-137	1.3979E+00	166,112.80	332,225.60	0.00E+00	2.32E+05	4.64E+05	1.2500	2.331E+14
Eu-154	2.0203E-02	166,112.80	332,225.60	0.00E+00	3.36E+03	6.71E+03	1.7500	6.981E+12
Eu-155	1.7684E-03	166,112.80	332,225.60	0.00E+00	2.94E+02	5.88E+02	2.2500	1.124E+09
Fe-55	4.3136E-05	166,112.80	332,225.60	0.00E+00	7.17E+00	1.43E+01	2.7500	2.303E+09
H-3	2.0769E-02	166,112.80	332,225.60	0.00E+00	3.45E+03	6.90E+03	3.5000	2.371E+09
I-129	9.8288E-07	166,112.80	332,225.60	0.00E+00	1.63E-01	3.27E-01	5.0000	1.014E+08
Kr-85	2.8214E-02	166,112.80	332,225.60	0.00E+00	4.69E+03	9.37E+03	7.0000	1.169E+07
Np-237	1.1218E-05	166,112.80	332,225.60	0.00E+00	1.86E+00	3.73E+00	11.0000	1.342E+08
Pa-231	1.3036E-09	166,112.80	332,225.60	0.00E+00	2.17E-04	4.33E-04		
Pb-210	8.5078E-11	166,112.80	332,225.60	0.00E+00	1.41E-05	2.83E-05		
Pm-147	3.6531E-04	166,112.80	332,225.60	0.00E+00	6.07E+01	1.21E+02		
Pu-238	7.4564E-02	166,112.80	332,225.60	0.00E+00	1.24E+04	2.48E+04		
Pu-239	1.1623E-02	166,112.80	332,225.60	0.00E+00	1.93E+03	3.86E+03		
Pu-240	1.5132E-02	166,112.80	332,225.60	0.00E+00	2.51E+03	5.03E+03		
Pu-241	9.0036E-01	166,112.80	332,225.60	0.00E+00	1.50E+05	2.99E+05		
Pu-242	6.4260E-05	166,112.80	332,225.60	0.00E+00	1.07E+01	2.13E+01		
Ra-226	2.2804E-10	166,112.80	332,225.60	0.00E+00	3.79E-05	7.58E-05		
Ra-228	5.2713E-12	166,112.80	332,225.60	0.00E+00	8.76E-07	1.75E-06		
Ru-106	6.1160E-10	166,112.80	332,225.60	0.00E+00	1.02E-04	2.03E-04		
Se-79	1.2377E-05	166,112.80	332,225.60	0.00E+00	2.06E+00	4.11E+00		
Sn-126	2.5210E-05	166,112.80	332,225.60	0.00E+00	4.19E+00	8.38E+00		
Sr-90	9.1667E-01	166,112.80	332,225.60	0.00E+00	1.52E+05	3.05E+05		
Tc-99	3.9357E-04	166,112.80	332,225.60	0.00E+00	6.54E+01	1.31E+02		
Th-229	1.2057E-10	166,112.80	332,225.60	0.00E+00	2.00E-05	4.01E-05		
Th-230	2.1043E-08	166,112.80	332,225.60	0.00E+00	3.50E-03	6.99E-03		
Th-232	5.2972E-12	166,112.80	332,225.60	0.00E+00	8.80E-07	1.76E-06		
Ti-208	1.7474E-07	166,112.80	332,225.60	0.00E+00	2.90E-02	5.81E-02		
U-232	4.7368E-07	166,112.80	332,225.60	0.00E+00	7.87E-02	1.57E-01		
U-233	2.5097E-08	166,112.80	332,225.60	0.00E+00	4.17E-03	8.34E-03		
U-234	5.0000E-05	166,112.80	332,225.60	0.00E+00	8.31E+00	1.66E+01		
U-235	-1.4489E-06	166,112.80	0.00	3.36E-01	9.54E-02	3.36E-01		
U-236	7.5824E-06	166,112.80	332,225.60	0.00E+00	1.26E+00	2.52E+00		
U-238	-2.6129E-07	166,112.80	0.00	1.79E+00	1.75E+00	1.79E+00		
Y-90	9.1699E-01	166,112.80	332,225.60	0.00E+00	1.52E+05	3.05E+05		
Other Radionuclides					2.23E+05	4.46E+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	
	2.833496228	0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	161,133.55	166,112.80	
Bounding:	173,158.20	332,225.60	
			Nominal burnup calculated from the heavy metal mass destroyed.
			Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.86	1.03	
Bounding:	1.73	1.92	
			1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO (T-11 ASSEMBLY)
SNF ID #: 993
Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=457.414kg; EOL=440kg
ROD Storage Site: INEEL

Fuel decay start date: 1983
Estimates as of: 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:
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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	16,560.18	33,120.35	0.00E+00	1.45E-05	2.91E-05	Avg. MeV	
Am-241	1.4352E-01	16,560.18	33,120.35	0.00E+00	2.38E+03	4.75E+03	0.0150	1.782E+15
Am-242m	2.8698E-04	16,560.18	33,120.35	0.00E+00	4.75E+00	9.50E+00	0.0250	3.594E+14
Am-243	6.2565E-04	16,560.18	33,120.35	0.00E+00	1.04E+01	2.07E+01	0.0375	3.427E+14
C-14	4.7901E-05	16,560.18	33,120.35	0.00E+00	7.93E-01	1.59E+00	0.0575	3.960E+14
Cl-36	8.0297E-07	16,560.18	33,120.35	0.00E+00	1.33E-02	2.66E-02	0.0850	1.894E+14
Cm-243	2.5081E-04	16,560.18	33,120.35	0.00E+00	4.15E+00	8.31E+00	0.1250	1.384E+14
Cm-244	4.9015E-02	16,560.18	33,120.35	0.00E+00	8.12E+02	1.62E+03	0.2250	1.710E+14
Co-60	2.5581E-03	16,560.18	33,120.35	0.00E+00	4.24E+01	8.47E+01	0.3750	7.353E+13
Cs-134	4.0636E-05	16,560.18	33,120.35	0.00E+00	6.71E-01	1.34E+00	0.5750	1.710E+15
Cs-135	1.4433E-05	16,560.18	33,120.35	0.00E+00	2.39E-01	4.78E-01	0.6500	2.366E+13
Cs-137	1.3979E+00	16,560.18	33,120.35	0.00E+00	2.32E+04	4.63E+04	1.2500	2.324E+13
Eu-154	2.0203E-02	16,560.18	33,120.35	0.00E+00	3.35E+02	6.69E+02	1.7500	6.959E+11
Eu-155	1.7684E-03	16,560.18	33,120.35	0.00E+00	2.93E+01	5.86E+01	2.2500	1.121E+08
Fe-55	4.3136E-05	16,560.18	33,120.35	0.00E+00	7.14E-01	1.43E+00	2.7500	2.296E+06
H-3	2.0769E-02	16,560.18	33,120.35	0.00E+00	3.44E+02	6.88E+02	3.5000	2.364E+07
I-129	9.8288E-07	16,560.18	33,120.35	0.00E+00	1.63E-02	3.26E-02	5.0000	1.011E+07
Kr-85	2.8214E-02	16,560.18	33,120.35	0.00E+00	4.87E+02	9.34E+02	7.0000	1.165E+06
Np-237	1.1218E-05	16,560.18	33,120.35	0.00E+00	1.86E-01	3.72E-01	11.0000	1.338E+05
Pa-231	1.3036E-09	16,560.18	33,120.35	0.00E+00	2.16E-05	4.32E-05		
Pb-210	8.5078E-11	16,560.18	33,120.35	0.00E+00	1.41E-06	2.82E-06		
Pm-147	3.6531E-04	16,560.18	33,120.35	0.00E+00	6.05E+00	1.21E+01		
Pu-238	7.4564E-02	16,560.18	33,120.35	0.00E+00	1.23E+03	2.47E+03		
Pu-239	1.1623E-02	16,560.18	33,120.35	0.00E+00	1.92E+02	3.85E+02		
Pu-240	1.5132E-02	16,560.18	33,120.35	0.00E+00	2.51E+02	5.01E+02		
Pu-241	9.0036E-01	16,560.18	33,120.35	0.00E+00	1.49E+04	2.98E+04		
Pu-242	6.4260E-05	16,560.18	33,120.35	0.00E+00	1.06E+00	2.13E+00		
Ra-226	2.2804E-10	16,560.18	33,120.35	0.00E+00	3.78E-06	7.55E-06		
Ra-228	5.2713E-12	16,560.18	33,120.35	0.00E+00	8.73E-08	1.75E-07		
Ru-106	6.1160E-10	16,560.18	33,120.35	0.00E+00	1.01E-05	2.03E-05		
Se-79	1.2377E-05	16,560.18	33,120.35	0.00E+00	2.05E-01	4.10E-01		
Sn-126	2.5210E-06	16,560.18	33,120.35	0.00E+00	4.17E-01	8.35E-01		
Sr-90	9.1667E-01	16,560.18	33,120.35	0.00E+00	1.52E+04	3.04E+04		
Tc-99	3.9357E-04	16,560.18	33,120.35	0.00E+00	6.52E+00	1.30E+01		
Th-229	1.2057E-10	16,560.18	33,120.35	0.00E+00	2.00E-06	3.99E-06		
Th-230	2.1043E-08	16,560.18	33,120.35	0.00E+00	3.48E-04	6.97E-04		
Th-232	5.2972E-12	16,560.18	33,120.35	0.00E+00	8.77E-08	1.75E-07		
Ti-208	1.7474E-07	16,560.18	33,120.35	0.00E+00	2.89E-03	5.79E-03		
U-232	4.7368E-07	16,560.18	33,120.35	0.00E+00	7.84E-03	1.57E-02		
U-233	2.5097E-08	16,560.18	33,120.35	0.00E+00	4.16E-04	8.31E-04		
U-234	5.0000E-05	16,560.18	33,120.35	0.00E+00	8.28E-01	1.66E+00		
U-235	-1.4489E-06	16,560.18	0.00	2.95E-02	5.52E-03	2.95E-02		
U-236	7.5824E-06	16,560.18	33,120.35	0.00E+00	1.26E-01	2.51E-01		
U-238	-2.6129E-07	16,560.18	0.00	1.49E-01	1.45E-01	1.49E-01		
Y-90	9.1699E-11	16,560.18	33,120.35	0.00E+00	1.52E+04	3.04E+04		
Other Radionuclides					2.22E+04	4.45E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	2.96167273	0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	13,429.88	16,560.18	
Bounding:	14,431.88	33,120.35	

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:	1.03	1.23	
Bounding:	2.07	2.29	

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO (T-11 RODS)
SNF ID #: 1049

Fuel Units & Descr: 9 - ROD

Heavy Metal Mass: BOL=20.18kg; EOL=19.678kg

ROD Storage Site: INEEL

*Fuel decay start date: 1963

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"

0.07

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	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	592.48	636.69	0.00E+00	5.20E-07	5.59E-07	Avg. MeV	
Am-241	1.4352E-01	592.48	636.69	0.00E+00	8.50E+01	9.14E+01	0.0150	3.426E+13
Am-242m	2.8698E-04	592.48	636.69	0.00E+00	1.70E-01	1.83E-01	0.0250	6.908E+12
Am-243	8.2565E-04	592.48	636.69	0.00E+00	3.71E-01	3.98E-01	0.0375	6.589E+12
C-14	4.7901E-05	592.48	636.69	0.00E+00	2.84E-02	3.05E-02	0.0575	7.813E+12
Cf-252	8.0297E-07	592.48	636.69	0.00E+00	4.76E-04	5.11E-04	0.0850	3.833E+12
Cm-243	2.5081E-04	592.48	636.69	0.00E+00	1.49E-01	1.60E-01	0.1250	2.660E+12
Cm-244	4.9015E-02	592.48	636.69	0.00E+00	2.90E+01	3.12E+01	0.2250	3.287E+12
Co-60	2.5581E-03	592.48	636.69	0.00E+00	1.52E+00	1.63E+00	0.3750	1.413E+12
Cs-134	4.0536E-05	592.48	636.69	0.00E+00	2.40E-02	2.58E-02	0.5750	3.287E+13
Cs-135	1.4433E-05	592.48	636.69	0.00E+00	8.55E-03	9.19E-03	0.8500	4.548E+11
Cs-137	1.3979E+00	592.48	636.69	0.00E+00	8.28E+02	8.90E+02	1.2500	4.467E+11
Eu-154	2.0203E-02	592.48	636.69	0.00E+00	1.20E+01	1.29E+01	1.7500	1.338E+10
Eu-155	1.7684E-03	592.48	636.69	0.00E+00	1.05E+00	1.13E+00	2.2500	2.154E+08
Fe-55	4.3136E-05	592.48	636.69	0.00E+00	2.56E-02	2.75E-02	2.7500	4.413E+06
H-3	2.0769E-02	592.48	636.69	0.00E+00	1.23E+01	1.32E+01	3.5000	4.544E+06
I-129	9.8288E-07	592.48	636.69	0.00E+00	5.82E-04	6.26E-04	5.0000	1.943E+05
Kr-85	2.8214E-02	592.48	636.69	0.00E+00	1.67E+01	1.80E+01	7.0000	2.239E+04
Np-237	1.1218E-05	592.48	636.69	0.00E+00	6.65E-03	7.14E-03	11.0000	2.572E+03
Pa-231	1.3036E-09	592.48	636.69	0.00E+00	7.72E-07	8.30E-07		
Pb-210	8.5078E-11	592.48	636.69	0.00E+00	5.04E-08	5.42E-08		
Pm-147	3.6531E-04	592.48	636.69	0.00E+00	2.16E-01	2.33E-01		
Pu-238	7.4564E-02	592.48	636.69	0.00E+00	4.42E+01	4.75E+01		
Pu-239	1.1623E-02	592.48	636.69	0.00E+00	6.89E+00	7.40E+00		
Pu-240	1.5132E-02	592.48	636.69	0.00E+00	8.97E+00	9.63E+00		
Pu-241	9.0036E-01	592.48	636.69	0.00E+00	5.33E+02	5.73E+02		
Pu-242	8.4260E-05	592.48	636.69	0.00E+00	3.81E-02	4.09E-02		
Ra-226	2.2804E-10	592.48	636.69	0.00E+00	1.35E-07	1.45E-07		
Ra-228	5.2713E-12	592.48	636.69	0.00E+00	3.12E-09	3.36E-09		
Ru-106	6.1160E-10	592.48	636.69	0.00E+00	3.62E-07	3.89E-07		
Se-79	1.2377E-05	592.48	636.69	0.00E+00	7.33E-03	7.88E-03		
Sn-126	2.5210E-05	592.48	636.69	0.00E+00	1.49E-02	1.61E-02		
Sr-90	9.1667E-01	592.48	636.69	0.00E+00	5.43E+02	5.84E+02		
Tc-99	3.9357E-04	592.48	636.69	0.00E+00	2.33E-01	2.51E-01		
Th-229	1.2057E-10	592.48	636.69	0.00E+00	7.14E-08	7.68E-08		
Th-230	2.1043E-08	592.48	636.69	0.00E+00	1.25E-05	1.34E-05		
Th-232	5.2972E-12	592.48	636.69	0.00E+00	3.14E-09	3.37E-09		
Ti-208	1.7474E-07	592.48	636.69	0.00E+00	1.04E-04	1.11E-04		
U-232	4.7368E-07	592.48	636.69	0.00E+00	2.81E-04	3.02E-04		
U-233	2.5097E-08	592.48	636.69	0.00E+00	1.49E-05	1.60E-05	Thermal Power	
U-234	5.0000E-05	592.48	636.69	0.00E+00	2.96E-02	3.18E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-1.4489E-06	592.48	0.00	1.30E-03	4.44E-04	1.30E-03	1.35E+01	1.46E+01
U-236	7.5824E-06	592.48	636.69	0.00E+00	4.49E-03	4.83E-03	Total	Total
U-238	-2.6129E-07	592.48	0.00	6.58E-03	6.43E-03	6.58E-03		
Y-90	9.1699E-01	592.48	636.69	0.00E+00	5.43E+02	5.84E+02		
Other Radionuclides					7.95E+02	8.55E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.986165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	592.48	477.57
Bounding:	636.69	955.14

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.81
Bounding:	0.90	1.50

Estimated EOL HM/ Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEP00 T-11
SNF ID #: 994
Fuel Units & Descr: 3 - ROD
Heavy Metal Mass: BOL=6.727kg; EOL=6.559kg
ROD Storage Site: INEEL

Fuel decay start date: 1983
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"
0.02

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	197.49	212.23	0.00E+00	1.73E-07	1.86E-07	Avg. MeV	
Am-241	1.4352E-01	197.49	212.23	0.00E+00	2.83E+01	3.05E+01	0.0150	1.142E+13
Am-242m	2.8698E-04	197.49	212.23	0.00E+00	5.67E-02	6.09E-02	0.0250	2.303E+12
Am-243	6.2565E-04	197.49	212.23	0.00E+00	1.24E-01	1.33E-01	0.0375	2.196E+12
C-14	4.7901E-05	197.49	212.23	0.00E+00	9.46E-03	1.02E-02	0.0675	2.538E+12
Cl-36	8.0297E-07	197.49	212.23	0.00E+00	1.59E-04	1.70E-04	0.0850	1.278E+12
Cm-243	2.5081E-04	197.49	212.23	0.00E+00	4.95E-02	5.32E-02	0.1250	8.867E+11
Cm-244	4.9015E-02	197.49	212.23	0.00E+00	9.68E+00	1.04E+01	0.2250	1.096E+12
Co-60	2.5581E-03	197.49	212.23	0.00E+00	5.05E-01	5.43E-01	0.3750	4.712E+11
Cs-134	4.0536E-05	197.49	212.23	0.00E+00	8.01E-03	8.60E-03	0.5750	1.096E+13
Cs-135	1.4433E-05	197.49	212.23	0.00E+00	2.85E-03	3.06E-03	0.8500	1.516E+11
Cs-137	1.3979E+00	197.49	212.23	0.00E+00	2.76E+02	2.97E+02	1.2500	1.489E+11
Eu-154	2.0203E-02	197.49	212.23	0.00E+00	3.99E+00	4.29E+00	1.7500	4.459E+09
Eu-155	1.7684E-03	197.49	212.23	0.00E+00	3.49E-01	3.75E-01	2.2500	7.181E+05
Fe-55	4.3136E-05	197.49	212.23	0.00E+00	8.52E-03	9.15E-03	2.7500	1.471E+06
H-3	2.0769E-02	197.49	212.23	0.00E+00	4.10E+00	4.41E+00	3.5000	1.515E+05
I-129	9.8288E-07	197.49	212.23	0.00E+00	1.94E-04	2.09E-04	5.0000	6.477E+04
Kr-85	2.8214E-02	197.49	212.23	0.00E+00	5.57E+00	5.99E+00	7.0000	7.465E+03
Np-237	1.1218E-05	197.49	212.23	0.00E+00	2.22E-03	2.38E-03	11.0000	8.574E+02
Pa-231	1.3036E-09	197.49	212.23	0.00E+00	2.57E-07	2.77E-07		
Pb-210	8.5078E-11	197.49	212.23	0.00E+00	1.68E-08	1.81E-08		
Pm-147	3.6531E-04	197.49	212.23	0.00E+00	7.21E-02	7.75E-02		
Pu-238	7.4564E-02	197.49	212.23	0.00E+00	1.47E+01	1.58E+01		
Pu-239	1.1623E-02	197.49	212.23	0.00E+00	2.30E+00	2.47E+00		
Pu-240	1.5132E-02	197.49	212.23	0.00E+00	2.99E+00	3.21E+00		
Pu-241	9.0036E-01	197.49	212.23	0.00E+00	1.78E+02	1.91E+02		
Pu-242	6.4260E-05	197.49	212.23	0.00E+00	1.27E-02	1.36E-02		
Ra-226	2.2804E-10	197.49	212.23	0.00E+00	4.50E-08	4.84E-08		
Ra-228	5.2713E-12	197.49	212.23	0.00E+00	1.04E-09	1.12E-09		
Ru-106	6.1160E-10	197.49	212.23	0.00E+00	1.21E-07	1.30E-07		
Se-79	1.2377E-05	197.49	212.23	0.00E+00	2.44E-03	2.63E-03		
Sn-126	2.5210E-05	197.49	212.23	0.00E+00	4.98E-03	5.35E-03		
Sr-90	9.1867E-01	197.49	212.23	0.00E+00	1.81E+02	1.95E+02		
Tc-99	3.9357E-04	197.49	212.23	0.00E+00	7.77E-02	8.35E-02		
Th-229	1.2057E-10	197.49	212.23	0.00E+00	2.38E-08	2.56E-08		
Th-230	2.1043E-08	197.49	212.23	0.00E+00	4.16E-06	4.47E-06		
Th-232	5.2972E-12	197.49	212.23	0.00E+00	1.05E-09	1.12E-09		
Ti-208	1.7474E-07	197.49	212.23	0.00E+00	3.45E-05	3.71E-05		
U-232	4.7368E-07	197.49	212.23	0.00E+00	9.35E-05	1.01E-04		
U-233	2.5097E-08	197.49	212.23	0.00E+00	4.96E-06	5.33E-06		
U-234	5.0000E-05	197.49	212.23	0.00E+00	9.87E-03	1.06E-02		
U-235	-1.4489E-06	197.49	0.00	4.34E-04	1.48E-04	4.34E-04		
U-236	7.5824E-06	197.49	212.23	0.00E+00	1.50E-03	1.61E-03		
U-238	-2.6129E-07	197.49	0.00	2.19E-03	2.14E-03	2.19E-03		
Y-90	9.1699E-01	197.49	212.23	0.00E+00	1.81E+02	1.95E+02		
Other Radionuclides					2.65E+02	2.85E+02		

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 %:	2.985165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	197.49	159.19
Bounding:	212.23	318.38

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.81
Bounding:	0.90	1.50

Estimated EOL HM/Given EOL HM

0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-(AUSTRA)LEU U308
SNF ID #: 1058
Fuel Units & Descr: 3 - 19 FLAT PLATES
Heavy Metal Mass: BOL=5.379kg; EOL=4.818kg
ROD Storage Site: SRS

*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"
0.08

II. Estimates	a _n	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	2.0068E-09	530.99	1,061.99	0.00E+00	1.07E-06	2.13E-06	Avg. MeV	
Am-241	2.5251E-03	530.99	1,061.99	0.00E+00	1.34E+00	2.68E+00	0.0150	7.822E+13
Am-242m	3.9624E-07	530.99	1,061.99	0.00E+00	2.10E-04	4.21E-04	0.0250	1.624E+13
Am-243	1.4880E-06	530.99	1,061.99	0.00E+00	7.90E-04	1.58E-03	0.0375	1.412E+13
C-14	5.7053E-09	530.99	1,061.99	0.00E+00	3.03E-06	6.06E-06	0.0575	1.520E+13
Cl-36	1.3124E-32	530.99	1,061.99	0.00E+00	6.97E-30	1.39E-29	0.0850	9.156E+12
Cm-243	1.1419E-07	530.99	1,061.99	0.00E+00	6.06E-05	1.21E-04	0.1250	6.047E+12
Cm-244	1.6522E-05	530.99	1,061.99	0.00E+00	8.77E-03	1.75E-02	0.2250	7.904E+12
Co-60	7.4047E-07	530.99	1,061.99	0.00E+00	3.93E-04	7.86E-04	0.3750	3.439E+12
Cs-134	2.0455E-05	530.99	1,061.99	0.00E+00	1.09E-02	2.17E-02	0.5750	5.683E+13
Cs-135	3.4477E-06	530.99	1,061.99	0.00E+00	1.83E-03	3.66E-03	0.8500	6.942E+11
Cs-137	1.4365E+00	530.99	1,061.99	0.00E+00	7.63E+02	1.53E+03	1.2500	3.358E+11
Eu-154	7.3230E-03	530.99	1,061.99	0.00E+00	3.89E+00	7.78E+00	1.7500	1.890E+10
Eu-155	5.8259E-04	530.99	1,061.99	0.00E+00	3.15E-01	6.29E-01	2.2500	1.580E+06
Fe-55	2.2791E-06	530.99	1,061.99	0.00E+00	1.21E-03	2.42E-03	2.7500	1.508E+06
H-3	1.9698E-03	530.99	1,061.99	0.00E+00	1.05E+00	2.09E+00	3.5000	8.812E+02
I-129	7.5300E-07	530.99	1,061.99	0.00E+00	4.00E-04	8.00E-04	5.0000	3.602E+02
Kr-85	4.1176E-02	530.99	1,061.99	0.00E+00	2.19E+01	4.37E+01	7.0000	3.944E+01
Np-237	9.5752E-06	530.99	1,061.99	0.00E+00	5.08E-03	1.02E-02	11.0000	4.398E+00
Pa-231	3.8379E-09	530.99	1,061.99	0.00E+00	2.09E-06	4.18E-06		
Pb-210	3.3115E-10	530.99	1,061.99	0.00E+00	1.76E-07	3.52E-07		
Pm-147	9.2402E-04	530.99	1,061.99	0.00E+00	4.91E-01	9.81E-01		
Pu-238	1.6217E-02	530.99	1,061.99	0.00E+00	8.61E+00	1.72E+01		
Pu-239	4.2810E-04	530.99	1,061.99	0.00E+00	2.27E-01	4.55E-01		
Pu-240	2.4333E-04	530.99	1,061.99	0.00E+00	1.29E-01	2.58E-01		
Pu-241	1.6242E-02	530.99	1,061.99	0.00E+00	8.62E+00	1.72E+01		
Pu-242	3.6329E-07	530.99	1,061.99	0.00E+00	1.93E-04	3.86E-04		
Ra-226	9.0114E-10	530.99	1,061.99	0.00E+00	4.79E-07	9.57E-07		
Ra-228	3.1019E-14	530.99	1,061.99	0.00E+00	1.65E-11	3.29E-11		
Ru-106	2.1225E-10	530.99	1,061.99	0.00E+00	1.13E-07	2.25E-07		
Se-79	1.2930E-05	530.99	1,061.99	0.00E+00	6.87E-03	1.37E-02		
Sn-126	1.1571E-05	530.99	1,061.99	0.00E+00	6.14E-03	1.23E-02		
Sr-90	1.3472E+00	530.99	1,061.99	0.00E+00	7.15E+02	1.43E+03		
Tc-99	4.2239E-04	530.99	1,061.99	0.00E+00	2.24E-01	4.49E-01		
Th-229	1.2407E-11	530.99	1,061.99	0.00E+00	6.59E-09	1.32E-08		
Th-230	8.3497E-08	530.99	1,061.99	0.00E+00	4.43E-05	8.87E-05		
Th-232	3.8371E-14	530.99	1,061.99	0.00E+00	2.04E-11	4.08E-11		
Ti-208	4.0414E-08	530.99	1,061.99	0.00E+00	2.15E-05	4.29E-05		
U-232	1.0948E-07	530.99	1,061.99	0.00E+00	5.81E-05	1.16E-04		
U-233	3.6275E-09	530.99	1,061.99	0.00E+00	1.93E-06	3.85E-06		
U-234	1.8562E-04	530.99	1,061.99	0.00E+00	9.86E-02	1.97E-01		
U-235	-2.7235E-06	530.99	0.00	2.27E-03	8.21E-04	2.27E-03		
U-236	1.5493E-05	530.99	1,061.99	0.00E+00	8.23E-03	1.65E-02		
U-238	-4.2851E-09	530.99	0.00	1.46E-03	1.45E-03	1.46E-03		
Y-90	1.3475E+00	530.99	1,061.99	0.00E+00	7.16E+02	1.43E+03		
Other Radionuclides					7.27E+02	1.45E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.50065847	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		530.99	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,061.99	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.31		1.01
Bounding:	0.63		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIAN(EU)US2
 Site ID #: 712
 Fuel Units & Dates: 39 - 19 FLAT PLATES
 Heavy Metal Mass: BOL-172258g; EOL=66.153g
 ROD Storage Site: SRS

Fuel decay start date: 1985
 Estimates as of: 2030
 Template: ATR (Light Water, Aum, 60 to 100%, U)
 Template Burnup/(MWd): 367.2
 Template BOL Heavy Metal Mass (g): 0.00116538
 Template Decay Time: 35 years

Estimated
 Canister Usage:
 18 x 10 1.08

II. Estimates

Radionuclide	CLWWD From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Gamma Sources
Ac-227	2.0088E-09	5.732.12	11.464.24	0.00E+00	1.15E-05	2.30E-05	Avg. 444V	Total Photon/see (Bouding)
Am-241	2.5251E-07	5.732.12	11.464.24	0.00E+00	1.45E+01	2.89E+01	0.0150	8.44E+14
Am-242m	3.9624E-07	5.732.12	11.464.24	0.00E+00	2.27E-03	4.54E-03	0.0250	1.75E+14
Am-243	1.4880E-08	5.732.12	11.464.24	0.00E+00	8.53E-03	1.71E-02	0.0375	1.54E+14
C-14	5.703E-08	5.732.12	11.464.24	0.00E+00	3.27E-05	6.54E-05	0.0675	1.64E+14
Ce-136	1.3124E-32	5.732.12	11.464.24	0.00E+00	7.52E-29	1.50E-28	0.0850	8.89E+13
Co-243	1.1419E-07	5.732.12	11.464.24	0.00E+00	6.55E-04	1.31E-03	0.1250	6.52E+13
Co-244	1.6522E-05	5.732.12	11.464.24	0.00E+00	9.47E-02	1.89E-01	0.2250	8.52E+13
Co-60	7.4047E-07	5.732.12	11.464.24	0.00E+00	4.24E-03	8.49E-03	0.3750	3.71E+13
Co-136	2.0455E-05	5.732.12	11.464.24	0.00E+00	1.17E-01	2.34E-01	0.5750	6.13E+13
Ce-138	3.4477E-06	5.732.12	11.464.24	0.00E+00	1.98E-02	3.94E-02	0.8500	7.49E+12
Co-137	1.4365E-00	5.732.12	11.464.24	0.00E+00	8.22E+03	1.65E+04	1.2500	3.62E+12
Eu-154	7.3230E-03	5.732.12	11.464.24	0.00E+00	4.20E+01	8.40E+01	1.7500	2.04E+11
Eu-155	5.9259E-04	5.732.12	11.464.24	0.00E+00	3.40E+00	6.79E+00	2.2500	1.70E+07
Fe-55	2.2791E-06	5.732.12	11.464.24	0.00E+00	1.31E-02	2.61E-02	2.7500	1.62E+07
H-3	1.9698E-03	5.732.12	11.464.24	0.00E+00	1.13E+01	2.26E+01	3.5000	9.52E+03
I-129	7.5300E-07	5.732.12	11.464.24	0.00E+00	4.32E-03	8.63E-03	5.0000	3.897E+03
K-40	4.1178E-02	5.732.12	11.464.24	0.00E+00	2.38E+02	4.72E+02	7.0000	4.297E+02
La-237	9.5752E-06	5.732.12	11.464.24	0.00E+00	5.49E-02	1.10E-01	11.0000	4.76E+01
La-231	3.8379E-09	5.732.12	11.464.24	0.00E+00	2.26E-05	4.51E-05		
Pb-210	3.3115E-10	5.732.12	11.464.24	0.00E+00	1.90E-06	3.80E-06		
Pb-147	9.2402E-04	5.732.12	11.464.24	0.00E+00	5.30E+00	1.06E+01		
Pb-238	1.6217E-02	5.732.12	11.464.24	0.00E+00	8.30E+01	1.66E+02		
Pu-239	4.2810E-04	5.732.12	11.464.24	0.00E+00	2.45E+00	4.91E+00		
Pu-240	2.4333E-04	5.732.12	11.464.24	0.00E+00	1.39E+00	2.79E+00		
Pu-241	1.6242E-02	5.732.12	11.464.24	0.00E+00	9.31E+01	1.86E+02		
Pu-242	3.6309E-07	5.732.12	11.464.24	0.00E+00	2.08E-03	4.16E-03		
Pu-238	8.014E-10	5.732.12	11.464.24	0.00E+00	5.17E-08	1.03E-08		
Pu-239	3.1019E-14	5.732.12	11.464.24	0.00E+00	1.78E-10	3.56E-10		
Ru-106	2.1225E-10	5.732.12	11.464.24	0.00E+00	1.22E-08	2.43E-08		
Sr-90	1.2693E-05	5.732.12	11.464.24	0.00E+00	7.41E-02	1.48E-01		
Sr-126	1.1571E-05	5.732.12	11.464.24	0.00E+00	6.63E-02	1.33E-01		
Sr-90	1.2472E+00	5.732.12	11.464.24	0.00E+00	7.72E+03	1.54E+04		
Tc-99	4.2238E-04	5.732.12	11.464.24	0.00E+00	2.42E+00	4.84E+00		
Ti-229	1.2407E-11	5.732.12	11.464.24	0.00E+00	7.11E-08	1.42E-07		
Ti-230	8.3497E-06	5.732.12	11.464.24	0.00E+00	4.79E-04	9.57E-04		
Ti-232	3.8371E-14	5.732.12	11.464.24	0.00E+00	2.20E-10	4.40E-10		
Ti-208	4.0414E-08	5.732.12	11.464.24	0.00E+00	2.32E-04	4.63E-04		
U-232	1.0948E-07	5.732.12	11.464.24	0.00E+00	6.28E-04	1.26E-03		
U-233	3.6275E-09	5.732.12	11.464.24	0.00E+00	2.08E-05	4.16E-05		
U-234	1.8582E-04	5.732.12	11.464.24	0.00E+00	1.06E+00	2.13E+00		
U-235	-2.7235E-08	5.732.12	0.00	3.10E-02	1.54E-02	3.10E-02		
U-238	1.5483E-06	5.732.12	11.464.24	0.00E+00	8.89E-02	1.79E-01		
U-238	4.2851E-09	5.732.12	0.00	1.94E-02	1.94E-02	1.94E-02		
Y-90	1.3475E+00	5.732.12	11.464.24	0.00E+00	7.72E+03	1.54E+04		

Thermal Power	
Nominal Heat Output (Watts)	Heat Output (Watts)
9.59E+01	1.92E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	
From SFD	Used
Reactor Moderator: LIGHT WATER	Reactor Moderator: LIGHT WATER
Fuel Cladding: ALUM	Fuel Cladding: ALUM
BOL HM Constituent: U	BOL HM Constituent: U
BOL Enrichment %: 19.63900556	BOL Enrichment %: 60 to 100

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

Burnup Summary (MWd/g)	
From SFD	Estimated
Nominal: 5.732.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding: 11.464.24	Bounding burnup assumed to be twice nominal burnup.

Checks	
Nominal: Burnup Multiplier 0.25	Estimated Burnup/ Given Burnup
Bounding: 0.50	Estimated EOL HM/ Given EOL HM
	1.01

Reactor shutdown, core removal, storage, shipping or other data 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/gm).

L Fuel and Template Information

SNF ID #: 646

Fuel Units & Descr: 33 - MTR TYPE

Heavy Metal Mass: BOL=9.026kg; EOL=4.369kg

ROD Storage Site: SRS

¹Fuel decay start date:**Estimates as of:**

Template: ATR (Light Water, Alum., 60 to 100%, U)

2.Template Burnup(MWd):

Template BOL Heavy Metal Mass (MT):

Template Decay Time:

1985

2030

ater, A

367.2

0.00116689

35 years

Estimated Canister usage:	18"x10'
	0.92

II. Estimates

1992

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2

 γ_b

Gamma Source

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ⁴	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	4,418.98	8,547.32	0.00E+00	8.87E-06	1.72E-05	Avg. MeV	
Am-241	2.5251E-03	4,418.98	8,547.32	0.00E+00	1.12E+01	2.16E+01	0.0150	6.295E+14
Am-242m	3.9624E-07	4,418.98	8,547.32	0.00E+00	1.75E-03	3.39E-03	0.0250	1.307E+14
Am-243	1.4880E-06	4,418.98	8,547.32	0.00E+00	6.58E-03	1.27E-02	0.0375	1.136E+14
C-14	5.7063E-09	4,418.98	8,547.32	0.00E+00	2.52E-05	4.88E-05	0.0575	1.223E+14
Cl-36	1.3124E-32	4,418.98	8,547.32	0.00E+00	5.80E-29	1.12E-28	0.0850	7.369E+13
Cm-243	1.1419E-07	4,418.98	8,547.32	0.00E+00	5.05E-04	9.76E-04	0.1250	4.867E+13
Cm-244	1.6522E-05	4,418.98	8,547.32	0.00E+00	7.30E-02	1.41E-01	0.2250	6.361E+13
Co-60	7.4047E-07	4,418.98	8,547.32	0.00E+00	3.27E-03	6.33E-03	0.3750	2.768E+13
Cs-134	2.0455E-05	4,418.98	8,547.32	0.00E+00	9.04E-02	1.75E-01	0.5750	4.574E+14
Cs-135	3.4477E-06	4,418.98	8,547.32	0.00E+00	1.52E-02	2.95E-02	0.8500	5.587E+12
Cs-137	1.4365E+00	4,418.98	8,547.32	0.00E+00	6.35E+03	1.23E+04	1.2500	2.702E+12
Eu-154	7.3230E-03	4,418.98	8,547.32	0.00E+00	3.24E+01	6.26E+01	1.7500	1.521E+11
Eu-155	5.9259E-04	4,418.98	8,547.32	0.00E+00	2.62E+00	5.07E+00	2.2500	1.272E+07
Fe-55	2.2791E-06	4,418.98	8,547.32	0.00E+00	1.01E-02	1.95E-02	2.7500	1.214E+07
H-3	1.9698E-03	4,418.98	8,547.32	0.00E+00	8.70E+00	1.68E+01	3.5000	7.031E+03
I-129	7.5300E-07	4,418.98	8,547.32	0.00E+00	3.33E-03	6.44E-03	5.0000	2.873E+03
Kr-85	4.1178E-02	4,418.98	8,547.32	0.00E+00	1.82E+02	3.52E+02	7.0000	3.144E+02
Np-237	9.5752E-06	4,418.98	8,547.32	0.00E+00	4.23E-02	8.18E-02	11.0000	3.505E+01
Pa-231	3.9379E-09	4,418.98	8,547.32	0.00E+00	1.74E-05	3.37E-05		
Pb-210	3.3115E-10	4,418.98	8,547.32	0.00E+00	1.46E-06	2.83E-06		
Pm-147	9.2402E-04	4,418.98	8,547.32	0.00E+00	4.08E+00	7.90E+00		
Pu-238	1.6217E-02	4,418.98	8,547.32	0.00E+00	7.17E+01	1.39E+02		
Pu-239	4.2810E-04	4,418.98	8,547.32	0.00E+00	1.89E+00	3.66E+00		
Pu-240	2.4333E-04	4,418.98	8,547.32	0.00E+00	1.08E+00	2.08E+00		
Pu-241	1.6242E-02	4,418.98	8,547.32	0.00E+00	7.18E+01	1.39E+02		
Pu-242	3.6329E-07	4,418.98	8,547.32	0.00E+00	1.61E-03	3.11E-03		
Ra-226	9.0114E-10	4,418.98	8,547.32	0.00E+00	3.98E-06	7.70E-06		
Ra-228	3.1018E-14	4,418.98	8,547.32	0.00E+00	1.37E-10	2.65E-10		
Ru-106	2.1225E-10	4,418.98	8,547.32	0.00E+00	9.38E-07	1.81E-06		
Se-79	1.2930E-05	4,418.98	8,547.32	0.00E+00	5.71E-02	1.11E-01		
Sn-126	1.1571E-05	4,418.98	8,547.32	0.00E+00	5.11E-02	9.89E-02		
Sr-90	1.3472E+00	4,418.98	8,547.32	0.00E+00	5.95E+03	1.15E+04		
Tc-99	4.2239E-04	4,418.98	8,547.32	0.00E+00	1.87E+00	3.61E+00		
Th-229	1.2407E-11	4,418.98	8,547.32	0.00E+00	5.48E-08	1.06E-07		
Th-230	8.3497E-08							

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
OL HM Constituents:	U	U
BOL Enrichment %:	93.07350223	60 to 100

Basis for Parameter Differences:

Bumup Summary (MWd)

	From SFD	Estimated
Nominal:		4,418.98
Bounding:		8,547.32

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.56	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIA (UALX-MEU)
SNF ID #: 586
Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=3.62kg; EOL=2.766kg
ROD Storage Site: SRS

¹Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.14

II. Estimates	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	807.81	1,615.62	0.00E+00	1.62E-08	3.24E-08	Avg. MeV	
Am-241	2.5251E-03	807.81	1,615.62	0.00E+00	2.04E+00	4.08E+00	0.0150	1.190E+14
Am-242m	3.9624E-07	807.81	1,615.62	0.00E+00	3.20E-04	6.40E-04	0.0250	2.471E+13
Am-243	1.4880E-06	807.81	1,615.62	0.00E+00	1.20E-03	2.40E-03	0.0375	2.148E+13
C-14	5.7053E-09	807.81	1,615.62	0.00E+00	4.61E-08	9.22E-08	0.0575	2.312E+13
Cl-36	1.3124E-32	807.81	1,615.62	0.00E+00	1.06E-29	2.12E-29	0.0850	1.393E+13
Cm-243	1.1419E-07	807.81	1,615.62	0.00E+00	9.22E-05	1.84E-04	0.1250	9.200E+12
Cm-244	1.6522E-05	807.81	1,615.62	0.00E+00	1.33E-02	2.67E-02	0.2250	1.202E+13
Co-60	7.4047E-07	807.81	1,615.62	0.00E+00	5.98E-04	1.20E-03	0.3750	5.231E+12
Cs-134	2.0455E-05	807.81	1,615.62	0.00E+00	1.65E-02	3.30E-02	0.5750	8.646E+13
Cs-135	3.4477E-06	807.81	1,615.62	0.00E+00	2.79E-03	5.57E-03	0.8500	1.058E+12
Cs-137	1.4365E+00	807.81	1,615.62	0.00E+00	1.16E+03	2.32E+03	1.2500	5.108E+11
Eu-154	7.3230E-03	807.81	1,615.62	0.00E+00	5.92E+00	1.18E+01	1.7500	2.875E+10
Eu-155	5.9259E-04	807.81	1,615.62	0.00E+00	4.79E-01	9.57E-01	2.2500	2.404E+08
Fe-55	2.2791E-06	807.81	1,615.62	0.00E+00	1.84E-03	3.68E-03	2.7500	2.294E+06
H-3	1.9698E-03	807.81	1,615.62	0.00E+00	1.59E+00	3.18E+00	3.5000	1.332E+09
I-129	7.5300E-07	807.81	1,615.62	0.00E+00	6.08E-04	1.22E-03	5.0000	5.445E+02
Kr-85	4.1176E-02	807.81	1,615.62	0.00E+00	3.33E+01	6.65E+01	7.0000	5.950E+01
Np-237	9.5752E-06	807.81	1,615.62	0.00E+00	7.73E-03	1.55E-02	11.0000	6.645E+00
Pa-231	3.9379E-09	807.81	1,615.62	0.00E+00	3.18E-08	6.36E-08		
Pb-210	3.3115E-10	807.81	1,615.62	0.00E+00	2.68E-07	5.35E-07		
Pm-147	9.2402E-04	807.81	1,615.62	0.00E+00	7.48E-01	1.49E+00		
Pu-238	1.6217E-02	807.81	1,615.62	0.00E+00	1.31E+01	2.62E+01		
Pu-239	4.2810E-04	807.81	1,615.62	0.00E+00	3.46E-01	6.92E-01		
Pu-240	2.4333E-04	807.81	1,615.62	0.00E+00	1.97E-01	3.93E-01		
Pu-241	1.6242E-02	807.81	1,615.62	0.00E+00	1.31E+01	2.62E+01		
Pu-242	3.6329E-07	807.81	1,615.62	0.00E+00	2.93E-04	5.87E-04		
Ra-226	9.0114E-10	807.81	1,615.62	0.00E+00	7.28E-07	1.46E-06		
Ra-228	3.1019E-14	807.81	1,615.62	0.00E+00	2.51E-11	5.01E-11		
Ru-106	2.1225E-10	807.81	1,615.62	0.00E+00	1.71E-07	3.43E-07		
Se-79	1.2930E-05	807.81	1,615.62	0.00E+00	1.04E-02	2.09E-02		
Sn-126	1.1571E-05	807.81	1,615.62	0.00E+00	9.35E-03	1.87E-02		
Sr-90	1.3472E+00	807.81	1,615.62	0.00E+00	1.09E+03	2.18E+03		
Tc-99	4.2239E-04	807.81	1,615.62	0.00E+00	3.41E-01	6.82E-01		
Th-229	1.2407E-11	807.81	1,615.62	0.00E+00	1.00E-08	2.00E-08		
Th-230	8.3497E-08	807.81	1,615.62	0.00E+00	6.74E-05	1.35E-04		
Th-232	3.8371E-14	807.81	1,615.62	0.00E+00	3.10E-11	6.20E-11		
Ti-208	4.0414E-08	807.81	1,615.62	0.00E+00	3.26E-05	6.53E-05		
U-232	1.0948E-07	807.81	1,615.62	0.00E+00	8.84E-05	1.77E-04		
U-233	3.6275E-09	807.81	1,615.62	0.00E+00	2.93E-06	5.86E-06		
U-234	1.8562E-04	807.81	1,615.62	0.00E+00	1.50E-01	3.00E-01		
U-235	-2.7235E-06	807.81	0.00	3.48E-03	1.28E-03	3.48E-03		
U-236	1.5493E-05	807.81	1,615.62	0.00E+00	1.25E-02	2.50E-02		
U-238	-4.2851E-09	807.81	0.00	6.76E-04	6.72E-04	6.76E-04		
Y-90	1.3475E+00	807.81	1,615.62	0.00E+00	1.09E+03	2.18E+03		
Other Radionuclides					1.11E+03	2.21E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.43904151	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		807.81
Bounding:		1,615.62

Basis for burnup used in estimates:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	
Bounding:	1.42	

Estimated EOL HM/Given EOL HM
1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATSR
SNF ID #: 17
Fuel Units & Descr: 20 - 19 FLAT PLATES
Heavy Metal Mass: BOL= ; EOL=3.21kg
ROD Storage Site: SRS

Fuel decay start date: 1988
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"
0.56

II. Estimates	m	X ₀	X _b	b	Y ₀	Y _b	Gamma Sources	
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	3,039.93	3,039.93	0.00E+00	6.10E-06	6.10E-06	Avg. MeV	
Am-241	2.5251E-03	3,039.93	3,039.93	0.00E+00	7.68E+00	7.68E+00	0.0150	2.239E+14
Am-242m	3.9624E-07	3,039.93	3,039.93	0.00E+00	1.20E-03	1.20E-03	0.0250	4.649E+13
Am-243	1.4880E-06	3,039.93	3,039.93	0.00E+00	4.52E-03	4.52E-03	0.0375	4.041E+13
C-14	5.7053E-09	3,039.93	3,039.93	0.00E+00	1.73E-05	1.73E-05	0.0575	4.350E+13
Cl-36	1.3124E-32	3,039.93	3,039.93	0.00E+00	3.99E-29	3.99E-29	0.0850	2.621E+13
Cm-243	1.1419E-07	3,039.93	3,039.93	0.00E+00	3.47E-04	3.47E-04	0.1250	1.731E+13
Cm-244	1.8522E-05	3,039.93	3,039.93	0.00E+00	5.02E-02	5.02E-02	0.2250	2.263E+13
Co-60	7.4047E-07	3,039.93	3,039.93	0.00E+00	2.25E-03	2.25E-03	0.3750	9.843E+12
Cs-134	2.0455E-05	3,039.93	3,039.93	0.00E+00	6.22E-02	6.22E-02	0.5750	1.827E+14
Cs-135	3.4477E-06	3,039.93	3,039.93	0.00E+00	1.05E-02	1.05E-02	0.8500	1.987E+12
Cs-137	1.4365E+00	3,039.93	3,039.93	0.00E+00	4.37E+03	4.37E+03	1.2500	9.811E+11
Eu-154	7.3230E-03	3,039.93	3,039.93	0.00E+00	2.23E+01	2.23E+01	1.7500	5.409E+10
Eu-155	5.8259E-04	3,039.93	3,039.93	0.00E+00	1.80E+00	1.80E+00	2.2500	4.523E+06
Fe-55	2.2791E-06	3,039.93	3,039.93	0.00E+00	6.93E-03	6.93E-03	2.7500	4.317E+06
H-3	1.9698E-03	3,039.93	3,039.93	0.00E+00	5.99E+00	5.99E+00	3.5000	2.501E+03
I-129	7.5300E-07	3,039.93	3,039.93	0.00E+00	2.29E-03	2.29E-03	5.0000	1.022E+03
Kr-85	4.1176E-02	3,039.93	3,039.93	0.00E+00	1.25E+02	1.25E+02	7.0000	1.118E+02
Np-237	9.5752E-06	3,039.93	3,039.93	0.00E+00	2.91E-02	2.91E-02	11.0000	1.247E+01
Pa-231	3.9379E-09	3,039.93	3,039.93	0.00E+00	1.20E-05	1.20E-05		
Pb-210	3.3115E-10	3,039.93	3,039.93	0.00E+00	1.01E-06	1.01E-06		
Pm-147	9.2402E-04	3,039.93	3,039.93	0.00E+00	2.81E+00	2.81E+00		
Pu-238	1.8217E-02	3,039.93	3,039.93	0.00E+00	4.93E+01	4.93E+01		
Pu-239	4.2810E-04	3,039.93	3,039.93	0.00E+00	1.30E+00	1.30E+00		
Pu-240	2.4333E-04	3,039.93	3,039.93	0.00E+00	7.40E-01	7.40E-01		
Pu-241	1.6242E-02	3,039.93	3,039.93	0.00E+00	4.94E+01	4.94E+01		
Pu-242	3.6329E-07	3,039.93	3,039.93	0.00E+00	1.10E-03	1.10E-03		
Ra-226	9.0114E-10	3,039.93	3,039.93	0.00E+00	2.74E-06	2.74E-06		
Ra-228	3.1019E-14	3,039.93	3,039.93	0.00E+00	9.43E-11	9.43E-11		
Ru-106	2.1225E-10	3,039.93	3,039.93	0.00E+00	6.45E-07	6.45E-07		
Se-79	1.2930E-05	3,039.93	3,039.93	0.00E+00	3.93E-02	3.93E-02		
Sn-126	1.1571E-05	3,039.93	3,039.93	0.00E+00	3.52E-02	3.52E-02		
Sr-90	1.3472E+00	3,039.93	3,039.93	0.00E+00	4.10E+03	4.10E+03		
Tc-99	4.2239E-04	3,039.93	3,039.93	0.00E+00	1.28E+00	1.28E+00		
Th-229	1.2407E-11	3,039.93	3,039.93	0.00E+00	3.77E-08	3.77E-08		
Th-230	8.3497E-08	3,039.93	3,039.93	0.00E+00	2.54E-04	2.54E-04		
Th-232	3.8371E-14	3,039.93	3,039.93	0.00E+00	1.17E-10	1.17E-10		
Ti-208	4.0414E-08	3,039.93	3,039.93	0.00E+00	1.23E-04	1.23E-04		
U-232	1.0948E-07	3,039.93	3,039.93	0.00E+00	3.33E-04	3.33E-04		
U-233	3.6275E-09	3,039.93	3,039.93	0.00E+00	1.10E-05	1.10E-05	Thermal Power	
U-234	1.8562E-04	3,039.93	3,039.93	0.00E+00	5.64E-01	5.64E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	3,039.93	0.00	1.28E-02	4.50E-03	1.28E-02	6.09E+01	6.09E+01
U-236	1.5493E-05	3,039.93	3,039.93	0.00E+00	4.71E-02	4.71E-02	Total	Total
U-238	-4.2851E-09	3,039.93	0.00	1.29E-04	1.16E-04	1.29E-04		
Y-90	1.3475E+00	3,039.93	3,039.93	0.00E+00	4.10E+03	4.10E+03		
Other Radionuclides					4.16E+03	4.16E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		3,039.93
Bounding:		3,039.93

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:	1.50	
Bounding:	1.50	

Estimated EOL HM/Given EOL HM
1.02

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BABCOCK & WILCOX SCRAP
SNF ID #: 18
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.07kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1969
Estimates as of: 2030
Template: (Worst Case)
²Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186885
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	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	66.52	66.52	0.00E+00	1.68E-04	1.68E-04	Avg. MeV	
Am-241	8.6432E+00	66.52	66.52	0.00E+00	5.75E+02	5.75E+02	0.0150	5.639E+13
Am-242m	1.5728E-02	66.52	66.52	0.00E+00	1.05E+00	1.05E+00	0.0250	1.114E+13
Am-243	1.6288E-02	66.52	66.52	0.00E+00	1.08E+00	1.08E+00	0.0375	9.415E+12
C-14	1.2068E-01	66.52	66.52	0.00E+00	8.03E+00	8.03E+00	0.0675	1.778E+13
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01	0.0850	5.961E+12
Cm-243	6.0144E-04	66.52	66.52	0.00E+00	4.00E-02	4.00E-02	0.1250	4.218E+12
Cm-244	9.4880E-02	66.52	66.52	0.00E+00	6.31E+00	6.31E+00	0.2250	5.159E+12
Co-60	3.9052E+00	66.52	66.52	0.00E+00	2.60E+02	2.60E+02	0.3750	2.233E+12
Cs-134	2.2139E-06	66.52	66.52	0.00E+00	1.47E-04	1.47E-04	0.5750	3.695E+13
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02	0.8500	8.094E+11
Cs-137	1.4887E+01	66.52	66.52	0.00E+00	9.90E+02	9.90E+02	1.2500	1.984E+13
Eu-154	3.7342E-01	66.52	66.52	0.00E+00	2.48E+01	2.48E+01	1.7500	2.384E+10
Eu-155	8.4893E-03	66.52	66.52	0.00E+00	5.65E-01	5.65E-01	2.2500	1.031E+08
Fe-55	5.3750E-03	66.52	66.52	0.00E+00	3.58E-01	3.58E-01	2.7500	1.775E+08
H-3	1.0472E-01	66.52	66.52	0.00E+00	6.97E+00	6.97E+00	3.5000	9.882E+04
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04	5.0000	4.083E+04
Kr-85	2.2717E-01	66.52	66.52	0.00E+00	1.51E+01	1.51E+01	7.0000	4.651E+03
Np-237	1.6400E-04	66.52	66.52	0.00E+00	1.09E-02	1.09E-02	11.0000	5.305E+02
Pa-231	2.8688E-06	66.52	66.52	0.00E+00	1.91E-04	1.91E-04		
Pb-210	4.7312E-08	66.52	66.52	0.00E+00	3.15E-06	3.15E-06		
Pm-147	3.2198E-04	66.52	66.52	0.00E+00	2.14E-02	2.14E-02		
Pu-238	-1.1924E+00	66.52	0.00	1.80E+01	0.00E+00	1.80E+01		
Pu-239	-4.8600E-02	66.52	0.00	2.18E+00	0.00E+00	2.18E+00		
Pu-240	-3.0127E-01	66.52	0.00	2.78E+00	0.00E+00	2.78E+00		
Pu-241	-1.2917E+02	66.52	0.00	7.16E+02	0.00E+00	7.16E+02		
Pu-242	-1.1381E-04	66.52	0.00	1.20E-02	4.46E-03	1.20E-02		
Ra-226	1.0760E-07	66.52	66.52	0.00E+00	7.16E-06	7.16E-06		
Ra-228	6.0160E-07	66.52	66.52	0.00E+00	4.00E-05	4.00E-05		
Ru-106	1.3388E-13	66.52	66.52	0.00E+00	8.91E-12	8.91E-12		
Se-79	1.9179E-04	66.52	66.52	0.00E+00	1.28E-02	1.28E-02		
Sn-126	1.6699E-04	66.52	66.52	0.00E+00	1.11E-02	1.11E-02		
Sr-90	1.3859E+01	66.52	66.52	0.00E+00	9.22E+02	9.22E+02		
Tc-99	6.7678E-03	66.52	66.52	0.00E+00	4.50E-01	4.50E-01		
Th-229	2.2592E-06	66.52	66.52	0.00E+00	1.50E-04	1.50E-04		
Th-230	7.5955E-08	66.52	66.52	0.00E+00	5.05E-04	5.05E-04		
Th-232	6.0208E-07	66.52	66.52	0.00E+00	4.01E-05	4.01E-05		
Th-208	7.5795E-05	66.52	66.52	0.00E+00	5.04E-03	5.04E-03		
U-232	2.0521E-04	66.52	66.52	0.00E+00	1.37E-02	1.37E-02		
U-233	3.6128E-04	66.52	66.52	0.00E+00	2.40E-02	2.40E-02		
U-234	1.2788E-02	66.52	66.52	0.00E+00	8.51E-01	8.51E-01		
U-235	5.7486E-04	66.52	66.52	6.02E-05	3.83E-02	3.83E-02		
U-238	2.3485E-04	66.52	66.52	0.00E+00	1.56E-02	1.56E-02		
U-238	1.1581E-04	66.52	66.52	7.49E-06	7.71E-03	7.71E-03		
Y-90	1.3861E+01	66.52	66.52	0.00E+00	9.22E+02	9.22E+02		
Other Radionuclides					3.42E+03	3.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.57E+01	3.65E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	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) ³			Basis for burnup used in estimates:
	From SFD	Estimated	
Nominal:		66.52	Nominal burnup set equal to bounding burnup.
Bounding:		66.52	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks			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: BER-M (HMI) (END BOXES) GERMANY
 SNF ID #: 892
 Fuel Units & Descr: 6 - MTR TYPE
 Heavy Metal Mass: BOL=0kg, EOL=0kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1996
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 25 years

Estimated
 Canister usage:
 HIC
 1.00

II. Estimates	m	x ₀	x _b	b	y ₀	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	2.3056E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	0.000E+00
Am-242m	4.1476E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4894E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	0.000E+00
C-14	5.7108E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	0.000E+00
Cl-36	1.3124E-32	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	0.000E+00
Cm-243	1.4562E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	0.000E+00
Cm-244	2.4221E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	0.000E+00
Co-60	2.7560E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	0.000E+00
Cs-134	5.8851E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	0.000E+00
Cs-135	3.4477E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	0.000E+00
Cs-137	1.8099E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	0.000E+00
Eu-154	1.6386E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	0.000E+00
Eu-155	2.3957E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	0.000E+00
Fe-55	3.2707E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	0.000E+00
H-3	3.4504E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	0.000E+00
I-129	7.5300E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	0.000E+00
Kr-85	7.8540E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	0.000E+00
Np-237	9.5615E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	0.000E+00
Pa-231	2.7968E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	1.2612E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	1.2952E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.7549E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	4.2810E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.4357E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	2.6277E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	3.6329E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	4.4444E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9714E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	2.0477E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.2933E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.1574E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	1.7092E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.2239E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	7.7260E-12	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	5.8497E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.6906E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-234	4.4336E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-232	1.2037E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-233	3.0011E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-234	1.8497E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-235	-2.7235E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-236	1.5493E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-4.2851E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Y-90	1.7094E+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		

Thermal Power
 Nominal Heat Bounding
 Output Heat Output
 (Watts) (Watts)
 0.00E+00 0.00E+00
 Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		
Bounding:		

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:		
Bounding:		

Estimated EOL HM/Given EOL HM

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II (HAW) (UALX HEU) GERMANY
SNF ID #: 758
Fuel Units & Descr: 112 - 17 FLAT PLATES
Heavy Metal Mass: BOL=20.653kg; EOL=12.074kg
ROD Storage Site: SRS

Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116688
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
4.67

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	8,124.67	16,249.34	0.00E+00	9.32E-06	1.86E-05	Avg. MeV	
Am-241	2.3056E-03	8,124.67	16,249.34	0.00E+00	1.87E+01	3.75E+01	0.0150	1.520E+15
Am-242m	4.1476E-07	8,124.67	16,249.34	0.00E+00	3.37E-03	6.74E-03	0.0250	3.159E+14
Am-243	1.4894E-06	8,124.67	16,249.34	0.00E+00	1.21E-02	2.42E-02	0.0375	2.751E+14
C-14	5.7108E-09	8,124.67	16,249.34	0.00E+00	4.64E-05	9.28E-05	0.0575	2.954E+14
Cl-36	1.3124E-32	8,124.67	16,249.34	0.00E+00	1.07E-28	2.13E-28	0.0850	1.782E+14
Cm-243	1.4562E-07	8,124.67	16,249.34	0.00E+00	1.18E-03	2.37E-03	0.1250	1.194E+14
Cm-244	2.4221E-05	8,124.67	16,249.34	0.00E+00	1.97E-01	3.94E-01	0.2250	1.539E+14
Co-60	2.7560E-06	8,124.67	16,249.34	0.00E+00	2.24E-02	4.48E-02	0.3750	6.690E+13
Cs-134	5.8851E-04	8,124.67	16,249.34	0.00E+00	4.78E+00	9.56E+00	0.5750	1.097E+15
Cs-135	3.4477E-06	8,124.67	16,249.34	0.00E+00	2.80E-02	5.60E-02	0.8500	1.580E+13
Cs-137	1.8099E+00	8,124.67	16,249.34	0.00E+00	1.47E+04	2.94E+04	1.2500	6.789E+12
Eu-154	1.6386E-02	8,124.67	16,249.34	0.00E+00	1.33E+02	2.66E+02	1.7500	4.342E+11
Eu-155	2.3957E-03	8,124.67	16,249.34	0.00E+00	1.95E+01	3.89E+01	2.2500	3.095E+07
Fe-55	3.2707E-05	8,124.67	16,249.34	0.00E+00	2.66E-01	5.31E-01	2.7500	2.534E+07
H-3	3.4504E-03	8,124.67	16,249.34	0.00E+00	2.80E+01	5.61E+01	3.5000	1.912E+04
I-129	7.5300E-07	8,124.67	16,249.34	0.00E+00	6.12E-03	1.22E-02	5.0000	6.431E-03
Kr-85	7.8540E-02	8,124.67	16,249.34	0.00E+00	6.38E+02	1.28E+03	7.0000	7.077E+02
Np-237	9.5615E-06	8,124.67	16,249.34	0.00E+00	7.77E-02	1.55E-01	11.0000	7.916E+01
Pa-231	2.7968E-09	8,124.67	16,249.34	0.00E+00	2.27E-05	4.54E-05		
Pb-210	1.2612E-10	8,124.67	16,249.34	0.00E+00	1.02E-06	2.05E-06		
Pm-147	1.2952E-02	8,124.67	16,249.34	0.00E+00	1.05E+02	2.10E+02		
Pu-238	1.7549E-02	8,124.67	16,249.34	0.00E+00	1.43E+02	2.85E+02		
Pu-239	4.2810E-04	8,124.67	16,249.34	0.00E+00	3.48E+00	6.96E+00		
Pu-240	2.4357E-04	8,124.67	16,249.34	0.00E+00	1.98E+00	3.96E+00		
Pu-241	2.6277E-02	8,124.67	16,249.34	0.00E+00	2.13E+02	4.27E+02		
Pu-242	3.6329E-07	8,124.67	16,249.34	0.00E+00	2.95E-03	5.90E-03		
Ra-226	4.4444E-10	8,124.67	16,249.34	0.00E+00	3.61E-06	7.22E-06		
Ra-228	1.9714E-14	8,124.67	16,249.34	0.00E+00	1.60E-10	3.20E-10		
Ru-106	2.0477E-07	8,124.67	16,249.34	0.00E+00	1.66E-03	3.33E-03		
Se-79	1.2933E-05	8,124.67	16,249.34	0.00E+00	1.05E-01	2.10E-01		
Sn-126	1.1574E-05	8,124.67	16,249.34	0.00E+00	9.40E-02	1.88E-01		
Sr-90	1.7092E+00	8,124.67	16,249.34	0.00E+00	1.39E+04	2.78E+04		
Tc-99	4.2239E-04	8,124.67	16,249.34	0.00E+00	3.43E+00	6.86E+00		
Th-229	7.7280E-12	8,124.67	16,249.34	0.00E+00	6.28E-08	1.26E-07		
Th-230	5.8497E-08	8,124.67	16,249.34	0.00E+00	4.75E-04	9.51E-04		
Th-232	2.6906E-14	8,124.67	16,249.34	0.00E+00	2.19E-10	4.37E-10		
Ti-208	4.4336E-06	8,124.67	16,249.34	0.00E+00	3.60E-04	7.20E-04		
U-232	1.2037E-07	8,124.67	16,249.34	0.00E+00	9.78E-04	1.96E-03		
U-233	3.0011E-09	8,124.67	16,249.34	0.00E+00	2.44E-05	4.88E-05		
U-234	1.8497E-04	8,124.67	16,249.34	0.00E+00	1.50E+00	3.01E+00		
U-235	2.7235E-06	8,124.67	0.00	4.15E-02	1.94E-02	4.15E-02		
U-236	1.5493E-05	8,124.67	16,249.34	0.00E+00	1.26E-01	2.52E-01		
U-238	4.2851E-09	8,124.67	0.00	4.84E-04	4.49E-04	4.84E-04		
Y-90	1.7094E+00	8,124.67	16,249.34	0.00E+00	1.39E+04	2.78E+04		
Other Radionuclides					1.40E+04	2.80E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.03245367	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		8,124.67	
Bounding:		16,249.34	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.25		
Bounding:	2.50		1.04

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: BNL MEDICAL RX (BNMR)
 SNF ID #: 21
 Fuel Units & Descr: 40 - CYLINDRICAL SECTIONS
 Heavy Metal Mass: BOL-6, 1889g, EOL-6, 124g
 ROD Storage Site: SNS

Fuel decay start date: 1989
 Estimate as of: 2030
 Template: ATR (Light Water, Atom. 60 to 100%, U)
 Template Burnup (MWd): 367.2
 Heavy Metal Mass (MT): 0.00196589
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18 "10"
 1.11

II. Radionuclides	m	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Gamma Sources
Radionuclide	CMWD 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	Photon Total Photons/sec (bounding)
Ac-227	2.0063E-03	1,007.63	2,015.26	0.00E+00	2,02E-06	4,04E-06	Avg. MeV	1.484E+14
Am-241	2.5251E-03	1,007.63	2,015.26	0.00E+00	2,54E-06	5,09E-06	0.0150	1.484E+14
Am-242m	3.8624E-07	1,007.63	2,015.26	0.00E+00	3,89E-04	7,89E-04	0.0250	3.002E+13
Am-243	1.4880E-06	1,007.63	2,015.26	0.00E+00	1,50E-03	3,00E-03	0.0375	2.879E+13
C-14	5.7053E-09	1,007.63	2,015.26	0.00E+00	5,75E-06	1,15E-05	0.0575	2.884E+13
Ci-36	1.3124E-32	1,007.63	2,015.26	0.00E+00	1,32E-29	2,64E-29	0.0850	1.237E+13
Cm-243	1.1419E-07	1,007.63	2,015.26	0.00E+00	1,15E-04	2,30E-04	0.1250	1.148E+13
Cm-244	1.6522E-06	1,007.63	2,015.26	0.00E+00	1,68E-02	3,36E-02	0.2250	1.500E+13
Co-60	7.4047E-07	1,007.63	2,015.26	0.00E+00	7,46E-04	1,49E-03	0.3750	6.525E+12
Co-134	2.0455E-06	1,007.63	2,015.26	0.00E+00	2,06E-02	4,12E-02	0.5750	1.078E+12
Co-137	3.4477E-06	1,007.63	2,015.26	0.00E+00	3,47E-03	6,95E-03	0.8500	1.317E+12
Eu-154	1.4365E+00	1,007.63	2,015.26	0.00E+00	1,45E+03	2,90E+03	1.2500	6.371E+11
Eu-155	6.9259E-04	1,007.63	2,015.26	0.00E+00	5,97E-01	1,19E+00	1.7500	3.588E+10
Fe-55	2.2771E-06	1,007.63	2,015.26	0.00E+00	2,30E-03	4,59E-03	2.2500	2.852E+06
Fe-59	1.8698E-03	1,007.63	2,015.26	0.00E+00	1,88E+00	3,77E+00	3.5000	1.659E+03
H-3	7.5300E-07	1,007.63	2,015.26	0.00E+00	7,59E-04	1,52E-03	6.0000	6.177E+02
I-129	4.1176E-02	1,007.63	2,015.26	0.00E+00	4,15E+01	8,30E+01	7.0000	7.416E+01
Np-237	8.5752E-06	1,007.63	2,015.26	0.00E+00	8,65E-03	1,73E-02	11.0000	8.289E+00
Pu-231	3.8379E-09	1,007.63	2,015.26	0.00E+00	3,87E-06	7,74E-06		
Pu-210	3.3115E-10	1,007.63	2,015.26	0.00E+00	3,34E-07	6,67E-07		
Pm-147	9.2402E-04	1,007.63	2,015.26	0.00E+00	9,31E-01	1,86E+00		
Pu-239	1.6217E-02	1,007.63	2,015.26	0.00E+00	1,63E+01	3,27E+01		
Pu-240	4.2810E-04	1,007.63	2,015.26	0.00E+00	4,31E-01	8,63E-01		
Pu-241	2.4333E-04	1,007.63	2,015.26	0.00E+00	2,45E-01	4,90E-01		
Pu-242	1.6242E-02	1,007.63	2,015.26	0.00E+00	1,64E+01	3,27E+01		
Pu-242	3.6329E-07	1,007.63	2,015.26	0.00E+00	3,66E-04	7,32E-04		
Pu-246	9.0114E-10	1,007.63	2,015.26	0.00E+00	9,08E-07	1,82E-06		
Ra-226	3.1019E-14	1,007.63	2,015.26	0.00E+00	3,13E-11	6,25E-11		
Ru-106	2.1225E-05	1,007.63	2,015.26	0.00E+00	2,14E-07	4,28E-07		
Sr-79	1.2930E-06	1,007.63	2,015.26	0.00E+00	1,30E-02	2,61E-02		
Sr-126	1.1571E-05	1,007.63	2,015.26	0.00E+00	1,17E-02	2,33E-02		
Tc-99	1.3472E+00	1,007.63	2,015.26	0.00E+00	1,36E+03	2,71E+03		
Ti-229	4.2239E-04	1,007.63	2,015.26	0.00E+00	4,28E-01	8,51E-01		
Ti-230	1.2407E-11	1,007.63	2,015.26	0.00E+00	1,25E-08	2,50E-08		
Ti-232	8.3497E-08	1,007.63	2,015.26	0.00E+00	8,41E-05	1,68E-04		
Ti-232	3.8371E-14	1,007.63	2,015.26	0.00E+00	3,87E-11	7,73E-11		
Ti-236	4.0414E-07	1,007.63	2,015.26	0.00E+00	4,07E-05	8,14E-05		
U-232	1.0848E-07	1,007.63	2,015.26	0.00E+00	1,10E-04	2,21E-04		
U-233	3.6273E-09	1,007.63	2,015.26	0.00E+00	3,66E-06	7,31E-06		
U-234	1.8562E-04	1,007.63	2,015.26	0.00E+00	1,87E-01	3,74E-01		
U-235	2.7235E-06	1,007.63	2,015.26	0.00E+00	9,65E-03	1,93E-02		
U-236	1.5493E-05	1,007.63	2,015.26	0.00E+00	1,56E-02	3,12E-02		
U-238	4.2851E-09	1,007.63	2,015.26	0.00E+00	1,53E-04	3,06E-04		
Y-90	1.3475E+00	1,007.63	2,015.26	0.00E+00	1,36E+03	2,72E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: ALUMI	ALUMI
BOL HMI Constituents: U	U
BOL Enrichment %: 82.65182255	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

From SFD	Estimated
Nominal: 1,007.63	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding: 2,015.26	Bounding burnup assumed to be twice nominal burnup.

Basis for burnup used in estimate:

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal: 0.92		
Bounding: 1.03		

Estimated EOL (MWd) BOL HMI
 1.01

³ Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.
⁴ Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/Mt).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BSR
SNF ID #: 31
Fuel Units & Descr: 41 - 19 PLATE MTR ASSY
Heavy Metal Mass: BOL=7.856kg; EOL=6.941kg
ROD Storage Site: SRS

Fuel decay start date: 1991
Estimate 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"x19"
1.71

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	865.86	1,731.72	0.00E+00	1.74E-08	3.48E-08	Avg. MeV	
Am-241	2.5251E-03	865.86	1,731.72	0.00E+00	2.19E+00	4.37E+00	0.0150	1.275E+14
Am-242m	3.9624E-07	865.86	1,731.72	0.00E+00	3.43E-04	6.86E-04	0.0250	2.648E+13
Am-243	1.4880E-06	865.86	1,731.72	0.00E+00	1.29E-03	2.58E-03	0.0375	2.302E+13
C-14	5.7053E-09	865.86	1,731.72	0.00E+00	4.94E-08	9.88E-08	0.0575	2.478E+13
Cl-36	1.3124E-32	865.86	1,731.72	0.00E+00	1.14E-29	2.27E-29	0.0850	1.493E+13
Cm-243	1.1419E-07	865.86	1,731.72	0.00E+00	9.89E-05	1.98E-04	0.1250	9.861E+12
Cm-244	1.6522E-05	865.86	1,731.72	0.00E+00	1.43E-02	2.86E-02	0.2250	1.289E+13
Co-60	7.4047E-07	865.86	1,731.72	0.00E+00	6.41E-04	1.28E-03	0.3750	5.607E+12
Cs-134	2.0455E-05	865.86	1,731.72	0.00E+00	1.77E-02	3.54E-02	0.5750	9.267E+13
Cs-135	3.4477E-06	865.86	1,731.72	0.00E+00	2.99E-03	5.97E-03	0.8500	1.132E+12
Cs-137	1.4365E+00	865.86	1,731.72	0.00E+00	1.24E+03	2.49E+03	1.2500	5.475E+11
Eu-154	7.3230E-03	865.86	1,731.72	0.00E+00	6.34E+00	1.27E+01	1.7500	3.081E+10
Eu-155	5.9259E-04	865.86	1,731.72	0.00E+00	5.13E-01	1.03E+00	2.2500	2.576E+06
Fe-55	2.2791E-06	865.86	1,731.72	0.00E+00	1.97E-03	3.95E-03	2.7500	2.459E+06
H-3	1.9698E-03	865.86	1,731.72	0.00E+00	1.71E+00	3.41E+00	3.5000	1.426E+03
I-129	7.5300E-07	865.86	1,731.72	0.00E+00	6.52E-04	1.30E-03	5.0000	5.825E+02
Kr-85	4.1176E-02	865.86	1,731.72	0.00E+00	3.57E+01	7.13E+01	7.0000	6.375E+01
Np-237	9.5752E-06	865.86	1,731.72	0.00E+00	8.29E-03	1.66E-02	11.0000	7.108E+00
Pa-231	3.9379E-09	865.86	1,731.72	0.00E+00	3.41E-06	6.82E-06		
Pb-210	3.3115E-10	865.86	1,731.72	0.00E+00	2.87E-07	5.73E-07		
Pm-147	9.2402E-04	865.86	1,731.72	0.00E+00	8.00E-01	1.60E+00		
Pu-238	1.6217E-02	865.86	1,731.72	0.00E+00	1.40E+01	2.81E+01		
Pu-239	4.2810E-04	865.86	1,731.72	0.00E+00	3.71E-01	7.41E-01		
Pu-240	2.4333E-04	865.86	1,731.72	0.00E+00	2.11E-01	4.21E-01		
Pu-241	1.6242E-02	865.86	1,731.72	0.00E+00	1.41E+01	2.81E+01		
Pu-242	3.6329E-07	865.86	1,731.72	0.00E+00	3.15E-04	6.29E-04		
Ra-226	9.0114E-10	865.86	1,731.72	0.00E+00	7.80E-07	1.56E-06		
Ra-228	3.1019E-14	865.86	1,731.72	0.00E+00	2.69E-11	5.37E-11		
Ru-106	2.1225E-10	865.86	1,731.72	0.00E+00	1.84E-07	3.68E-07		
Se-79	1.2930E-05	865.86	1,731.72	0.00E+00	1.12E-02	2.24E-02		
Sn-126	1.1571E-05	865.86	1,731.72	0.00E+00	1.00E-02	2.00E-02		
Sr-90	1.3472E+00	865.86	1,731.72	0.00E+00	1.17E+03	2.33E+03		
Tc-99	4.2239E-04	865.86	1,731.72	0.00E+00	3.68E-01	7.31E-01		
Th-229	1.2407E-11	865.86	1,731.72	0.00E+00	1.07E-08	2.15E-08		
Th-230	8.3497E-08	865.86	1,731.72	0.00E+00	7.23E-05	1.45E-04		
Th-232	3.8371E-14	865.86	1,731.72	0.00E+00	3.32E-11	6.64E-11		
Ti-208	4.0414E-08	865.86	1,731.72	0.00E+00	3.50E-06	7.00E-06		
U-232	1.0948E-07	865.86	1,731.72	0.00E+00	9.48E-05	1.90E-04		
U-233	3.6275E-09	865.86	1,731.72	0.00E+00	3.14E-06	6.28E-06		
U-234	1.8562E-04	865.86	1,731.72	0.00E+00	1.61E-01	3.21E-01		
U-235	2.7235E-06	865.86	0.00	1.58E-02	1.35E-02	1.58E-02		
U-236	1.5493E-05	865.86	1,731.72	0.00E+00	1.34E-02	2.68E-02		
U-238	4.2851E-09	865.86	0.00	1.79E-04	1.75E-04	1.79E-04		
Y-90	1.3475E+00	865.86	1,731.72	0.00E+00	1.17E+03	2.33E+03		
Other Radionuclides					1.18E+03	2.37E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.23369049	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		865.86
Bounding:		1,731.72

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.35	
Bounding:	0.70	

Estimated EOL HM/Given EOL HM
1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CANDU
SNF ID #: 979
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass: BOL= ; EOL=49.32kg
ROD Storage Site: INEEL

Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x15"
0.14

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.7980E-09	47,275.85	47,275.85	0.00E+00	3.69E-04	3.69E-04	Avg. MeV	
Am-241	2.3560E-02	47,275.85	47,275.85	0.00E+00	1.11E+03	1.11E+03	0.0150	1.618E+15
Am-242m	3.0880E-06	47,275.85	47,275.85	0.00E+00	1.46E-01	1.46E-01	0.0250	3.342E+14
Am-243	2.0520E-06	47,275.85	47,275.85	0.00E+00	9.70E-02	9.70E-02	0.0375	2.942E+14
C-14	1.1222E-03	47,275.85	47,275.85	0.00E+00	5.31E+01	5.31E+01	0.0575	3.256E+14
Cl-36	8.3760E-11	47,275.85	47,275.85	0.00E+00	3.96E-06	3.96E-06	0.0850	1.875E+14
Cm-243	2.4260E-07	47,275.85	47,275.85	0.00E+00	1.15E-02	1.15E-02	0.1250	1.218E+14
Cm-244	3.3140E-06	47,275.85	47,275.85	0.00E+00	1.57E-01	1.57E-01	0.2250	1.614E+14
Co-60	1.2454E-03	47,275.85	47,275.85	0.00E+00	5.89E+01	5.89E+01	0.3750	7.028E+13
Cs-134	3.3040E-10	47,275.85	47,275.85	0.00E+00	1.56E-05	1.56E-05	0.5750	1.257E+15
Cs-135	7.9140E-06	47,275.85	47,275.85	0.00E+00	3.74E-01	3.74E-01	0.8500	1.201E+13
Cs-137	7.1580E-01	47,275.85	47,275.85	0.00E+00	3.38E+04	3.38E+04	1.2500	8.677E+12
Eu-154	6.0500E-04	47,275.85	47,275.85	0.00E+00	2.86E+01	2.86E+01	1.7500	3.102E+11
Eu-155	9.4860E-06	47,275.85	47,275.85	0.00E+00	4.48E-01	4.48E-01	2.2500	5.583E+07
Fe-55	1.9322E-08	47,275.85	47,275.85	0.00E+00	9.13E-04	9.13E-04	2.7500	5.801E+07
H-3	4.4180E-03	47,275.85	47,275.85	0.00E+00	2.09E+02	2.09E+02	3.5000	2.364E+05
I-129	7.5020E-07	47,275.85	47,275.85	0.00E+00	3.55E-02	3.55E-02	5.0000	9.920E+04
Kr-85	5.4940E-03	47,275.85	47,275.85	0.00E+00	2.60E+02	2.60E+02	7.0000	1.116E+04
Np-237	5.8040E-06	47,275.85	47,275.85	0.00E+00	2.74E-01	2.74E-01	11.0000	1.265E+03
Pa-231	1.1096E-08	47,275.85	47,275.85	0.00E+00	5.25E-04	5.25E-04		
Pb-210	1.4712E-08	47,275.85	47,275.85	0.00E+00	6.96E-04	6.96E-04		
Pm-147	3.5920E-07	47,275.85	47,275.85	0.00E+00	1.70E-02	1.70E-02		
Pu-238	5.0700E-03	47,275.85	47,275.85	0.00E+00	2.40E+02	2.40E+02		
Pu-239	1.8728E-02	47,275.85	47,275.85	0.00E+00	8.85E+02	8.85E+02		
Pu-240	8.3280E-03	47,275.85	47,275.85	0.00E+00	3.94E+02	3.94E+02		
Pu-241	3.4460E-02	47,275.85	47,275.85	0.00E+00	1.63E+03	1.63E+03		
Pu-242	2.0380E-06	47,275.85	47,275.85	0.00E+00	9.63E-02	9.63E-02		
Ra-226	2.9640E-08	47,275.85	47,275.85	0.00E+00	1.40E-03	1.40E-03		
Ra-228	1.1922E-09	47,275.85	47,275.85	0.00E+00	5.64E-05	5.64E-05		
Ru-106	3.5780E-19	47,275.85	47,275.85	0.00E+00	1.69E-14	1.69E-14		
Se-79	1.2520E-05	47,275.85	47,275.85	0.00E+00	5.92E-01	5.92E-01		
Sn-126	1.2050E-05	47,275.85	47,275.85	0.00E+00	5.70E-01	5.70E-01		
Sr-90	6.1880E-01	47,275.85	47,275.85	0.00E+00	2.93E+04	2.93E+04		
Tc-99	4.4120E-04	47,275.85	47,275.85	0.00E+00	2.09E+01	2.09E+01		
Th-229	6.9280E-09	47,275.85	47,275.85	0.00E+00	3.28E-04	3.28E-04		
Th-230	1.7084E-06	47,275.85	47,275.85	0.00E+00	8.08E-02	8.08E-02		
Th-232	1.1826E-09	47,275.85	47,275.85	0.00E+00	5.64E-05	5.64E-05		
Th-208	3.4740E-08	47,275.85	47,275.85	0.00E+00	1.64E-03	1.64E-03		
U-232	9.2940E-08	47,275.85	47,275.85	0.00E+00	4.39E-03	4.39E-03		
U-233	9.1680E-07	47,275.85	47,275.85	0.00E+00	4.33E-02	4.33E-02		
U-234	2.3440E-03	47,275.85	47,275.85	0.00E+00	1.11E+02	1.11E+02		
U-235	-2.3296E-06	47,275.85	0.00	1.07E-02	0.00E+00	1.07E-02		
U-236	2.6620E-05	47,275.85	47,275.85	0.00E+00	1.26E+00	1.26E+00		
U-238	-1.3291E-07	47,275.85	0.00	3.12E-02	2.49E-02	3.12E-02		
Y-90	6.1900E-01	47,275.85	47,275.85	0.00E+00	2.93E+04	2.93E+04		
Other Radionuclides					3.24E+04	3.24E+04		
							Thermal Power	
							Nominal Heat	Bounding
							Output (Watts)	Heat Output (Watts)
							4.49E+02	4.49E+02
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY 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 47,275.85	
Bounding:	Estimated 47,275.85	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CVTR FUEL
SNF ID #: 37
Fuel Units & Descr: 34 - ROD
Heavy Metal Mass: BOL=68.656kg; EOL=67.47kg
ROD Storage Site: INEEL

Fuel decay start date: 1967
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 50 years

Estimated
Canister usage:
18"x15"
0.45

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.2320E-09	1,137.42	2,274.84	0.00E+00	7.09E-08	1.42E-05	Avg. MeV	
Am-241	2.3540E-02	1,137.42	2,274.84	0.00E+00	2.68E+01	5.35E+01	0.0150	1.110E+14
Am-242m	3.3060E-06	1,137.42	2,274.84	0.00E+00	3.76E-03	7.52E-03	0.0250	2.296E+13
Am-243	2.0560E-06	1,137.42	2,274.84	0.00E+00	2.34E-03	4.68E-03	0.0375	2.020E+13
C-14	1.1244E-03	1,137.42	2,274.84	0.00E+00	1.28E+00	2.56E+00	0.0575	2.210E+13
Cl-36	8.3760E-11	1,137.42	2,274.84	0.00E+00	9.53E-08	1.91E-07	0.0850	1.289E+13
Cm-243	3.4960E-07	1,137.42	2,274.84	0.00E+00	3.98E-04	7.95E-04	0.1250	8.420E+12
Cm-244	5.8860E-08	1,137.42	2,274.84	0.00E+00	6.69E-03	1.34E-02	0.2250	1.111E+13
Co-60	8.9560E-03	1,137.42	2,274.84	0.00E+00	1.02E+01	2.04E+01	0.3750	4.834E+12
Cs-134	5.1180E-08	1,137.42	2,274.84	0.00E+00	5.82E-05	1.16E-04	0.5750	8.557E+13
Cs-135	7.9140E-08	1,137.42	2,274.84	0.00E+00	9.00E-03	1.80E-02	0.8500	8.698E+11
Cs-137	1.0122E+00	1,137.42	2,274.84	0.00E+00	1.15E+03	2.30E+03	1.2500	1.856E+12
Eu-154	2.0260E-03	1,137.42	2,274.84	0.00E+00	2.30E+00	4.61E+00	1.7500	2.288E+10
Eu-155	7.7180E-05	1,137.42	2,274.84	0.00E+00	8.78E-02	1.76E-01	2.2500	1.023E+07
Fe-55	1.0538E-08	1,137.42	2,274.84	0.00E+00	1.20E-03	2.40E-03	2.7500	3.238E+08
H-3	1.0256E-02	1,137.42	2,274.84	0.00E+00	1.17E+01	2.33E+01	3.5000	1.163E+04
I-129	7.5020E-07	1,137.42	2,274.84	0.00E+00	8.53E-04	1.71E-03	5.0000	4.879E+03
Kr-85	1.4492E-02	1,137.42	2,274.84	0.00E+00	1.65E+01	3.30E+01	7.0000	5.488E+02
Np-237	5.6900E-06	1,137.42	2,274.84	0.00E+00	6.47E-03	1.29E-02	11.0000	6.227E+01
Pa-231	9.4900E-09	1,137.42	2,274.84	0.00E+00	1.08E-05	2.16E-05		
Pb-210	8.6720E-09	1,137.42	2,274.84	0.00E+00	9.86E-08	1.97E-05		
Pm-147	1.8906E-05	1,137.42	2,274.84	0.00E+00	2.15E-02	4.30E-02		
Pu-238	5.7080E-03	1,137.42	2,274.84	0.00E+00	6.49E+00	1.30E+01		
Pu-239	1.8736E-02	1,137.42	2,274.84	0.00E+00	2.13E+01	4.26E+01		
Pu-240	8.3420E-03	1,137.42	2,274.84	0.00E+00	9.49E+00	1.90E+01		
Pu-241	7.0960E-02	1,137.42	2,274.84	0.00E+00	8.07E+01	1.61E+02		
Pu-242	2.0400E-06	1,137.42	2,274.84	0.00E+00	2.32E-03	4.64E-03		
Ra-226	1.9722E-08	1,137.42	2,274.84	0.00E+00	2.24E-05	4.49E-05		
Ra-228	1.1912E-09	1,137.42	2,274.84	0.00E+00	1.35E-06	2.71E-06		
Ru-108	1.0798E-14	1,137.42	2,274.84	0.00E+00	1.23E-11	2.46E-11		
Se-79	1.2522E-05	1,137.42	2,274.84	0.00E+00	1.42E-02	2.85E-02		
Sn-126	1.2052E-05	1,137.42	2,274.84	0.00E+00	1.37E-02	2.74E-02		
Sr-90	8.8440E-01	1,137.42	2,274.84	0.00E+00	1.01E+03	2.01E+03		
Tc-99	4.4120E-04	1,137.42	2,274.84	0.00E+00	5.02E-01	1.00E+00		
Th-229	5.6400E-09	1,137.42	2,274.84	0.00E+00	6.42E-06	1.28E-05		
Th-230	1.3922E-06	1,137.42	2,274.84	0.00E+00	1.58E-03	3.17E-03		
Th-232	1.1926E-09	1,137.42	2,274.84	0.00E+00	1.36E-06	2.71E-06		
Ti-208	4.0060E-08	1,137.42	2,274.84	0.00E+00	4.56E-05	9.11E-05		
U-232	1.0738E-07	1,137.42	2,274.84	0.00E+00	1.22E-04	2.44E-04		
U-233	9.1640E-07	1,137.42	2,274.84	0.00E+00	1.04E-03	2.08E-03		
U-234	2.3440E-03	1,137.42	2,274.84	0.00E+00	2.67E+00	5.33E+00		
U-235	-2.3296E-06	1,137.42	0.00	2.67E-03	2.09E-05	2.67E-03		
U-236	2.6620E-05	1,137.42	2,274.84	0.00E+00	3.03E-02	6.06E-02		
U-238	-1.3291E-07	1,137.42	0.00	2.27E-02	2.25E-02	2.27E-02		
Y-90	8.8460E-01	1,137.42	2,274.84	0.00E+00	1.01E+03	2.01E+03		
Other Radionuclides					1.10E+03	2.20E+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 possibly cladding.
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ZIRC OR SST	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	1.8	0 to 5	

Burnup Summary (MWd)^a

	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:		1,137.42	
Bounding:		2,274.84	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.13		
Bounding:	2.27		1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (USO8 LEU)(DENMARK)
 SNF ID #: 1059
 Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=2.752kg; EOL=2.517kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
²Template Burnup(MWd): 15
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 25 years

Estimated
 Canister usage:
 16"x10"
 0.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4973E-09	224.12	448.24	0.00E+00	3.36E-07	6.71E-07	Avg. MeV	
Am-241	2.6120E-02	224.12	448.24	0.00E+00	5.85E+00	1.17E+01	0.0150	4.029E+13
Am-242m	8.7133E-06	224.12	448.24	0.00E+00	1.95E-03	3.91E-03	0.0250	8.360E+12
Am-243	6.3980E-06	224.12	448.24	0.00E+00	1.43E-03	2.87E-03	0.0375	7.333E+12
C-14	2.9600E-08	224.12	448.24	0.00E+00	6.63E-06	1.33E-05	0.0575	7.951E+12
Ci-36	5.9507E-35	224.12	448.24	0.00E+00	1.33E-32	2.67E-32	0.0850	4.707E+12
Cm-243	1.9560E-06	224.12	448.24	0.00E+00	4.38E-04	8.77E-04	0.1250	3.140E+12
Cm-244	9.0867E-05	224.12	448.24	0.00E+00	2.04E-02	4.07E-02	0.2250	4.059E+12
Co-60	8.4667E-06	224.12	448.24	0.00E+00	1.90E-03	3.80E-03	0.3750	1.764E+12
Cs-134	3.9760E-04	224.12	448.24	0.00E+00	8.91E-02	1.78E-01	0.5750	3.008E+13
Cs-135	4.8607E-06	224.12	448.24	0.00E+00	1.09E-03	2.18E-03	0.8500	4.008E+11
Cs-137	1.8020E+00	224.12	448.24	0.00E+00	4.04E+02	8.08E+02	1.2500	2.168E+11
Eu-154	1.3960E-02	224.12	448.24	0.00E+00	3.13E+00	6.26E+00	1.7500	1.100E+10
Eu-155	2.0313E-03	224.12	448.24	0.00E+00	4.55E-01	9.11E-01	2.2500	8.218E+05
Fe-55	3.7360E-04	224.12	448.24	0.00E+00	8.37E-02	1.67E-01	2.7500	1.184E+05
H-3	3.5233E-03	224.12	448.24	0.00E+00	7.90E-01	1.58E+00	3.5000	2.241E+03
I-129	7.1600E-07	224.12	448.24	0.00E+00	1.60E-04	3.21E-04	5.0000	8.888E+02
Kr-85	7.4133E-02	224.12	448.24	0.00E+00	1.66E+01	3.32E+01	7.0000	1.003E+02
Np-237	3.8020E-06	224.12	448.24	0.00E+00	8.52E-04	1.70E-03	11.0000	1.140E+01
Pa-231	3.7020E-09	224.12	448.24	0.00E+00	8.30E-07	1.66E-06		
Pb-210	1.4067E-13	224.12	448.24	0.00E+00	3.15E-11	6.31E-11		
Pm-147	1.2360E-02	224.12	448.24	0.00E+00	2.77E+00	5.54E+00		
Pu-238	5.3133E-03	224.12	448.24	0.00E+00	1.19E+00	2.38E+00		
Pu-239	1.0313E-02	224.12	448.24	0.00E+00	2.31E+00	4.62E+00		
Pu-240	5.4153E-03	224.12	448.24	0.00E+00	1.21E+00	2.43E+00		
Pu-241	2.9540E-01	224.12	448.24	0.00E+00	6.62E+01	1.32E+02		
Pu-242	3.0713E-06	224.12	448.24	0.00E+00	6.88E-04	1.38E-03		
Ra-226	5.9440E-13	224.12	448.24	0.00E+00	1.33E-10	2.66E-10		
Ra-228	1.6733E-14	224.12	448.24	0.00E+00	3.75E-12	7.50E-12		
Ru-106	2.7233E-07	224.12	448.24	0.00E+00	6.10E-05	1.22E-04		
Se-79	1.2533E-05	224.12	448.24	0.00E+00	2.81E-03	5.62E-03		
Sn-126	1.1393E-05	224.12	448.24	0.00E+00	2.55E-03	5.11E-03		
Sr-90	1.6333E+00	224.12	448.24	0.00E+00	3.66E+02	7.32E+02		
Tc-99	4.3633E-04	224.12	448.24	0.00E+00	9.76E-02	1.95E-01		
Th-229	1.0827E-12	224.12	448.24	0.00E+00	2.43E-10	4.85E-10		
Th-230	1.0793E-10	224.12	448.24	0.00E+00	2.42E-08	4.84E-08		
Th-232	2.2773E-14	224.12	448.24	0.00E+00	5.10E-12	1.02E-11		
Ti-208	7.3067E-09	224.12	448.24	0.00E+00	1.64E-06	3.28E-06		
U-232	1.9833E-08	224.12	448.24	0.00E+00	4.45E-06	8.89E-06		
U-233	6.0453E-10	224.12	448.24	0.00E+00	1.35E-07	2.71E-07		
U-234	6.1000E-07	224.12	448.24	0.00E+00	1.37E-04	2.73E-04		
U-235	2.5335E-06	224.12	0.00	1.16E-03	5.97E-04	1.16E-03		
U-236	1.3000E-05	224.12	448.24	0.00E+00	2.91E-03	5.83E-03		
U-238	-1.4207E-08	224.12	0.00	7.44E-04	7.41E-04	7.44E-04		
Y-90	1.6340E+00	224.12	448.24	0.00E+00	3.66E+02	7.32E+02		
Other Radionuclides					3.84E+02	7.67E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.58291238	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		224.12
Bounding:		448.24

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.86	
Bounding:	3.72	

Estimated EOL HM/Given EOL HM
 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (U3S2 LEU)(DENMARK)
 SNF ID #: 759
 Fuel Units & Descr: 375 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=341.662kg; EOL=309.112kg
 ROD Storage Site: SRS

Fuel decay start date: 1997
 Estimate 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 Times: 25 years

Estimated
 Canister usage:
 18"x10"
 10.42

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	1.4973E-09	30,937.63	61,875.26	0.00E+00	4.63E-05	9.26E-05	Avg. MeV	
Am-241	2.6120E-02	30,937.63	61,875.26	0.00E+00	8.08E+02	1.62E+03	0.0150	5.562E+15
Am-242m	8.7133E-06	30,937.63	61,875.26	0.00E+00	2.70E-01	5.39E-01	0.0250	1.154E+15
Am-243	6.3980E-06	30,937.63	61,875.26	0.00E+00	1.98E-01	3.96E-01	0.0375	1.012E+15
C-14	2.9600E-08	30,937.63	61,875.26	0.00E+00	9.16E-04	1.83E-03	0.0575	1.098E+15
Cl-36	5.9507E-35	30,937.63	61,875.26	0.00E+00	1.84E-30	3.68E-30	0.0850	6.497E+14
Cm-243	1.9560E-06	30,937.63	61,875.26	0.00E+00	6.05E-02	1.21E-01	0.1250	4.335E+14
Cm-244	9.0867E-05	30,937.63	61,875.26	0.00E+00	2.81E+00	5.62E+00	0.2250	5.603E+14
Co-60	8.4667E-06	30,937.63	61,875.26	0.00E+00	2.62E-01	5.24E-01	0.3750	2.435E+14
Cs-134	3.9760E-04	30,937.63	61,875.26	0.00E+00	1.23E+01	2.46E+01	0.5750	4.152E+15
Cs-135	4.8607E-06	30,937.63	61,875.26	0.00E+00	1.50E-01	3.01E-01	0.8500	5.533E+13
Cs-137	1.8020E+00	30,937.63	61,875.26	0.00E+00	5.57E+04	1.11E+05	1.2500	2.993E+13
Eu-154	1.3960E-02	30,937.63	61,875.26	0.00E+00	4.32E+02	8.64E+02	1.7500	1.519E+12
Eu-155	2.0313E-03	30,937.63	61,875.26	0.00E+00	6.28E+01	1.26E+02	2.2500	1.134E+08
Fe-55	3.7360E-04	30,937.63	61,875.26	0.00E+00	1.16E+01	2.31E+01	2.7500	1.634E+07
H-3	3.5233E-03	30,937.63	61,875.26	0.00E+00	1.09E+02	2.18E+02	3.5000	3.092E+06
I-129	7.1600E-07	30,937.63	61,875.26	0.00E+00	2.22E-02	4.43E-02	5.0000	1.227E+05
Kr-85	7.4133E-02	30,937.63	61,875.26	0.00E+00	2.29E+03	4.59E+03	7.0000	1.385E+04
Np-237	3.8020E-06	30,937.63	61,875.26	0.00E+00	1.18E-01	2.35E-01	11.0000	1.573E+03
Pa-231	3.7020E-09	30,937.63	61,875.26	0.00E+00	1.15E-04	2.29E-04		
Pb-210	1.4067E-13	30,937.63	61,875.26	0.00E+00	4.35E-09	8.70E-09		
Pm-147	1.2360E-02	30,937.63	61,875.26	0.00E+00	3.82E+02	7.65E+02		
Pu-238	5.3133E-03	30,937.63	61,875.26	0.00E+00	1.84E+02	3.29E+02		
Pu-239	1.0313E-02	30,937.63	61,875.26	0.00E+00	3.19E+02	6.38E+02		
Pu-240	5.4153E-03	30,937.63	61,875.26	0.00E+00	1.68E+02	3.36E+02		
Pu-241	2.9540E-01	30,937.63	61,875.26	0.00E+00	9.14E+03	1.83E+04		
Pu-242	3.0713E-06	30,937.63	61,875.26	0.00E+00	9.50E-02	1.90E-01		
Ra-226	5.9440E-13	30,937.63	61,875.26	0.00E+00	1.84E-08	3.68E-08		
Ra-228	1.6733E-14	30,937.63	61,875.26	0.00E+00	5.18E-10	1.04E-09		
Ru-106	2.7233E-07	30,937.63	61,875.26	0.00E+00	8.43E-03	1.69E-02		
Se-79	1.2533E-05	30,937.63	61,875.26	0.00E+00	3.88E-01	7.76E-01		
Sn-126	1.1393E-05	30,937.63	61,875.26	0.00E+00	3.52E-01	7.05E-01		
Sr-90	1.6333E+00	30,937.63	61,875.26	0.00E+00	5.05E+04	1.01E+05		
Tc-99	4.3533E-04	30,937.63	61,875.26	0.00E+00	1.35E+01	2.69E+01		
Th-229	1.0827E-12	30,937.63	61,875.26	0.00E+00	3.35E-08	6.70E-08		
Th-230	1.0793E-10	30,937.63	61,875.26	0.00E+00	3.34E-08	6.68E-08		
Th-232	2.2773E-14	30,937.63	61,875.26	0.00E+00	7.05E-10	1.41E-09		
Ti-208	7.3067E-09	30,937.63	61,875.26	0.00E+00	2.26E-04	4.52E-04		
U-232	1.9833E-08	30,937.63	61,875.26	0.00E+00	6.14E-04	1.23E-03		
U-233	6.0453E-10	30,937.63	61,875.26	0.00E+00	1.87E-05	3.74E-05		
U-234	6.1000E-07	30,937.63	61,875.26	0.00E+00	1.89E-02	3.77E-02		
U-235	-2.5335E-06	30,937.63	0.00	1.46E-01	6.75E-02	1.46E-01		
U-236	1.3000E-05	30,937.63	61,875.26	0.00E+00	4.02E-01	8.04E-01		
U-238	-1.4207E-08	30,937.63	0.00	9.21E-02	9.17E-02	9.21E-02		
Y-90	1.6340E+00	30,937.63	61,875.26	0.00E+00	5.06E+04	1.01E+05		
Other Radionuclides					5.29E+04	1.06E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7578539	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		30,937.63
Bounding:		61,875.26

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.07	
Bounding:	4.14	

Estimated EOL HM/Given EOL HM
 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: DR-3 (ULX HEUDENMARK)
 SIF ID #: 714
 Fuel Units & Descr: 88 - 4 CONCENTRIC TUBES
 Heavy Metal Mass: BOL=14.529kg; EOL=6.8kg
 ROD Storage Sht: SRS

Fuel decay start date: 1997
 Estimates as of: 2000
 Template: HFBR (Heavy Water, Alm., 40 to 100%, U)
 Template BOL Heavy Metal Mass (MT): 164.6
 Template Decay Time: 0.000377
 25 years

Estimated
 Canister usage:
 18-710
 2-44

Radionuclide	CI/AVD 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	5.4520E-10	5.276.81	10.553.63	0.00E+00	2.88E-05	5.75E-05	Avg. Ray	9.894E+14
Am-241	9.2294E-03	5.276.81	10.553.63	0.00E+00	4.87E+01	9.74E+01	0.0150	2.036E+14
Am-242m	1.3390E-06	5.276.81	10.553.63	0.00E+00	7.07E-03	1.41E-02	0.0250	1.788E+14
Am-243	3.7084E-05	5.276.81	10.553.63	0.00E+00	1.96E-01	3.91E-01	0.0075	1.918E+14
C-14	2.6439E-08	5.276.81	10.553.63	0.00E+00	1.40E-04	2.79E-04	0.0575	1.918E+14
C-36	4.4441E-31	5.276.81	10.553.63	0.00E+00	2.35E-27	4.69E-27	0.0850	1.154E+14
Cm-243	5.0498E-06	5.276.81	10.553.63	0.00E+00	2.96E-02	5.33E-02	0.1250	8.010E+13
Cm-244	3.8451E-03	5.276.81	10.553.63	0.00E+00	2.03E+01	4.06E+01	0.2250	9.863E+13
Cm-60	2.6225E-05	5.276.81	10.553.63	0.00E+00	1.33E-01	2.66E-01	0.3750	4.313E+13
Cs-134	1.9830E-03	5.276.81	10.553.63	0.00E+00	1.05E+01	2.09E+01	0.5750	7.182E+14
Cs-135	4.2584E-06	5.276.81	10.553.63	0.00E+00	2.25E-02	4.49E-02	0.8500	1.409E+13
Cs-137	1.8141E+00	5.276.81	10.553.63	0.00E+00	9.57E+03	1.91E+04	1.2500	9.507E+12
Eu-154	3.4733E-02	5.276.81	10.553.63	0.00E+00	1.83E+02	3.67E+02	1.7500	3.935E+11
Eu-155	7.1081E-03	5.276.81	10.553.63	0.00E+00	3.75E+01	7.50E+01	2.2500	2.121E+07
Fe-55	3.5790E-04	5.276.81	10.553.63	0.00E+00	1.89E+00	3.78E+00	2.7500	1.823E+07
H-3	3.4945E-03	5.276.81	10.553.63	0.00E+00	1.84E+01	3.69E+01	3.5000	6.259E+05
H-129	6.6403E-07	5.276.81	10.553.63	0.00E+00	3.50E-03	7.01E-03	5.0000	2.653E+05
K-45	7.8250E-02	5.276.81	10.553.63	0.00E+00	4.13E+02	8.26E+02	7.0000	3.043E+04
Mo-237	3.1567E-05	5.276.81	10.553.63	0.00E+00	1.67E-01	3.33E-01	11.0000	3.468E+03
Pa-231	1.3372E-09	5.276.81	10.553.63	0.00E+00	7.06E-05	1.41E-05		
Pb-210	3.0644E-11	5.276.81	10.553.63	0.00E+00	1.62E-07	3.23E-07		
Pm-147	6.5188E-03	5.276.81	10.553.63	0.00E+00	3.44E+01	6.88E+01		
Pu-238	1.4789E-01	5.276.81	10.553.63	0.00E+00	7.79E+02	1.56E+03		
Pu-239	6.9502E-04	5.276.81	10.553.63	0.00E+00	3.67E+00	7.33E+00		
Pu-240	3.7928E-04	5.276.81	10.553.63	0.00E+00	2.00E+00	4.00E+00		
Pu-241	1.0565E-01	5.276.81	10.553.63	0.00E+00	5.57E+02	1.11E+03		
Pu-242	3.0911E-05	5.276.81	10.553.63	0.00E+00	1.63E-02	3.26E-02		
Ra-226	1.1081E-10	5.276.81	10.553.63	0.00E+00	6.85E-07	1.17E-06		
Ra-228	2.1185E-14	5.276.81	10.553.63	0.00E+00	1.12E-10	2.24E-10		
Ru-106	2.3621E-07	5.276.81	10.553.63	0.00E+00	1.25E-03	2.49E-03		
Sr-78	1.2339E-05	5.276.81	10.553.63	0.00E+00	6.51E-02	1.30E-01		
Sr-126	1.0194E-05	5.276.81	10.553.63	0.00E+00	5.38E-02	1.08E-01		
Te-99	3.8056E-04	5.276.81	10.553.63	0.00E+00	8.93E+03	1.79E+04		
Ti-229	9.1252E-12	5.276.81	10.553.63	0.00E+00	2.01E+00	4.02E+00		
Ti-230	1.5407E-08	5.276.81	10.553.63	0.00E+00	4.82E-08	9.63E-08		
Ti-232	2.8537E-14	5.276.81	10.553.63	0.00E+00	1.53E-10	3.05E-10		
Ti-232	1.2855E-07	5.276.81	10.553.63	0.00E+00	6.78E-04	1.35E-03		
U-233	5.1470E-09	5.276.81	10.553.63	0.00E+00	2.72E-05	5.43E-05		
U-234	5.6069E-05	5.276.81	10.553.63	0.00E+00	2.96E-01	5.92E-01		
U-235	2.8661E-06	5.276.81	0.00	2.79E-02	1.28E-02	2.79E-02		
U-236	1.6701E-05	5.276.81	10.553.63	0.00E+00	8.81E-02	1.76E-01		
U-238	4.8194E-09	5.276.81	0.00	5.43E-04	4.94E-04	6.43E-04		
Y-80	1.6532E+00	5.276.81	10.553.63	0.00E+00	8.19E+03	1.79E+04		
					8.19E+03	1.83E+04		

Thermal Power	
Nominal Heat Output (Watts)	2.79E+02
Bounding Heat Output (Watts)	2.79E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	
From SFD	Used
Reactor Moderator: HEAVY WATER	HEAVY WATER
Fuel Cladding: ALUM	ALUM
BOL HMI Constituents: U	U
BOL Enrichment %: 88.87461392	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd) ³	
From SFD	Estimated
Nominal: 5.276.81	
Bounding: 10.553.63	

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: 0.83	
Bounding: 1.66	

Estimated EOL HMI/Given EOL HMI
 1.01

¹ Reactor shutdown, core removal, storage, shipping or other date confirming that radiation 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/HM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DREXEN1 THO2UO2 (LEU)
 SNF ID #: 44
 Fuel Units & Decay: 1000 - ROD
 Heavy Metal Mass: BOL - EOL-2382.5kg
 ROD Storage Site: NIEL

Fuel decay start date: 1985
 Estimates as of: 2000
 Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
 Template BOL Heavy Metal Mass (MT): 10269.14
 Template Decay Time: 0.45991251 50 years

Estimated
 Canister Usage:
 13 "115"
 5.00

II. Estimates

	m	x _m	x _h	b	y _h	y _s	Gamma Sources
Radionuclide	CI/MAF From Template	Nonfuel Fuel Burnup (MWd) ⁷	Bounding Fuel Burnup (MWd) ⁷	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group
Ac-227	1.0595E-04	2.318,560.61	2.318,560.61	0.00E+00	2.46E+02	2.46E+02	2.2500
Am-241	2.4988E-04	2.318,560.61	2.318,560.61	0.00E+00	5.79E+02	5.79E+02	2.7500
Am-243m	1.3847E-06	2.318,560.61	2.318,560.61	0.00E+00	3.21E+00	3.21E+00	0.0250
Am-243	3.1103E-07	2.318,560.61	2.318,560.61	0.00E+00	7.21E-01	7.21E-01	0.0375
C-14	9.2287E-05	2.318,560.61	2.318,560.61	0.00E+00	2.14E+02	2.14E+02	0.0575
Ch-38	1.8103E-06	2.318,560.61	2.318,560.61	0.00E+00	4.20E+00	4.20E+00	0.0850
Ch-243	2.1249E-07	2.318,560.61	2.318,560.61	0.00E+00	4.93E-01	4.93E-01	0.1250
Co-244	7.9669E-06	2.318,560.61	2.318,560.61	0.00E+00	1.86E+01	1.86E+01	0.2250
Co-134	1.2143E-04	2.318,560.61	2.318,560.61	0.00E+00	2.82E+02	2.82E+02	0.5750
Co-135	1.6535E-07	2.318,560.61	2.318,560.61	0.00E+00	3.83E-01	3.83E-01	0.8500
Co-137	2.8639E-06	2.318,560.61	2.318,560.61	0.00E+00	6.64E+01	6.64E+01	1.2500
Eu-154	1.0449E+00	2.318,560.61	2.318,560.61	0.00E+00	2.42E+06	2.42E+06	2.7500
Eu-156	2.5679E-03	2.318,560.61	2.318,560.61	0.00E+00	5.95E+03	5.95E+03	1.7500
Eu-155	8.1175E-05	2.318,560.61	2.318,560.61	0.00E+00	1.88E+02	1.88E+02	2.7500
Eu-157	4.2194E-08	2.318,560.61	2.318,560.61	0.00E+00	9.79E-02	9.79E-02	2.7500
H-3	9.1673E-04	2.318,560.61	2.318,560.61	0.00E+00	2.13E+03	2.13E+03	3.5000
H-129	1.5853E-06	2.318,560.61	2.318,560.61	0.00E+00	3.68E+00	3.68E+00	7.0000
H-237	2.3741E-02	2.318,560.61	2.318,560.61	0.00E+00	5.50E+04	5.50E+04	11.0000
H-231	1.2747E-07	2.318,560.61	2.318,560.61	0.00E+00	2.79E-01	2.79E-01	
Pb-210	1.4424E-08	2.318,560.61	2.318,560.61	0.00E+00	4.27E-02	4.27E-02	
Pb-147	4.9829E-06	2.318,560.61	2.318,560.61	0.00E+00	1.16E+01	1.16E+01	
Pu-238	3.7744E-04	2.318,560.61	2.318,560.61	0.00E+00	8.75E+02	8.75E+02	
Pu-239	2.7510E-05	2.318,560.61	2.318,560.61	0.00E+00	6.38E+01	6.38E+01	
Pu-240	1.6175E-05	2.318,560.61	2.318,560.61	0.00E+00	3.75E+01	3.75E+01	
Pu-241	7.1379E-04	2.318,560.61	2.318,560.61	0.00E+00	1.65E+03	1.65E+03	
Pu-242	4.0831E-08	2.318,560.61	2.318,560.61	0.00E+00	9.47E-02	9.47E-02	
Pu-238	2.8039E-08	2.318,560.61	2.318,560.61	0.00E+00	6.73E-02	6.73E-02	
Pu-238	4.6352E-08	2.318,560.61	2.318,560.61	0.00E+00	1.07E+01	1.07E+01	
Pu-108	1.3321E-15	2.318,560.61	2.318,560.61	0.00E+00	3.09E-09	3.09E-09	
Sm-149	3.5407E-06	2.318,560.61	2.318,560.61	0.00E+00	8.21E+01	8.21E+01	
Sm-148	3.9639E-05	2.318,560.61	2.318,560.61	0.00E+00	9.24E+01	9.24E+01	
Sm-147	1.0449E+00	2.318,560.61	2.318,560.61	0.00E+00	2.42E+06	2.42E+06	
Th-232	8.2305E-06	2.318,560.61	2.318,560.61	0.00E+00	1.91E+02	1.91E+02	
Th-230	3.2529E-04	2.318,560.61	2.318,560.61	0.00E+00	7.54E+02	7.54E+02	
Th-232	1.2533E-08	2.318,560.61	2.318,560.61	0.00E+00	2.91E+00	2.91E+00	
Th-230	4.0329E-08	2.318,560.61	2.318,560.61	0.00E+00	2.94E-01	2.94E-01	
Th-230	2.318,560.61	2.318,560.61	2.318,560.61	0.00E+00	2.80E+04	2.80E+04	
U-232	3.2729E-02	2.318,560.61	2.318,560.61	0.00E+00	7.59E+04	7.59E+04	
U-233	3.3244E-03	2.318,560.61	2.318,560.61	0.00E+00	1.69E+03	1.69E+03	
U-234	8.1769E-04	2.318,560.61	2.318,560.61	0.00E+00	1.90E+03	1.90E+03	
U-235	5.7813E-08	2.318,560.61	2.318,560.61	0.00E+00	1.34E-01	1.34E-01	
U-236	1.3273E-07	2.318,560.61	2.318,560.61	0.00E+00	3.08E-01	3.08E-01	
U-238	3.1121E-10	2.318,560.61	2.318,560.61	0.00E+00	2.21E+04	2.21E+04	
Y-90	1.0449E+00	2.318,560.61	2.318,560.61	0.00E+00	2.42E+06	2.42E+06	

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: SST	ZIRC
BOL H/M Constraints: Th and U	Th and U
BOL Enrichment %:	60 to 100

Basic for Parameter Differences:
 The Template was used for the following reasons:
 This fuel matches on all parameters except cladding and enrichment (unknown).

Burnup Summary (MWd)

From SFD	Estimated
Nonfuel: 2.318,560.61	2.318,560.61
Bounding: 2.318,560.61	2.318,560.61

Basic for burnup used in estimate:
 Nominal burnup set equal to bounding burnup.
 Bounding burnup estimated by assuming BOL heavy metal mass was like EOL.

Checks

Nonfuel: 21.79	Burnup Multiplier: 21.79	Estimated Burnup: 21.79
Bounding: 21.79		

Estimated EOL H/M/Given EOL H/M: 1.28

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

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

Thermal Power	Bounding
Output (Watts)	Heat Output (Watts)
4.68E+04	4.68E+04
Total	Total

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN UO2 (LEU)
 SNF ID #: 49
 Fuel Units & Descr: 72 - ROD
 Heavy Metal Mass: BOL = ; EOL=162.382kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1966
 Estimates as of: 2030
 Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6.01
 Template BOL Heavy Metal Mass (MT): 0.00012882
 Template Decay Time: 50 years

Estimated
 Canister usage:
 16"x15"
 0.36

II. Estimates	a ₁	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	153,393.39	153,393.39	0.00E+00	5.26E-03	5.26E-03	Avg. MeV	
Am-241	1.1458E-04	153,393.39	153,393.39	0.00E+00	1.76E+01	1.76E+01	0.0150	7.998E+15
Am-242m	7.9468E-09	153,393.39	153,393.39	0.00E+00	1.22E-03	1.22E-03	0.0250	1.862E+15
Am-243	9.8386E-10	153,393.39	153,393.39	0.00E+00	1.51E-04	1.51E-04	0.0375	1.441E+15
C-14	2.2978E-04	153,393.39	153,393.39	0.00E+00	3.52E+01	3.52E+01	0.0575	1.550E+15
Cf-252	1.2261E-06	153,393.39	153,393.39	0.00E+00	1.88E-01	1.88E-01	0.0850	9.363E+14
Cm-243	1.7271E-10	153,393.39	153,393.39	0.00E+00	2.65E-05	2.65E-05	0.1250	6.074E+14
Cm-244	1.3058E-09	153,393.39	153,393.39	0.00E+00	2.00E-04	2.00E-04	0.2250	8.069E+14
Co-60	9.8636E-03	153,393.39	153,393.39	0.00E+00	1.51E+03	1.51E+03	0.3750	3.520E+14
Cs-134	1.9617E-08	153,393.39	153,393.39	0.00E+00	3.01E-03	3.01E-03	0.5750	5.860E+15
Cs-135	3.0316E-05	153,393.39	153,393.39	0.00E+00	4.85E+00	4.85E+00	0.8500	5.786E+13
Cs-137	1.0263E+00	153,393.39	153,393.39	0.00E+00	1.57E+05	1.57E+05	1.2500	1.318E+14
Eu-154	2.0017E-04	153,393.39	153,393.39	0.00E+00	3.07E+01	3.07E+01	1.7500	1.480E+12
Eu-155	8.5957E-05	153,393.39	153,393.39	0.00E+00	1.32E+01	1.32E+01	2.2500	7.550E+08
Fe-55	2.2646E-05	153,393.39	153,393.39	0.00E+00	3.47E+00	3.47E+00	2.7500	1.028E+08
H-3	1.0835E-03	153,393.39	153,393.39	0.00E+00	1.66E+02	1.66E+02	3.5000	8.989E+03
I-129	7.3195E-07	153,393.39	153,393.39	0.00E+00	1.12E-01	1.12E-01	6.0000	3.711E+03
Kr-85	1.5661E-02	153,393.39	153,393.39	0.00E+00	2.40E+03	2.40E+03	7.0000	4.099E+02
Np-237	1.1494E-06	153,393.39	153,393.39	0.00E+00	1.76E-01	1.76E-01	11.0000	4.801E+01
Pa-231	5.8070E-08	153,393.39	153,393.39	0.00E+00	8.91E-03	8.91E-03		
Pb-210	1.2985E-12	153,393.39	153,393.39	0.00E+00	1.99E-07	1.99E-07		
Pm-147	2.2196E-05	153,393.39	153,393.39	0.00E+00	3.40E+00	3.40E+00		
Pu-238	2.6223E-04	153,393.39	153,393.39	0.00E+00	4.02E+01	4.02E+01		
Pu-239	6.6739E-04	153,393.39	153,393.39	0.00E+00	1.02E+02	1.02E+02		
Pu-240	8.6705E-05	153,393.39	153,393.39	0.00E+00	1.33E+01	1.33E+01		
Pu-241	3.4759E-04	153,393.39	153,393.39	0.00E+00	5.33E+01	5.33E+01		
Pu-242	1.9717E-09	153,393.39	153,393.39	0.00E+00	3.02E-04	3.02E-04		
Ra-226	3.0000E-12	153,393.39	153,393.39	0.00E+00	4.60E-07	4.60E-07		
Ra-228	8.3328E-12	153,393.39	153,393.39	0.00E+00	1.28E-06	1.28E-06		
Ru-106	6.1464E-15	153,393.39	153,393.39	0.00E+00	9.43E-10	9.43E-10		
Se-79	1.3221E-05	153,393.39	153,393.39	0.00E+00	2.03E+00	2.03E+00		
Sn-126	1.1491E-05	153,393.39	153,393.39	0.00E+00	1.76E+00	1.76E+00		
Sr-90	9.5541E-01	153,393.39	153,393.39	0.00E+00	1.47E+05	1.47E+05		
Tc-99	4.6656E-04	153,393.39	153,393.39	0.00E+00	7.16E+01	7.16E+01		
Th-229	1.9085E-11	153,393.39	153,393.39	0.00E+00	2.93E-06	2.93E-06		
Th-230	2.1913E-10	153,393.39	153,393.39	0.00E+00	3.36E-05	3.36E-05		
Th-232	8.3478E-12	153,393.39	153,393.39	0.00E+00	1.28E-06	1.28E-06		
Th-238	1.8752E-08	153,393.39	153,393.39	0.00E+00	2.88E-03	2.88E-03		
U-232	5.0782E-08	153,393.39	153,393.39	0.00E+00	7.79E-03	7.79E-03		
U-233	3.2596E-09	153,393.39	153,393.39	0.00E+00	5.00E-04	5.00E-04		
U-234	3.8817E-07	153,393.39	153,393.39	0.00E+00	6.11E-02	6.11E-02		
U-235	-2.7761E-06	153,393.39	0.00	6.56E-01	2.30E-01	6.56E-01		
U-236	1.8190E-05	153,393.39	153,393.39	0.00E+00	2.48E+00	2.48E+00		
U-238	-2.8547E-09	153,393.39	0.00	7.09E-03	6.65E-03	7.09E-03		
Y-90	9.5557E-01	153,393.39	153,393.39	0.00E+00	1.47E+05	1.47E+05		
Other Radionuclides					1.87E+05	1.87E+05		

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 %:		80 to 100

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		153,393.39
Bounding:		153,393.39

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.12	
Bounding:	10.12	

Estimated EOL HM/Given EOL HM
 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (6% UO2) LEU
 SNF ID #: 65
 Fuel Units & Descr: 61 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=1636.02kg; EOL=1603.51kg
 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): 0.00178911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18"x10"
 5.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	30,906.72	61,813.45	0.00E+00	3.32E-05	6.63E-05	Avg. MeV	
Am-241	1.4751E-01	30,906.72	61,813.45	0.00E+00	4.56E+03	9.12E+03	0.0150	2.352E+15
Am-242m	2.6809E-04	30,906.72	61,813.45	0.00E+00	8.29E+00	1.66E+01	0.0250	4.714E+14
Am-243	6.2484E-04	30,906.72	61,813.45	0.00E+00	1.93E+01	3.86E+01	0.0375	4.442E+14
C-14	4.7820E-05	30,906.72	61,813.45	0.00E+00	1.48E+00	2.96E+00	0.0575	5.558E+14
Cf-252	8.0297E-07	30,906.72	61,813.45	0.00E+00	2.48E-02	4.96E-02	0.0850	2.597E+14
Cm-243	1.7426E-04	30,906.72	61,813.45	0.00E+00	5.39E+00	1.08E+01	0.1250	1.728E+14
Cm-244	2.7616E-02	30,906.72	61,813.45	0.00E+00	8.54E+02	1.71E+03	0.2250	2.217E+14
Co-60	3.5610E-04	30,906.72	61,813.45	0.00E+00	1.10E+01	2.20E+01	0.3750	9.575E+13
Cs-134	2.6260E-07	30,906.72	61,813.45	0.00E+00	8.12E-03	1.62E-02	0.5750	2.255E+15
Cs-135	1.4433E-05	30,906.72	61,813.45	0.00E+00	4.46E-01	8.92E-01	0.8500	2.202E+13
Cs-137	9.8870E-01	30,906.72	61,813.45	0.00E+00	3.06E+04	6.11E+04	1.2500	1.401E+13
Eu-154	6.0320E-03	30,906.72	61,813.45	0.00E+00	1.86E+02	3.73E+02	1.7500	6.180E+11
Eu-155	2.1770E-04	30,906.72	61,813.45	0.00E+00	6.73E+00	1.35E+01	2.2500	1.012E+08
Fe-55	7.9206E-07	30,906.72	61,813.45	0.00E+00	2.45E-02	4.90E-02	2.7500	3.568E+08
H-3	8.9486E-03	30,906.72	61,813.45	0.00E+00	2.77E+02	5.53E+02	3.5000	2.546E+07
I-129	9.8288E-07	30,906.72	61,813.45	0.00E+00	3.04E-02	6.08E-02	5.0000	1.088E+07
Kr-85	1.0707E-02	30,906.72	61,813.45	0.00E+00	3.31E+02	6.62E+02	7.0000	1.253E+06
Np-237	1.1927E-05	30,906.72	61,813.45	0.00E+00	3.69E-01	7.37E-01	11.0000	1.439E+05
Pa-231	1.4703E-09	30,906.72	61,813.45	0.00E+00	4.54E-05	9.09E-05		
Pb-210	1.6828E-10	30,906.72	61,813.45	0.00E+00	5.20E-06	1.04E-05		
Pm-147	6.9606E-06	30,906.72	61,813.45	0.00E+00	2.15E-01	4.30E-01		
Pu-238	6.6263E-02	30,906.72	61,813.45	0.00E+00	2.05E+03	4.10E+03		
Pu-239	1.1618E-02	30,906.72	61,813.45	0.00E+00	3.59E+02	7.18E+02		
Pu-240	1.5142E-02	30,906.72	61,813.45	0.00E+00	4.68E+02	9.36E+02		
Pu-241	4.3766E-01	30,906.72	61,813.45	0.00E+00	1.35E+04	2.71E+04		
Pu-242	6.4260E-05	30,906.72	61,813.45	0.00E+00	1.99E+00	3.97E+00		
Ra-226	3.8501E-10	30,906.72	61,813.45	0.00E+00	1.19E-05	2.38E-05		
Ra-228	5.2955E-12	30,906.72	61,813.45	0.00E+00	1.64E-07	3.27E-07		
Ru-106	2.0413E-14	30,906.72	61,813.45	0.00E+00	6.31E-10	1.26E-09		
Se-79	1.2376E-05	30,906.72	61,813.45	0.00E+00	3.82E-01	7.65E-01		
Sn-126	2.5210E-05	30,906.72	61,813.45	0.00E+00	7.79E-01	1.56E+00		
Sr-90	6.4163E-01	30,906.72	61,813.45	0.00E+00	1.98E+04	3.97E+04		
Tc-99	3.9357E-04	30,906.72	61,813.45	0.00E+00	1.22E+01	2.43E+01		
Th-229	1.5644E-10	30,906.72	61,813.45	0.00E+00	4.84E-06	9.67E-06		
Th-230	2.7972E-08	30,906.72	61,813.45	0.00E+00	8.65E-04	1.73E-03		
Th-232	5.3036E-12	30,906.72	61,813.45	0.00E+00	1.64E-07	3.28E-07		
Ti-206	1.5136E-07	30,906.72	61,813.45	0.00E+00	4.68E-03	9.36E-03		
U-232	4.1005E-07	30,906.72	61,813.45	0.00E+00	1.27E-02	2.53E-02		
U-233	2.5856E-08	30,906.72	61,813.45	0.00E+00	7.99E-04	1.60E-03		
U-234	5.2655E-05	30,906.72	61,813.45	0.00E+00	1.83E+00	3.66E+00		
U-235	-1.4487E-06	30,906.72	0.00	2.11E-01	1.66E-01	2.11E-01		
U-236	7.5888E-06	30,906.72	61,813.45	0.00E+00	2.35E-01	4.69E-01		
U-238	-2.6129E-07	30,906.72	0.00	5.17E-01	5.09E-01	5.17E-01		
Y-90	6.4180E-01	30,906.72	61,813.45	0.00E+00	1.98E+04	3.97E+04		
Other Radionuclides					2.95E+04	5.89E+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:	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 %:	5.973154429	0 to 5	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		30,906.72	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	2,617.63	61,813.45	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.54		1.00
Bounding:	1.08	23.61	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (FUEL FOLLOWER) HEU
SNF ID #: 740
Fuel Units & Descr: 4 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=1.76kg; EOL=1.728kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
Estimates as of: 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:
HIC
1.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	GMWd 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	3.4276E-08	29.85	59.70	0.00E+00	1.02E-06	2.05E-06	Avg. MeV	
Am-241	1.1458E-04	29.85	59.70	0.00E+00	3.42E-03	6.84E-03	0.0150	3.113E+12
Am-242m	7.9468E-09	29.85	59.70	0.00E+00	2.37E-07	4.74E-07	0.0250	6.469E+11
Am-243	9.8386E-10	29.85	59.70	0.00E+00	2.94E-08	5.87E-08	0.0375	5.609E+11
C-14	2.2978E-04	29.85	59.70	0.00E+00	6.86E-03	1.37E-02	0.0575	6.033E+11
Ci-36	1.2261E-06	29.85	59.70	0.00E+00	3.86E-05	7.32E-05	0.0850	3.644E+11
Cm-243	1.7271E-10	29.85	59.70	0.00E+00	5.16E-09	1.03E-08	0.1250	2.364E+11
Cm-244	1.3058E-09	29.85	59.70	0.00E+00	3.90E-08	7.80E-08	0.2250	3.141E+11
Co-60	9.8636E-03	29.85	59.70	0.00E+00	2.94E-01	5.89E-01	0.3750	1.370E+11
Cs-134	1.9617E-08	29.85	59.70	0.00E+00	5.86E-07	1.17E-06	0.5750	2.281E+12
Cs-135	3.0316E-05	29.85	59.70	0.00E+00	9.05E-04	1.81E-03	0.8500	2.252E+10
Cs-137	1.0263E+00	29.85	59.70	0.00E+00	3.06E+01	6.13E+01	1.2500	5.129E+10
Eu-154	2.0017E-04	29.85	59.70	0.00E+00	5.98E-03	1.20E-02	1.7500	5.796E+08
Eu-155	8.5957E-05	29.85	59.70	0.00E+00	2.57E-03	5.13E-03	2.2500	2.939E+05
Fe-55	2.2646E-05	29.85	59.70	0.00E+00	6.76E-04	1.35E-03	2.7500	4.003E+04
H-3	1.0635E-03	29.85	59.70	0.00E+00	3.23E-02	6.47E-02	3.5000	3.796E+00
I-129	7.3195E-07	29.85	59.70	0.00E+00	2.18E-05	4.37E-05	5.0000	1.569E+00
Kr-85	1.5661E-02	29.85	59.70	0.00E+00	4.67E-01	9.35E-01	7.0000	1.736E-01
Np-237	1.1494E-06	29.85	59.70	0.00E+00	3.43E-05	6.86E-05	11.0000	1.950E-02
Pa-231	5.8070E-08	29.85	59.70	0.00E+00	1.73E-06	3.47E-06		
Pb-210	1.2985E-12	29.85	59.70	0.00E+00	3.88E-11	7.75E-11		
Pm-147	2.2196E-05	29.85	59.70	0.00E+00	6.63E-04	1.33E-03		
Pu-238	2.8223E-04	29.85	59.70	0.00E+00	7.83E-03	1.57E-02		
Pu-239	6.6739E-04	29.85	59.70	0.00E+00	1.99E-02	3.98E-02		
Pu-240	8.6705E-05	29.85	59.70	0.00E+00	2.59E-03	5.18E-03		
Pu-241	3.4759E-04	29.85	59.70	0.00E+00	1.04E-02	2.08E-02		
Pu-242	1.9717E-09	29.85	59.70	0.00E+00	5.89E-08	1.18E-07		
Ra-226	3.0000E-12	29.85	59.70	0.00E+00	8.96E-11	1.79E-10		
Ra-228	6.3328E-12	29.85	59.70	0.00E+00	2.49E-10	4.97E-10		
Ru-106	6.1464E-15	29.85	59.70	0.00E+00	1.83E-13	3.67E-13		
Se-79	1.3221E-05	29.85	59.70	0.00E+00	3.95E-04	7.89E-04		
Sn-126	1.1491E-05	29.85	59.70	0.00E+00	3.43E-04	6.86E-04		
Sr-90	9.5541E-01	29.85	59.70	0.00E+00	2.85E+01	5.70E+01		
Tc-99	4.6656E-04	29.85	59.70	0.00E+00	1.39E-02	2.79E-02		
Th-229	1.9085E-11	29.85	59.70	0.00E+00	5.70E-10	1.14E-09		
Th-230	2.1913E-10	29.85	59.70	0.00E+00	6.54E-09	1.31E-08		
Th-232	8.3478E-12	29.85	59.70	0.00E+00	2.49E-10	4.98E-10		
Th-208	1.8752E-08	29.85	59.70	0.00E+00	5.60E-07	1.12E-06		
U-232	5.0782E-08	29.85	59.70	0.00E+00	1.52E-06	3.03E-06		
U-233	3.2596E-09	29.85	59.70	0.00E+00	9.73E-08	1.95E-07		
U-234	3.9817E-07	29.85	59.70	0.00E+00	1.19E-05	2.38E-05		
U-235	-2.7761E-06	29.85	0.00	3.56E-03	3.48E-03	3.56E-03		
U-236	1.6190E-05	29.85	59.70	0.00E+00	4.83E-04	9.67E-04		
U-238	-2.8547E-09	29.85	0.00	3.76E-05	3.76E-05	3.76E-05		
Y-90	9.5557E-01	29.85	59.70	0.00E+00	2.85E+01	5.70E+01		
Other Radionuclides					3.64E+01	7.28E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ZIRC	SST	This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.636	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		29.85	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		59.70	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.36		1.00
Bounding:	0.73		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (MOX)
SNF ID #: 63
Fuel Units & Descr: 25 - 6 FLAT PLATES
Heavy Metal Mass: BOL=986kg; EOL=932.562kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
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"x18"
2.08

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	50,784.46	101,568.92	0.00E+00	1.28E-01	2.56E-01	Avg. MeV	
Am-241	8.6432E+00	50,784.46	101,568.92	0.00E+00	4.39E+05	8.78E+05	0.0150	8.689E+16
Am-242m	1.5728E-02	50,784.46	101,568.92	0.00E+00	7.99E+02	1.60E+03	0.0250	1.700E+16
Am-243	1.6288E-02	50,784.46	101,568.92	0.00E+00	8.27E+02	1.65E+03	0.0375	1.438E+16
C-14	1.2068E-01	50,784.46	101,568.92	0.00E+00	6.13E+03	1.23E+04	0.0575	2.715E+16
Cl-36	2.2849E-03	50,784.46	101,568.92	0.00E+00	1.16E+02	2.32E+02	0.0850	9.101E+15
Co-243	6.0144E-04	50,784.46	101,568.92	0.00E+00	3.05E+01	6.11E+01	0.1250	6.440E+15
Co-244	9.4880E-02	50,784.46	101,568.92	0.00E+00	4.82E+03	9.64E+03	0.2250	7.877E+15
Co-60	3.9052E+00	50,784.46	101,568.92	0.00E+00	1.98E+05	3.97E+05	0.3750	3.410E+15
Cs-134	2.2139E-06	50,784.46	101,568.92	0.00E+00	1.12E-01	2.25E-01	0.5750	5.642E+16
Cs-135	4.3976E-04	50,784.46	101,568.92	0.00E+00	2.23E+01	4.47E+01	0.8500	1.236E+15
Cs-137	1.4887E+01	50,784.46	101,568.92	0.00E+00	7.56E+05	1.51E+06	1.2500	3.029E+16
Eu-154	3.7342E-01	50,784.46	101,568.92	0.00E+00	1.90E+04	3.79E+04	1.7500	3.640E+13
Eu-155	8.4893E-03	50,784.46	101,568.92	0.00E+00	4.31E+02	8.62E+02	2.2500	1.574E+11
Fe-55	5.3750E-03	50,784.46	101,568.92	0.00E+00	2.73E+02	5.46E+02	2.7500	2.710E+11
H-3	1.0472E-01	50,784.46	101,568.92	0.00E+00	5.32E+03	1.06E+04	3.5000	1.821E+08
I-129	1.0618E-05	50,784.46	101,568.92	0.00E+00	5.39E-01	1.08E+00	5.0000	6.851E+07
Kr-85	2.2717E-01	50,784.46	101,568.92	0.00E+00	1.15E+04	2.31E+04	7.0000	7.798E+06
Np-237	1.6400E-04	50,784.46	101,568.92	0.00E+00	8.33E+00	1.67E+01	11.0000	8.893E+05
Pa-231	2.8688E-06	50,784.46	101,568.92	0.00E+00	1.46E-01	2.91E-01		
Pb-210	4.7312E-08	50,784.46	101,568.92	0.00E+00	2.40E-03	4.81E-03		
Pm-147	3.2198E-04	50,784.46	101,568.92	0.00E+00	1.64E+01	3.27E+01		
Pu-238	-1.1924E+00	50,784.46	0.00	1.27E+05	6.61E+04	1.27E+05		
Pu-239	-4.8600E-02	50,784.46	0.00	1.53E+04	1.29E+04	1.53E+04		
Pu-240	-3.0127E-01	50,784.46	0.00	1.96E+04	4.28E+03	1.96E+04		
Pu-241	-1.2917E+02	50,784.46	0.00	5.04E+08	0.00E+00	5.04E+08		
Pu-242	-1.1381E-04	50,784.46	0.00	8.47E+01	7.90E+01	8.47E+01		
Ra-226	1.0760E-07	50,784.46	101,568.92	0.00E+00	5.46E-03	1.09E-02		
Ra-228	6.0160E-07	50,784.46	101,568.92	0.00E+00	3.06E-02	6.11E-02		
Ru-106	1.3388E-13	50,784.46	101,568.92	0.00E+00	6.80E-09	1.36E-08		
Se-79	1.9179E-04	50,784.46	101,568.92	0.00E+00	9.74E+00	1.95E+01		
Sn-126	1.6669E-04	50,784.46	101,568.92	0.00E+00	8.47E+00	1.69E+01		
Sr-90	1.3859E+01	50,784.46	101,568.92	0.00E+00	7.04E+05	1.41E+06		
Tc-99	6.7678E-03	50,784.46	101,568.92	0.00E+00	3.44E+02	6.87E+02		
Th-229	2.2592E-06	50,784.46	101,568.92	0.00E+00	1.15E-01	2.29E-01		
Th-230	7.5955E-06	50,784.46	101,568.92	0.00E+00	3.86E-01	7.71E-01		
Th-232	6.0208E-07	50,784.46	101,568.92	0.00E+00	3.06E-02	6.12E-02		
Th-208	7.5795E-05	50,784.46	101,568.92	0.00E+00	3.85E+00	7.70E+00		
U-232	2.0521E-04	50,784.46	101,568.92	0.00E+00	1.04E+01	2.08E+01		
U-233	3.6128E-04	50,784.46	101,568.92	0.00E+00	1.83E+01	3.67E+01		
U-234	1.2788E-02	50,784.46	101,568.92	0.00E+00	6.49E+02	1.30E+03		
U-235	5.7486E-04	50,784.46	101,568.92	4.24E-01	2.96E+01	5.88E+01		
U-238	2.3485E-04	50,784.46	101,568.92	0.00E+00	1.19E+01	2.39E+01		
U-236	1.1581E-04	50,784.46	101,568.92	5.28E-02	5.93E+00	1.18E+01		
Y-90	1.3881E+01	50,784.46	101,568.92	0.00E+00	7.04E+05	1.41E+06		
Other Radionuclides					2.61E+06	5.22E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E+04	5.99E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
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 HMI Constituents:	ZIRC	SST/Inconel	
BOL Enrichment %:	Pu and U	U, Th, & Pu	
	0.22222216	0 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		50,784.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		101,568.92	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.54		34.51
Bounding:	3.08		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (NORMAL UO2)
SNF ID #: 60
Fuel Units & Descr: 51 - 6 FLAT PLATES
Heavy Metal Mass: BOL=1358.84kg; EOL=1357.824kg
ROD Storage Site: INEEL

*Fuel decay start date: 1966
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"
4.25

II. Estimates	m	X ₀	X ₁	b	Y ₀	Y ₁	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	775.98	1,551.95	0.00E+00	8.33E-07	1.67E-06	Avg. MeV	
Am-241	1.4751E-01	775.98	1,551.95	0.00E+00	1.14E+02	2.29E+02	0.0150	5.906E+13
Am-242m	2.6800E-04	775.98	1,551.95	0.00E+00	2.08E-01	4.16E-01	0.0250	1.183E+13
Am-243	6.2484E-04	775.98	1,551.95	0.00E+00	4.85E-01	9.70E-01	0.0375	1.115E+13
C-14	4.7820E-05	775.98	1,551.95	0.00E+00	3.71E-02	7.42E-02	0.0675	1.395E+13
Ct-36	8.0297E-07	775.98	1,551.95	0.00E+00	6.23E-04	1.25E-03	0.0850	6.520E+12
Cm-243	1.7426E-04	775.98	1,551.95	0.00E+00	1.35E-01	2.70E-01	0.1250	4.338E+12
Cm-244	2.7616E-02	775.98	1,551.95	0.00E+00	2.14E+01	4.29E+01	0.2250	5.567E+12
Co-60	3.5610E-04	775.98	1,551.95	0.00E+00	2.76E-01	5.53E-01	0.3750	2.404E+12
Cs-134	2.8260E-07	775.98	1,551.95	0.00E+00	2.04E-04	4.08E-04	0.5750	5.661E+13
Cs-135	1.4433E-05	775.98	1,551.95	0.00E+00	1.12E-02	2.24E-02	0.8500	5.528E+11
Cs-137	9.8870E-01	775.98	1,551.95	0.00E+00	7.67E+02	1.53E+03	1.2500	3.518E+11
Eu-154	6.0320E-03	775.98	1,551.95	0.00E+00	4.88E+00	9.36E+00	1.7500	1.647E+10
Eu-155	2.1770E-04	775.98	1,551.95	0.00E+00	1.69E-01	3.38E-01	2.2500	2.546E+06
Fe-55	7.8296E-07	775.98	1,551.95	0.00E+00	6.15E-04	1.23E-03	2.7500	8.962E+06
H-3	8.9486E-03	775.98	1,551.95	0.00E+00	6.94E+00	1.39E+01	3.5000	6.416E+05
I-129	9.8288E-07	775.98	1,551.95	0.00E+00	7.63E-04	1.53E-03	8.0000	2.742E+06
Kr-85	1.0707E-02	775.98	1,551.95	0.00E+00	8.31E+00	1.66E+01	7.0000	3.159E+04
Np-237	1.1927E-05	775.98	1,551.95	0.00E+00	9.25E-03	1.85E-02	11.0000	3.627E+03
Pa-231	1.4703E-09	775.98	1,551.95	0.00E+00	1.14E-06	2.28E-06		
Pb-210	1.6828E-10	775.98	1,551.95	0.00E+00	1.31E-07	2.61E-07		
Pm-147	6.9606E-06	775.98	1,551.95	0.00E+00	5.40E-03	1.08E-02		
Pu-238	6.6263E-02	775.98	1,551.95	0.00E+00	5.14E+01	1.03E+02		
Pu-239	1.1618E-02	775.98	1,551.95	0.00E+00	9.02E+00	1.80E+01		
Pu-240	1.5142E-02	775.98	1,551.95	0.00E+00	1.17E+01	2.35E+01		
Pu-241	4.3766E-01	775.98	1,551.95	0.00E+00	3.40E+02	6.79E+02		
Pu-242	6.4260E-05	775.98	1,551.95	0.00E+00	4.99E-02	9.97E-02		
Ra-226	3.8501E-10	775.98	1,551.95	0.00E+00	2.99E-07	5.98E-07		
Ra-228	5.2955E-12	775.98	1,551.95	0.00E+00	4.11E-09	8.22E-09		
Ru-106	2.0413E-14	775.98	1,551.95	0.00E+00	1.58E-11	3.17E-11		
Se-79	1.2376E-05	775.98	1,551.95	0.00E+00	9.60E-03	1.92E-02		
Sn-126	2.5210E-05	775.98	1,551.95	0.00E+00	1.96E-02	3.91E-02		
Sr-90	6.4163E-01	775.98	1,551.95	0.00E+00	4.98E+02	9.96E+02		
Tc-99	3.9357E-04	775.98	1,551.95	0.00E+00	3.05E-01	6.11E-01		
Th-229	1.5644E-10	775.98	1,551.95	0.00E+00	1.21E-07	2.43E-07		
Th-230	2.7972E-08	775.98	1,551.95	0.00E+00	2.17E-05	4.34E-05		
Th-232	5.3036E-12	775.98	1,551.95	0.00E+00	4.12E-09	8.23E-09		
Ti-208	1.5136E-07	775.98	1,551.95	0.00E+00	1.17E-04	2.35E-04		
U-232	4.1005E-07	775.98	1,551.95	0.00E+00	3.18E-04	6.36E-04		
U-233	2.5856E-08	775.98	1,551.95	0.00E+00	2.01E-05	4.01E-05		
U-234	6.2665E-05	775.98	1,551.95	0.00E+00	4.09E-02	8.17E-02		
U-235	-1.4487E-06	775.98	0.00	2.09E-02	1.98E-02	2.09E-02		
U-236	7.5888E-06	775.98	1,551.95	0.00E+00	5.89E-03	1.18E-02		
U-238	-2.6129E-07	775.98	0.00	4.53E-01	4.53E-01	4.53E-01		
Y-90	6.4180E-01	775.98	1,551.95	0.00E+00	4.98E+02	9.96E+02		
Other Radionuclides					7.39E+02	1.48E+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 %:	0.711000016	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		775.98
Bounding:		1,551.95

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:	0.02	
Bounding:	0.03	

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: EBWR (SPKES)
SNF ID #: 891
Fuel Units & Descr: 31 - 7 X 7 ROD ARRAY
Heavy Metal Mass: BOL=29.205kg; EOL=28.989kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1966
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup (MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
2.58

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	3.4276E-08	2,093.81	4,187.62	0.00E+00	7.18E-05	1.44E-04	Avg. MeV
Am-241	1.1458E-04	2,093.81	4,187.62	0.00E+00	2.40E-01	4.80E-01	0.0150 2.184E+14
Am-242m	7.9468E-09	2,093.81	4,187.62	0.00E+00	1.66E-05	3.33E-05	0.0250 4.538E+13
Am-243	9.8386E-10	2,093.81	4,187.62	0.00E+00	2.08E-06	4.12E-06	0.0375 3.934E+13
C-14	2.2978E-04	2,093.81	4,187.62	0.00E+00	4.81E-01	9.62E-01	0.0575 4.232E+13
Cl-36	1.2261E-06	2,093.81	4,187.62	0.00E+00	2.57E-03	5.13E-03	0.0850 2.558E+13
Cm-243	1.7271E-10	2,093.81	4,187.62	0.00E+00	3.62E-07	7.23E-07	0.1250 1.658E+13
Cm-244	1.3058E-09	2,093.81	4,187.62	0.00E+00	2.73E-06	5.47E-06	0.2250 2.203E+13
Co-60	9.8636E-03	2,093.81	4,187.62	0.00E+00	2.07E+01	4.13E+01	0.3750 9.609E+12
Cs-134	1.9617E-08	2,093.81	4,187.62	0.00E+00	4.11E-06	8.21E-06	0.5750 1.600E+14
Cs-135	3.0316E-05	2,093.81	4,187.62	0.00E+00	6.35E-02	1.27E-01	0.8500 1.580E+12
Cs-137	1.0263E+00	2,093.81	4,187.62	0.00E+00	2.15E+03	4.30E+03	1.2500 3.597E+12
Eu-154	2.0017E-04	2,093.81	4,187.62	0.00E+00	4.19E-01	8.38E-01	1.7500 4.087E+10
Eu-155	8.5967E-05	2,093.81	4,187.62	0.00E+00	1.80E-01	3.60E-01	2.2500 2.081E+07
Fe-55	2.2648E-05	2,093.81	4,187.62	0.00E+00	4.74E-02	9.48E-02	2.7500 2.808E+06
H-3	1.0835E-03	2,093.81	4,187.62	0.00E+00	2.27E+00	4.54E+00	3.5000 2.490E+02
I-129	7.3195E-07	2,093.81	4,187.62	0.00E+00	1.53E-03	3.07E-03	5.0000 1.029E+02
Kr-85	1.5681E-02	2,093.81	4,187.62	0.00E+00	3.28E+01	6.56E+01	7.0000 1.138E+01
Np-237	1.1494E-06	2,093.81	4,187.62	0.00E+00	2.41E-03	4.81E-03	11.0000 1.277E+00
Pa-231	5.8070E-08	2,093.81	4,187.62	0.00E+00	1.22E-04	2.43E-04	
Pb-210	1.2985E-12	2,093.81	4,187.62	0.00E+00	2.72E-09	5.44E-09	
Pm-147	2.2196E-05	2,093.81	4,187.62	0.00E+00	4.65E-02	9.29E-02	
Pu-238	2.6223E-04	2,093.81	4,187.62	0.00E+00	5.49E-01	1.10E+00	
Pu-239	6.6739E-04	2,093.81	4,187.62	0.00E+00	1.40E+00	2.79E+00	
Pu-240	8.6705E-05	2,093.81	4,187.62	0.00E+00	1.82E-01	3.63E-01	
Pu-241	3.4759E-04	2,093.81	4,187.62	0.00E+00	7.28E-01	1.46E+00	
Pu-242	1.9717E-09	2,093.81	4,187.62	0.00E+00	4.13E-06	8.26E-06	
Ra-226	3.0000E-12	2,093.81	4,187.62	0.00E+00	6.28E-09	1.26E-08	
Ra-228	8.3328E-12	2,093.81	4,187.62	0.00E+00	1.74E-08	3.49E-08	
Ru-106	6.1464E-15	2,093.81	4,187.62	0.00E+00	1.29E-11	2.57E-11	
Se-79	1.3221E-05	2,093.81	4,187.62	0.00E+00	2.77E-02	5.54E-02	
Sn-126	1.1491E-05	2,093.81	4,187.62	0.00E+00	2.41E-02	4.81E-02	
Sr-90	9.5541E-01	2,093.81	4,187.62	0.00E+00	2.00E+03	4.00E+03	
Tc-99	4.6658E-04	2,093.81	4,187.62	0.00E+00	9.77E-01	1.95E+00	
Th-229	1.9085E-11	2,093.81	4,187.62	0.00E+00	4.00E-08	7.99E-08	
Th-230	2.1913E-10	2,093.81	4,187.62	0.00E+00	4.59E-07	9.18E-07	
Th-232	8.3478E-12	2,093.81	4,187.62	0.00E+00	1.75E-08	3.50E-08	
Ti-206	1.8752E-08	2,093.81	4,187.62	0.00E+00	3.93E-05	7.85E-05	
U-232	5.0782E-08	2,093.81	4,187.62	0.00E+00	1.06E-04	2.13E-04	
U-233	3.2596E-09	2,093.81	4,187.62	0.00E+00	8.82E-06	1.36E-05	
U-234	3.9817E-07	2,093.81	4,187.62	0.00E+00	8.34E-04	1.67E-03	
U-235	-2.7761E-06	2,093.81	0.00	5.88E-02	5.30E-02	5.88E-02	
U-236	1.6190E-05	2,093.81	4,187.62	0.00E+00	3.39E-02	6.78E-02	
U-238	-2.8547E-09	2,093.81	0.00	6.68E-04	6.62E-04	6.68E-04	
Y-90	9.5557E-01	2,093.81	4,187.62	0.00E+00	2.00E+03	4.00E+03	
Other Radionuclides					2.55E+03	5.11E+03	

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E+01	4.89E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used 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 %:	93.1899022	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
Nominal:	From SFD 1,233.24	Estimated 2,093.81	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	1,767.05	4,187.62	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 1.54	Estimated Burnup/ Given Burnup 1.70	1.00
Bounding:	3.07	2.37	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ENRICHED HEAVY
SNF ID #: 64
Fuel Units & Descr: 53 - 6 FLAT PLATES
Heavy Metal Mass: BOL=2969.2kg; EOL=2962.962kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
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"
4.42

II. Estimates	m	x_0	x_1	b	y_0	y_1	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	5,932.14	11,864.28	0.00E+00	6.37E-06	1.27E-05	Avg. MeV	
Am-241	1.4751E-01	5,932.14	11,864.28	0.00E+00	8.75E+02	1.75E+03	0.0150	4.515E+14
Am-242m	2.6808E-04	5,932.14	11,864.28	0.00E+00	1.59E+00	3.18E+00	0.0250	9.047E+13
Am-243	6.2484E-04	5,932.14	11,864.28	0.00E+00	3.71E+00	7.41E+00	0.0375	8.525E+13
C-14	4.7820E-05	5,932.14	11,864.28	0.00E+00	2.84E-01	5.67E-01	0.0575	1.067E+14
Cl-36	8.0297E-07	5,932.14	11,864.28	0.00E+00	4.76E-03	9.53E-03	0.0850	4.864E+13
Cm-243	1.7426E-04	5,932.14	11,864.28	0.00E+00	1.03E+00	2.07E+00	0.1250	3.316E+13
Cm-244	2.7616E-02	5,932.14	11,864.28	0.00E+00	1.84E+02	3.28E+02	0.2250	4.256E+13
Co-60	3.5610E-04	5,932.14	11,864.28	0.00E+00	2.11E+00	4.22E+00	0.3750	1.838E+13
Cs-134	2.6260E-07	5,932.14	11,864.28	0.00E+00	1.56E-03	3.12E-03	0.5750	4.328E+14
Cs-135	1.4433E-05	5,932.14	11,864.28	0.00E+00	8.56E-02	1.71E-01	0.8500	4.226E+12
Cs-137	9.8870E-01	5,932.14	11,864.28	0.00E+00	5.87E+03	1.17E+04	1.2500	2.889E+12
Eu-154	6.0320E-03	5,932.14	11,864.28	0.00E+00	3.58E+01	7.16E+01	1.7500	1.182E+11
Eu-155	2.1770E-04	5,932.14	11,864.28	0.00E+00	1.29E+00	2.58E+00	2.2500	1.944E+07
Fe-55	7.8296E-07	5,932.14	11,864.28	0.00E+00	4.70E-03	9.41E-03	2.7500	6.850E+07
H-3	8.9486E-03	5,932.14	11,864.28	0.00E+00	5.31E+01	1.06E+02	3.5000	4.891E+06
I-129	9.8288E-07	5,932.14	11,864.28	0.00E+00	5.83E-03	1.17E-02	5.0000	2.090E+06
Kr-85	1.0707E-02	5,932.14	11,864.28	0.00E+00	6.35E+01	1.27E+02	7.0000	2.408E+05
Np-237	1.1927E-05	5,932.14	11,864.28	0.00E+00	7.08E-02	1.42E-01	11.0000	2.765E+04
Pa-231	1.4703E-09	5,932.14	11,864.28	0.00E+00	8.72E-06	1.74E-05		
Pb-210	1.6828E-10	5,932.14	11,864.28	0.00E+00	9.98E-07	2.00E-06		
Pm-147	6.9606E-06	5,932.14	11,864.28	0.00E+00	4.13E-02	8.26E-02		
Pu-238	6.6263E-02	5,932.14	11,864.28	0.00E+00	3.93E+02	7.86E+02		
Pu-239	1.1618E-02	5,932.14	11,864.28	0.00E+00	6.89E+01	1.38E+02		
Pu-240	1.5142E-02	5,932.14	11,864.28	0.00E+00	8.98E+01	1.80E+02		
Pu-241	4.3766E-01	5,932.14	11,864.28	0.00E+00	2.60E+03	5.19E+03		
Pu-242	6.4260E-05	5,932.14	11,864.28	0.00E+00	3.81E-01	7.62E-01		
Ra-226	3.8501E-10	5,932.14	11,864.28	0.00E+00	2.28E-06	4.57E-06		
Ra-228	5.2955E-12	5,932.14	11,864.28	0.00E+00	3.14E-08	6.28E-08		
Ru-106	2.0413E-14	5,932.14	11,864.28	0.00E+00	1.21E-10	2.42E-10		
Se-79	1.2376E-05	5,932.14	11,864.28	0.00E+00	7.34E-02	1.47E-01		
Sn-126	2.5210E-05	5,932.14	11,864.28	0.00E+00	1.50E-01	2.99E-01		
Sr-90	8.4163E-01	5,932.14	11,864.28	0.00E+00	3.81E+03	7.61E+03		
Tc-99	3.9357E-04	5,932.14	11,864.28	0.00E+00	2.33E+00	4.67E+00		
Th-229	1.5644E-10	5,932.14	11,864.28	0.00E+00	9.28E-07	1.86E-06		
Th-230	2.7972E-08	5,932.14	11,864.28	0.00E+00	1.66E-04	3.32E-04		
Th-232	5.3036E-12	5,932.14	11,864.28	0.00E+00	3.15E-08	6.29E-08		
Ti-208	1.5136E-07	5,932.14	11,864.28	0.00E+00	8.98E-04	1.80E-03		
U-232	4.1005E-07	5,932.14	11,864.28	0.00E+00	2.43E-03	4.86E-03		
U-233	2.5856E-08	5,932.14	11,864.28	0.00E+00	1.53E-04	3.07E-04		
U-234	5.2655E-05	5,932.14	11,864.28	0.00E+00	3.12E-01	6.25E-01		
U-235	-1.4487E-06	5,932.14	0.00	9.28E-02	8.42E-02	9.28E-02		
U-236	7.5888E-06	5,932.14	11,864.28	0.00E+00	4.50E-02	9.00E-02		
U-238	-2.6129E-07	5,932.14	0.00	9.90E-01	9.89E-01	9.90E-01		
Y-90	6.4180E-01	5,932.14	11,864.28	0.00E+00	3.81E+03	7.61E+03		
Other Radionuclides					5.85E+03	1.13E+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:	U	U
BOL Enrichment %:	1.436170175	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		5,932.14
Bounding:	4,782.72	11,864.28

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.11	2.48

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: EBWR (U METAL) ENRICHED THIN
SNF ID #: 687
Fuel Units & Descr: 54 - 6 FLAT PLATES
Heavy Metal Mass: BOL = ; EOL=2194.101kg
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: 50 years

Estimated
Canister usage:
18"x10"
4.50

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) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	3,516.48	3,516.48	0.00E+00	3.77E-08	3.77E-08	Avg. MeV	
Am-241	1.4751E-01	3,516.48	3,516.48	0.00E+00	5.19E+02	5.19E+02	0.0150	1.338E+14
Am-242m	2.6809E-04	3,516.48	3,516.48	0.00E+00	9.43E-01	9.43E-01	0.0250	2.681E+13
Am-243	6.2484E-04	3,516.48	3,516.48	0.00E+00	2.20E+00	2.20E+00	0.0375	2.527E+13
C-14	4.7820E-05	3,516.48	3,516.48	0.00E+00	1.68E-01	1.68E-01	0.0575	3.162E+13
Cl-36	8.0297E-07	3,516.48	3,516.48	0.00E+00	2.82E-03	2.82E-03	0.0850	1.477E+13
Cm-243	1.7426E-04	3,516.48	3,516.48	0.00E+00	6.13E-01	6.13E-01	0.1250	9.829E+12
Cm-244	2.7816E-02	3,516.48	3,516.48	0.00E+00	9.71E+01	9.71E+01	0.2250	1.262E+13
Co-60	3.5810E-04	3,516.48	3,516.48	0.00E+00	1.25E+00	1.25E+00	0.3750	5.447E+12
Cs-134	2.6260E-07	3,516.48	3,516.48	0.00E+00	9.23E-04	9.23E-04	0.5750	1.283E+14
Cs-135	1.4433E-05	3,516.48	3,516.48	0.00E+00	5.08E-02	5.08E-02	0.8500	1.253E+12
Cs-137	9.8870E-01	3,516.48	3,516.48	0.00E+00	3.48E+03	3.48E+03	1.2500	7.970E+11
Eu-154	6.0320E-03	3,516.48	3,516.48	0.00E+00	2.12E+01	2.12E+01	1.7500	3.504E+10
Eu-155	2.1770E-04	3,516.48	3,516.48	0.00E+00	7.66E-01	7.66E-01	2.2500	5.768E+08
Fe-55	7.9296E-07	3,516.48	3,516.48	0.00E+00	2.79E-03	2.79E-03	2.7500	2.030E+07
H-3	8.9486E-03	3,516.48	3,516.48	0.00E+00	3.15E+01	3.15E+01	3.5000	1.452E+06
I-129	9.8288E-07	3,516.48	3,516.48	0.00E+00	3.48E-03	3.48E-03	5.0000	6.206E+05
Kr-85	1.0707E-02	3,516.48	3,516.48	0.00E+00	3.77E+01	3.77E+01	7.0000	7.149E+04
Np-237	1.1927E-05	3,516.48	3,516.48	0.00E+00	4.19E-02	4.19E-02	11.0000	8.209E+03
Pa-231	1.4703E-09	3,516.48	3,516.48	0.00E+00	5.17E-08	5.17E-08		
Pb-210	1.6828E-10	3,516.48	3,516.48	0.00E+00	5.92E-07	5.92E-07		
Pm-147	6.9606E-08	3,516.48	3,516.48	0.00E+00	2.45E-02	2.45E-02		
Pu-238	6.6263E-02	3,516.48	3,516.48	0.00E+00	2.33E+02	2.33E+02		
Pu-239	1.1618E-02	3,516.48	3,516.48	0.00E+00	4.09E+01	4.09E+01		
Pu-240	1.5142E-02	3,516.48	3,516.48	0.00E+00	5.32E+01	5.32E+01		
Pu-241	4.3766E-01	3,516.48	3,516.48	0.00E+00	1.54E+03	1.54E+03		
Pu-242	6.4280E-05	3,516.48	3,516.48	0.00E+00	2.26E-01	2.26E-01		
Ra-226	3.8501E-10	3,516.48	3,516.48	0.00E+00	1.35E-06	1.35E-06		
Ra-228	5.2955E-12	3,516.48	3,516.48	0.00E+00	1.86E-08	1.86E-08		
Ru-106	2.0413E-14	3,516.48	3,516.48	0.00E+00	7.18E-11	7.18E-11		
Se-79	1.2376E-05	3,516.48	3,516.48	0.00E+00	4.35E-02	4.35E-02		
Sn-126	2.5210E-06	3,516.48	3,516.48	0.00E+00	8.87E-02	8.87E-02		
Sr-90	6.4163E-01	3,516.48	3,516.48	0.00E+00	2.26E+03	2.26E+03		
Tc-99	3.9357E-04	3,516.48	3,516.48	0.00E+00	1.38E+00	1.38E+00		
Th-229	1.5644E-10	3,516.48	3,516.48	0.00E+00	5.50E-07	5.50E-07		
Th-230	2.7972E-08	3,516.48	3,516.48	0.00E+00	9.84E-05	9.84E-05		
Th-232	5.3036E-12	3,516.48	3,516.48	0.00E+00	1.87E-08	1.87E-08		
Ti-208	1.5136E-07	3,516.48	3,516.48	0.00E+00	5.32E-04	5.32E-04		
U-232	4.1005E-07	3,516.48	3,516.48	0.00E+00	1.44E-03	1.44E-03		
U-233	2.5856E-08	3,516.48	3,516.48	0.00E+00	9.09E-05	9.09E-05		
U-234	5.2665E-05	3,516.48	3,516.48	0.00E+00	1.85E-01	1.85E-01		
U-235	1.4487E-06	3,516.48	0.00	1.52E-01	1.47E-01	1.52E-01		
U-236	7.5888E-06	3,516.48	3,516.48	0.00E+00	2.67E-02	2.67E-02		
U-238	2.6129E-07	3,516.48	0.00	7.15E-01	7.14E-01	7.15E-01		
Y-90	6.4180E-01	3,516.48	3,516.48	0.00E+00	2.26E+03	2.26E+03		
Other Radionuclides					3.35E+03	3.35E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	ZIRC	ZIRC	
BOL Enrichment %:	U	0 to 5	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		3,516.48	Nominal burnup set equal to bounding burnup
		3,516.48	Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ET-11
 SNF ID #: 888
 Fuel Units & Descr: 1 - 6 FLAT PLATES
 Heavy Metal Mass: BOL=40.2kg; EOL=38.365kg
 ROD Storage Site: INEEL

Fuel decay start date: 1966
 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:
 16"x10"
 0.08

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	CMWD From Template	Nominal Fuel Burnup (MWD) ²	Bounding 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	1,745.00	3,490.00	0.00E+00	1.87E-06	3.75E-06	Avg. MeV	
Am-241	1.4751E-01	1,745.00	3,490.00	0.00E+00	2.57E+02	5.15E+02	0.0150	1.328E+14
Am-242m	2.6809E-04	1,745.00	3,490.00	0.00E+00	4.68E-01	9.36E-01	0.0250	2.861E+13
Am-243	6.2484E-04	1,745.00	3,490.00	0.00E+00	1.09E+00	2.18E+00	0.0375	2.508E+13
C-14	4.7820E-06	1,745.00	3,490.00	0.00E+00	8.34E-02	1.67E-01	0.0575	3.138E+13
Ca-36	8.0297E-07	1,745.00	3,490.00	0.00E+00	1.40E-03	2.80E-03	0.0850	1.466E+13
Cm-243	1.7426E-04	1,745.00	3,490.00	0.00E+00	3.04E-01	6.08E-01	0.1250	9.755E+12
Cm-244	2.7616E-02	1,745.00	3,490.00	0.00E+00	4.82E+01	9.64E+01	0.2250	1.252E+13
Co-60	3.5610E-04	1,745.00	3,490.00	0.00E+00	6.21E-01	1.24E+00	0.3750	5.406E+12
Cs-134	2.6260E-07	1,745.00	3,490.00	0.00E+00	4.58E-04	9.16E-04	0.5750	1.273E+14
Cs-135	1.4433E-05	1,745.00	3,490.00	0.00E+00	2.52E-02	5.04E-02	0.8500	1.243E+12
Cs-137	9.8870E-01	1,745.00	3,490.00	0.00E+00	1.73E+03	3.45E+03	1.2500	7.910E+11
Eu-154	6.0320E-03	1,745.00	3,490.00	0.00E+00	1.05E+01	2.11E+01	1.7500	3.478E+10
Eu-155	2.1770E-04	1,745.00	3,490.00	0.00E+00	3.80E-01	7.60E-01	2.2500	5.716E+06
Fe-55	7.9296E-07	1,745.00	3,490.00	0.00E+00	1.38E-03	2.77E-03	2.7500	2.015E+07
H-3	8.9486E-03	1,745.00	3,490.00	0.00E+00	1.56E+01	3.12E+01	3.5000	1.437E+06
I-129	9.8288E-07	1,745.00	3,490.00	0.00E+00	1.72E-03	3.43E-03	5.0000	6.143E+05
Kr-85	1.0707E-02	1,745.00	3,490.00	0.00E+00	1.87E+01	3.74E+01	7.0000	7.077E+04
Np-237	1.1927E-05	1,745.00	3,490.00	0.00E+00	2.08E-02	4.16E-02	11.0000	8.126E+03
Pa-231	1.4703E-09	1,745.00	3,490.00	0.00E+00	2.57E-06	5.13E-06		
Pb-210	1.6828E-10	1,745.00	3,490.00	0.00E+00	2.94E-07	5.87E-07		
Pm-147	6.9606E-06	1,745.00	3,490.00	0.00E+00	1.21E-02	2.43E-02		
Pu-238	6.6263E-02	1,745.00	3,490.00	0.00E+00	1.16E+02	2.31E+02		
Pu-239	1.1618E-02	1,745.00	3,490.00	0.00E+00	2.03E+01	4.06E+01		
Pu-240	1.5142E-02	1,745.00	3,490.00	0.00E+00	2.64E+01	5.28E+01		
Pu-241	4.3766E-01	1,745.00	3,490.00	0.00E+00	7.64E+02	1.53E+03		
Pu-242	6.4260E-05	1,745.00	3,490.00	0.00E+00	1.12E-01	2.24E-01		
Ra-226	3.8501E-10	1,745.00	3,490.00	0.00E+00	6.72E-07	1.34E-06		
Ra-228	5.2955E-12	1,745.00	3,490.00	0.00E+00	9.24E-09	1.85E-08		
Ru-106	2.0413E-14	1,745.00	3,490.00	0.00E+00	3.56E-11	7.12E-11		
Se-79	1.2376E-05	1,745.00	3,490.00	0.00E+00	2.16E-02	4.32E-02		
Sn-126	2.5210E-05	1,745.00	3,490.00	0.00E+00	4.40E-02	8.80E-02		
Sr-90	6.4163E-01	1,745.00	3,490.00	0.00E+00	1.12E+03	2.24E+03		
Tc-99	3.9357E-04	1,745.00	3,490.00	0.00E+00	6.87E-01	1.37E+00		
Th-229	1.5644E-10	1,745.00	3,490.00	0.00E+00	2.73E-07	5.46E-07		
Th-230	2.7972E-08	1,745.00	3,490.00	0.00E+00	4.88E-05	9.76E-05		
Th-232	5.3036E-12	1,745.00	3,490.00	0.00E+00	9.25E-09	1.85E-08		
Ti-208	1.5136E-07	1,745.00	3,490.00	0.00E+00	2.64E-04	5.28E-04		
U-232	4.1005E-07	1,745.00	3,490.00	0.00E+00	7.16E-04	1.43E-03		
U-233	2.5856E-08	1,745.00	3,490.00	0.00E+00	4.51E-05	9.02E-05		
U-234	5.2665E-05	1,745.00	3,490.00	0.00E+00	8.19E-02	1.64E-01		
U-235	-1.4487E-06	1,745.00	0.00	1.26E-03	0.00E+00	1.26E-03		
U-236	7.5888E-06	1,745.00	3,490.00	0.00E+00	1.32E-02	2.65E-02		
U-238	-2.6129E-07	1,745.00	0.00	1.33E-02	1.29E-02	1.33E-02		
Y-90	6.4180E-01	1,745.00	3,490.00	0.00E+00	1.12E+03	2.24E+03		
Other Radionuclides					1.66E+03	3.33E+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 %:	1.447761185	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWD)²

	From SFD	Estimated
Nominal:		1,745.00
Bounding:	64.32	3,490.00

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.24	
Bounding:	2.48	54.26

Estimated EOL HM/Given EOL HM

1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: EBNR (U METAL) NORMAL HEAVY
 SNF ID #: 889
 Fuel Units & Description: 11 - 6 PLAT PLATES
 Heavy Metal Mass: BOL-620.4kg EOL-566.145kg
 ROD Storage Site: NEEL

Fuel decay start date: 1986
 Estimates as of: 2020
 Template: PWR (Light Water, Zirc. 0 to 5% U)
 Template Burnup (MWd/t): 61.92
 Heavy Metal Mass (MT): 0.00178911
 Template Decay Time: 50 years

Estimated
 Canister usage:
 18 "10"
 0.92

II. Estimates	m	x _g	x _h	b	y _g	y _h	Gamma Sources
Radionuclides	CLAWD From Template	Nominal Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group (Bouding)
Am-227	1.0733E-09	51.594.22	103.188.45	0.00E+00	5.54E+05	1.11E+04	Avg. Mass
Am-241	1.4751E-01	51.594.22	103.188.45	0.00E+00	7.81E+03	1.52E+04	3.928E+15
Am-242m	2.6809E-04	51.594.22	103.188.45	0.00E+00	1.38E+01	2.77E+01	0.0250
Am-243	6.2464E-04	51.594.22	103.188.45	0.00E+00	3.22E+01	6.45E+01	0.0075
C-14	4.7820E-06	51.594.22	103.188.45	0.00E+00	2.47E+00	4.93E+00	0.0578
C-36	8.0297E-07	51.594.22	103.188.45	0.00E+00	4.14E+02	8.29E+02	0.0850
Co-243	1.7426E-04	51.594.22	103.188.45	0.00E+00	8.99E+00	1.80E+01	0.1250
Co-244	2.7818E-02	51.594.22	103.188.45	0.00E+00	1.42E+03	2.85E+03	0.2250
Co-60	3.5610E-04	51.594.22	103.188.45	0.00E+00	1.84E+01	3.67E+01	0.5750
Co-134	2.6200E-07	51.594.22	103.188.45	0.00E+00	1.35E+02	2.71E+02	1.7500
Co-135	1.4433E-05	51.594.22	103.188.45	0.00E+00	7.46E+01	1.49E+00	0.8500
Co-137	9.8870E-01	51.594.22	103.188.45	0.00E+00	5.10E+04	1.02E+05	1.2500
Eu-154	6.0320E-03	51.594.22	103.188.45	0.00E+00	3.11E+02	6.22E+02	1.7500
Eu-155	2.1770E-04	51.594.22	103.188.45	0.00E+00	1.12E+01	2.25E+01	2.2500
Fe-55	7.9296E-07	51.594.22	103.188.45	0.00E+00	4.09E+02	8.18E+02	2.7500
H-3	8.9486E-03	51.594.22	103.188.45	0.00E+00	4.62E+02	9.23E+02	3.5000
I-129	9.8289E-07	51.594.22	103.188.45	0.00E+00	5.07E+02	1.01E+01	5.0000
K-40	1.0707E-02	51.594.22	103.188.45	0.00E+00	6.52E+02	1.10E+03	7.0000
Np-237	1.1927E-05	51.594.22	103.188.45	0.00E+00	6.19E+01	1.23E+00	11.0000
Pa-231	1.4703E-09	51.594.22	103.188.45	0.00E+00	7.59E+05	1.52E+04	
Pb-210	1.6828E-10	51.594.22	103.188.45	0.00E+00	8.68E+06	1.74E+05	
Pm-147	6.9909E-08	51.594.22	103.188.45	0.00E+00	3.59E+01	7.18E+01	
Pu-238	6.8263E-02	51.594.22	103.188.45	0.00E+00	3.42E+03	6.84E+03	
Pu-239	1.1618E-02	51.594.22	103.188.45	0.00E+00	5.99E+02	1.20E+03	
Pu-240	1.5142E-02	51.594.22	103.188.45	0.00E+00	7.81E+02	1.56E+03	
Pu-241	4.3766E-01	51.594.22	103.188.45	0.00E+00	2.28E+04	4.52E+04	
Pu-242	6.4290E-05	51.594.22	103.188.45	0.00E+00	3.32E+00	6.63E+00	
Pa-226	3.9501E-10	51.594.22	103.188.45	0.00E+00	1.99E+05	3.97E+05	
Pa-228	2.0413E-14	51.594.22	103.188.45	0.00E+00	2.73E+07	5.46E+07	
Se-78	1.2378E-06	51.594.22	103.188.45	0.00E+00	1.05E+09	2.11E+09	
Sm-126	2.3210E-05	51.594.22	103.188.45	0.00E+00	1.30E+00	2.60E+00	
Sn-90	6.4163E-01	51.594.22	103.188.45	0.00E+00	3.31E+04	6.62E+04	
Tc-98	3.9357E-04	51.594.22	103.188.45	0.00E+00	2.03E+01	4.06E+01	
Ti-229	1.5644E-10	51.594.22	103.188.45	0.00E+00	8.07E+06	1.61E+05	
Ti-230	2.7972E-08	51.594.22	103.188.45	0.00E+00	1.44E+03	2.88E+03	
Ti-232	3.3036E-12	51.594.22	103.188.45	0.00E+00	2.74E+07	5.47E+07	
Ti-233	1.5136E-07	51.594.22	103.188.45	0.00E+00	7.81E+03	1.56E+02	
U-232	4.1005E-07	51.594.22	103.188.45	0.00E+00	2.12E+02	4.23E+02	
U-233	2.5856E-08	51.594.22	103.188.45	0.00E+00	1.33E+03	2.67E+03	
U-234	5.2665E-05	51.594.22	103.188.45	0.00E+00	2.72E+00	5.43E+00	
U-235	-1.4487E-06	51.594.22	0.00	9.56E+03	0.00E+00	9.56E+03	
U-236	7.5889E-06	51.594.22	103.188.45	0.00E+00	3.92E+01	7.83E+01	
U-238	-2.6129E-07	51.594.22	0.00	2.07E+01	1.94E+01	2.07E+01	
Y-90	6.4180E-01	51.594.22	103.188.45	0.00E+00	3.31E+04	6.62E+04	
Other Radionuclides					4.32E+04	8.63E+04	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	8.23E+02	1.87E+03
Total		

TiL Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ZIRC	ZIRC
BOL HIL Constituents	U	U
BOL Enrichment %	0.712765638	0 to 5

Basic for Parameter Differences:

Burnup Summary (MWd/t)

From SFD	Estimated
Nominal	51.594.22
Bounding	992.64

Basic for burnup used in estimates:

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

Checks

Nonmetal	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding	4.75	103.93

Estimated EOL HIL/ Given EOL HIL
 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) NORMAL THIN
SNF ID #: 890
Fuel Units & Descr: 7 - 6 FLAT PLATES
Heavy Metal Mass: BOL=281.4kg; EOL=279.076kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc. 0 to 5%, U)
²Template Burnup (MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.58

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	2,210.01	4,420.01	0.00E+00	2.37E-06	4.74E-06	Avg. MeV	
Am-241	1.4751E-01	2,210.01	4,420.01	0.00E+00	3.26E+02	6.52E+02	0.0150	1.682E+14
Am-242m	2.6809E-04	2,210.01	4,420.01	0.00E+00	5.92E-01	1.18E+00	0.0250	3.370E+13
Am-243	6.2484E-04	2,210.01	4,420.01	0.00E+00	1.38E+00	2.76E+00	0.0375	3.176E+13
C-14	4.7820E-05	2,210.01	4,420.01	0.00E+00	1.06E-01	2.11E-01	0.0575	3.974E+13
Cl-36	8.0297E-07	2,210.01	4,420.01	0.00E+00	1.77E-03	3.55E-03	0.0650	1.857E+13
Cm-243	1.7426E-04	2,210.01	4,420.01	0.00E+00	3.85E-01	7.70E-01	0.1250	1.235E+13
Cm-244	2.7816E-02	2,210.01	4,420.01	0.00E+00	6.10E+01	1.22E+02	0.2250	1.585E+13
Co-60	3.5610E-04	2,210.01	4,420.01	0.00E+00	7.87E-01	1.57E+00	0.3750	8.847E+12
Cs-134	2.6260E-07	2,210.01	4,420.01	0.00E+00	5.80E-04	1.16E-03	0.5750	1.612E+14
Cs-135	1.4433E-05	2,210.01	4,420.01	0.00E+00	3.19E-02	6.38E-02	0.6500	1.574E+12
Cs-137	9.8870E-01	2,210.01	4,420.01	0.00E+00	2.19E+03	4.37E+03	1.2500	1.002E+12
Eu-154	6.0320E-03	2,210.01	4,420.01	0.00E+00	1.33E+01	2.67E+01	1.7500	4.405E+10
Eu-155	2.1770E-04	2,210.01	4,420.01	0.00E+00	4.81E-01	9.62E-01	2.2500	7.240E+06
Fe-55	7.8296E-07	2,210.01	4,420.01	0.00E+00	1.75E-03	3.50E-03	2.7500	2.552E+07
H-3	8.9486E-03	2,210.01	4,420.01	0.00E+00	1.98E+01	3.96E+01	3.5000	1.821E+06
I-129	9.8288E-07	2,210.01	4,420.01	0.00E+00	2.17E-03	4.34E-03	5.0000	7.782E+05
Kr-85	1.0707E-02	2,210.01	4,420.01	0.00E+00	2.37E+01	4.73E+01	7.0000	8.965E+04
Np-237	1.1927E-05	2,210.01	4,420.01	0.00E+00	2.84E-02	5.27E-02	11.0000	1.029E+04
Pa-231	1.4703E-09	2,210.01	4,420.01	0.00E+00	3.25E-06	6.50E-06		
Pb-210	1.6828E-10	2,210.01	4,420.01	0.00E+00	3.72E-07	7.44E-07		
Pm-147	6.9606E-06	2,210.01	4,420.01	0.00E+00	1.54E-02	3.08E-02		
Pu-238	6.6263E-02	2,210.01	4,420.01	0.00E+00	1.46E+02	2.93E+02		
Pu-239	1.1618E-02	2,210.01	4,420.01	0.00E+00	2.57E+01	5.14E+01		
Pu-240	1.5142E-02	2,210.01	4,420.01	0.00E+00	3.35E+01	6.69E+01		
Pu-241	4.3766E-01	2,210.01	4,420.01	0.00E+00	9.67E+02	1.93E+03		
Pu-242	8.4260E-05	2,210.01	4,420.01	0.00E+00	1.42E-01	2.84E-01		
Ra-226	3.8501E-10	2,210.01	4,420.01	0.00E+00	8.51E-07	1.70E-06		
Ra-228	5.2955E-12	2,210.01	4,420.01	0.00E+00	1.17E-08	2.34E-08		
Ru-106	2.0413E-14	2,210.01	4,420.01	0.00E+00	4.51E-11	9.02E-11		
Se-79	1.2376E-05	2,210.01	4,420.01	0.00E+00	2.74E-02	5.47E-02		
Sn-126	2.5210E-05	2,210.01	4,420.01	0.00E+00	5.57E-02	1.11E-01		
Sr-90	8.4163E-01	2,210.01	4,420.01	0.00E+00	1.42E+03	2.84E+03		
Tc-99	3.8357E-04	2,210.01	4,420.01	0.00E+00	8.70E-01	1.74E+00		
Th-229	1.5644E-10	2,210.01	4,420.01	0.00E+00	3.46E-07	6.91E-07		
Th-230	2.7972E-08	2,210.01	4,420.01	0.00E+00	6.18E-05	1.24E-04		
Th-232	5.3036E-12	2,210.01	4,420.01	0.00E+00	1.17E-08	2.34E-08		
Ti-206	1.5136E-07	2,210.01	4,420.01	0.00E+00	3.34E-04	6.69E-04		
U-232	4.1005E-07	2,210.01	4,420.01	0.00E+00	9.06E-04	1.81E-03		
U-233	2.5856E-08	2,210.01	4,420.01	0.00E+00	5.71E-05	1.14E-04		
U-234	5.2665E-05	2,210.01	4,420.01	0.00E+00	1.16E-01	2.33E-01		
U-235	-1.4487E-06	2,210.01	0.00	4.36E-03	1.15E-03	4.36E-03		
U-236	7.5888E-06	2,210.01	4,420.01	0.00E+00	1.68E-02	3.35E-02		
U-238	-2.6129E-07	2,210.01	0.00	9.39E-02	9.33E-02	9.39E-02		
Y-90	6.4180E-01	2,210.01	4,420.01	0.00E+00	1.42E+03	2.84E+03		
Other Radionuclides					2.11E+03	4.21E+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 %:	0.716417866	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		2,210.01
Bounding:	450.24	4,420.01

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.45	9.82

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: ENEA (LEU UALQ) SALUGGIA ITALY
SNF ID #: 760
Fuel Units & Descr: 32 - MTR TYPE
Heavy Metal Mass: BOL=22.4kg; EOL=21.568kg
ROD Storage Site: SRS

Fuel decay start date: 1996
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: 25 years

Estimated
Canister usage:
18"x10"
0.89

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	787.92	1,575.84	0.00E+00	9.03E-07	1.81E-06	Avg. MeV	
Am-241	2.3056E-03	787.92	1,575.84	0.00E+00	1.82E+00	3.83E+00	0.0150	1.475E+14
Am-242m	4.1476E-07	787.92	1,575.84	0.00E+00	3.27E-04	6.54E-04	0.0250	3.063E+13
Am-243	1.4894E-06	787.92	1,575.84	0.00E+00	1.17E-03	2.35E-03	0.0375	2.668E+13
C-14	5.7108E-09	787.92	1,575.84	0.00E+00	4.50E-06	9.00E-06	0.0575	2.865E+13
Cl-36	1.3124E-32	787.92	1,575.84	0.00E+00	1.03E-29	2.07E-29	0.0850	1.729E+13
Cm-243	1.4562E-07	787.92	1,575.84	0.00E+00	1.15E-04	2.29E-04	0.1250	1.158E+13
Cm-244	2.4221E-05	787.92	1,575.84	0.00E+00	1.91E-02	3.82E-02	0.2250	1.492E+13
Co-60	2.7560E-06	787.92	1,575.84	0.00E+00	2.17E-03	4.34E-03	0.3750	6.488E+12
Cs-134	5.8851E-04	787.92	1,575.84	0.00E+00	4.64E-01	9.27E-01	0.5750	1.084E+14
Cs-135	3.4477E-06	787.92	1,575.84	0.00E+00	2.72E-03	5.43E-03	0.8500	1.533E+12
Cs-137	1.8099E+00	787.92	1,575.84	0.00E+00	1.43E+03	2.85E+03	1.2500	8.523E+11
Eu-154	1.6386E-02	787.92	1,575.84	0.00E+00	1.29E+01	2.58E+01	1.7500	4.211E+10
Eu-155	2.3957E-03	787.92	1,575.84	0.00E+00	1.89E+00	3.78E+00	2.2500	3.001E+06
Fe-55	3.2707E-05	787.92	1,575.84	0.00E+00	2.58E-02	5.15E-02	2.7500	2.458E+06
H-3	3.4504E-03	787.92	1,575.84	0.00E+00	2.72E+00	5.44E+00	3.5000	1.886E+03
I-129	7.5300E-07	787.92	1,575.84	0.00E+00	5.93E-04	1.19E-03	5.0000	6.375E+02
Kr-85	7.8540E-02	787.92	1,575.84	0.00E+00	6.19E+01	1.24E+02	7.0000	7.021E+01
Np-237	9.5815E-06	787.92	1,575.84	0.00E+00	7.53E-03	1.51E-02	11.0000	7.859E+00
Pa-231	2.7968E-09	787.92	1,575.84	0.00E+00	2.20E-06	4.41E-06		
Pb-210	1.2612E-10	787.92	1,575.84	0.00E+00	9.94E-08	1.99E-07		
Pm-147	1.2952E-02	787.92	1,575.84	0.00E+00	1.02E+01	2.04E+01		
Pu-238	1.7549E-02	787.92	1,575.84	0.00E+00	1.38E+01	2.77E+01		
Pu-239	4.2810E-04	787.92	1,575.84	0.00E+00	3.37E-01	6.75E-01		
Pu-240	2.4357E-04	787.92	1,575.84	0.00E+00	1.92E-01	3.84E-01		
Pu-241	2.6277E-02	787.92	1,575.84	0.00E+00	2.07E+01	4.14E+01		
Pu-242	3.6329E-07	787.92	1,575.84	0.00E+00	2.86E-04	5.72E-04		
Ra-226	4.4444E-10	787.92	1,575.84	0.00E+00	3.50E-07	7.00E-07		
Ra-228	1.9714E-14	787.92	1,575.84	0.00E+00	1.55E-11	3.11E-11		
Ru-106	2.0477E-07	787.92	1,575.84	0.00E+00	1.61E-04	3.23E-04		
Se-79	1.2933E-05	787.92	1,575.84	0.00E+00	1.02E-02	2.04E-02		
Sn-126	1.1574E-05	787.92	1,575.84	0.00E+00	9.12E-03	1.82E-02		
Sr-90	1.7092E+00	787.92	1,575.84	0.00E+00	1.35E+03	2.69E+03		
Tc-99	4.2239E-04	787.92	1,575.84	0.00E+00	3.33E-01	6.66E-01		
Th-229	7.7260E-12	787.92	1,575.84	0.00E+00	6.09E-09	1.22E-08		
Th-230	5.8497E-08	787.92	1,575.84	0.00E+00	4.81E-05	9.22E-05		
Th-232	2.6906E-14	787.92	1,575.84	0.00E+00	2.12E-11	4.24E-11		
Ti-206	4.4336E-06	787.92	1,575.84	0.00E+00	3.49E-05	6.99E-05		
U-232	1.2037E-07	787.92	1,575.84	0.00E+00	9.48E-05	1.90E-04		
U-233	3.0011E-09	787.92	1,575.84	0.00E+00	2.36E-06	4.73E-06	Thermal Power	
U-234	1.8497E-04	787.92	1,575.84	0.00E+00	1.46E-01	2.91E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	787.92	0.00	9.68E-03	7.54E-03	9.68E-03	1.67E+01	3.33E+01
U-236	1.5493E-05	787.92	1,575.84	0.00E+00	1.22E-02	2.44E-02	Total	Total
U-238	-4.2851E-09	787.92	0.00	6.02E-03	6.02E-03	6.02E-03		
Y-90	1.7094E+00	787.92	1,575.84	0.00E+00	1.36E+03	2.69E+03		
Other Radionuclides					1.36E+03	2.71E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimator: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:		787.92	
Bounding:		1,575.84	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
Nominal:	0.11		
Bounding:	0.22		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ENEA (UALX HEU) SALUGGIA ITALY
SNF ID #: 574
Fuel Units & Descr: 116 - MTR TYPE
Heavy Metal Mass: BOL=18.56kg; EOL=17.226kg
ROO Storage Site: SRS

*Fuel decay start date: 1996
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: 25 years

Estimated
Canister usage:
18"x10"
3.22

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-04	1,263.32	2,526.65	0.00E+00	1.45E-06	2.90E-06	Avg. MeV	
Am-241	2.3056E-03	1,263.32	2,526.65	0.00E+00	2.91E+00	5.83E+00	0.0150	2.364E+14
Am-242m	4.1476E-07	1,263.32	2,526.65	0.00E+00	5.24E-04	1.05E-03	0.0250	4.912E+13
Am-243	1.4894E-06	1,263.32	2,526.65	0.00E+00	1.88E-03	3.76E-03	0.0375	4.278E+13
C-14	5.7108E-09	1,263.32	2,526.65	0.00E+00	7.21E-06	1.44E-05	0.0675	4.593E+13
Cl-36	1.3124E-32	1,263.32	2,526.65	0.00E+00	1.66E-29	3.32E-29	0.0850	2.772E+13
Cm-243	1.4562E-07	1,263.32	2,526.65	0.00E+00	1.84E-04	3.68E-04	0.1250	1.856E+13
Cm-244	2.4221E-05	1,263.32	2,526.65	0.00E+00	3.06E-02	6.12E-02	0.2250	2.393E+13
Co-60	2.7560E-06	1,263.32	2,526.65	0.00E+00	3.48E-03	6.96E-03	0.3750	1.040E+13
Cs-134	5.8851E-04	1,263.32	2,526.65	0.00E+00	7.43E-01	1.49E+00	0.5750	1.705E+14
Cs-135	3.4477E-06	1,263.32	2,526.65	0.00E+00	4.36E-03	8.71E-03	0.8500	2.457E+12
Cs-137	1.8099E+00	1,263.32	2,526.65	0.00E+00	2.29E+03	4.57E+03	1.2500	1.367E+12
Eu-154	1.6386E-02	1,263.32	2,526.65	0.00E+00	2.07E+01	4.14E+01	1.7500	6.752E+10
Eu-155	2.3957E-03	1,263.32	2,526.65	0.00E+00	3.03E+00	6.06E+00	2.2500	4.812E+06
Fe-55	3.2707E-05	1,263.32	2,526.65	0.00E+00	4.13E-02	8.26E-02	2.7500	3.940E+06
H-3	3.4504E-03	1,263.32	2,526.65	0.00E+00	4.36E+00	8.72E+00	3.5000	2.976E+03
I-129	7.5300E-07	1,263.32	2,526.65	0.00E+00	9.51E-04	1.90E-03	5.0000	1.001E+03
Kr-85	7.8540E-02	1,263.32	2,526.65	0.00E+00	9.92E+01	1.98E+02	7.0000	1.102E+02
Np-237	9.5615E-06	1,263.32	2,526.65	0.00E+00	1.21E-02	2.42E-02	11.0000	1.232E+01
Pa-231	2.7968E-09	1,263.32	2,526.65	0.00E+00	3.53E-06	7.07E-06		
Pb-210	1.2612E-10	1,263.32	2,526.65	0.00E+00	1.59E-07	3.19E-07		
Pm-147	1.2952E-02	1,263.32	2,526.65	0.00E+00	1.64E+01	3.27E+01		
Pu-238	1.7549E-02	1,263.32	2,526.65	0.00E+00	2.22E+01	4.43E+01		
Pu-239	4.2810E-04	1,263.32	2,526.65	0.00E+00	5.41E-01	1.08E+00		
Pu-240	2.4357E-04	1,263.32	2,526.65	0.00E+00	3.08E-01	6.15E-01		
Pu-241	2.6277E-02	1,263.32	2,526.65	0.00E+00	3.32E+01	6.64E+01		
Pu-242	3.6329E-07	1,263.32	2,526.65	0.00E+00	4.59E-04	9.18E-04		
Ra-226	4.4444E-10	1,263.32	2,526.65	0.00E+00	5.61E-07	1.12E-06		
Ra-228	1.9714E-14	1,263.32	2,526.65	0.00E+00	2.49E-11	4.98E-11		
Ru-106	2.0477E-07	1,263.32	2,526.65	0.00E+00	2.59E-04	5.17E-04		
Se-79	1.2933E-05	1,263.32	2,526.65	0.00E+00	1.63E-02	3.27E-02		
Sn-126	1.1574E-05	1,263.32	2,526.65	0.00E+00	1.46E-02	2.92E-02		
Sr-90	1.7092E+00	1,263.32	2,526.65	0.00E+00	2.18E+03	4.32E+03		
Tc-99	4.2239E-04	1,263.32	2,526.65	0.00E+00	5.34E-01	1.07E+00		
Th-229	7.7260E-12	1,263.32	2,526.65	0.00E+00	9.78E-09	1.95E-08		
Th-230	5.8497E-08	1,263.32	2,526.65	0.00E+00	7.39E-05	1.48E-04		
Th-232	2.6906E-14	1,263.32	2,526.65	0.00E+00	3.40E-11	6.80E-11		
Th-208	4.4336E-08	1,263.32	2,526.65	0.00E+00	5.60E-05	1.12E-04		
U-232	1.2037E-07	1,263.32	2,526.65	0.00E+00	1.52E-04	3.04E-04		
U-233	3.0011E-09	1,263.32	2,526.65	0.00E+00	3.79E-06	7.58E-06		
U-234	1.8497E-04	1,263.32	2,526.65	0.00E+00	2.34E-01	4.67E-01		
U-235	-2.7235E-06	1,263.32	0.00	3.74E-02	3.39E-02	3.74E-02		
U-236	1.5493E-05	1,263.32	2,526.65	0.00E+00	1.96E-02	3.91E-02		
U-238	-4.2851E-09	1,263.32	0.00	4.29E-04	4.23E-04	4.29E-04		
Y-90	1.7094E+00	1,263.32	2,526.65	0.00E+00	2.16E+03	4.32E+03		
Other Radionuclides					2.18E+03	4.35E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.125	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		1,263.32
Bounding:		2,526.65

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.43	

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: EPR
 Site ID #: 67
 Fuel Units & Decay: 1 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL : EOL=0.02kg
 ROD Storage Size: INEL

Fuel decay start date: 1986
 Estimate as of: 2000
 Template: (Worst Case)
 Template Burnup(MWD): 62.5
 Template Heavy Metal Mass (MT): 0.0018585
 Template Decay Time: 50 years

Estimated
 Canister Usage:
 18"x10"
 0.03

II. Estimates								Gamma Sources	
	m	x ₀	x ₁	b	y ₀	y ₁	Photon Energy Group	Total Photoisotopic (Bounding)	
Radionuclide	CLAWD From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV		
Ac-227	2.5200E-06	19.01	19.01	0.00E+00	4.79E-05	4.79E-05	0.0150	1.611E+13	
Am-241	8.6432E+00	19.01	19.01	0.00E+00	1.64E+02	1.64E+02	0.0750	3.182E+12	
Am-242m	1.5729E-02	19.01	19.01	0.00E+00	2.99E-01	2.99E-01	0.0260	2.800E+12	
Am-243	1.6288E-02	19.01	19.01	0.00E+00	3.10E-01	3.10E-01	0.0075	5.081E+12	
C-14	1.2069E-01	19.01	19.01	0.00E+00	2.29E+00	2.29E+00	0.0850	1.205E+12	
Ce-136	2.2849E-03	19.01	19.01	0.00E+00	4.34E-02	4.34E-02	0.2250	1.474E+12	
Cm-243	8.0144E-04	19.01	19.01	0.00E+00	1.14E-02	1.14E-02	0.3750	6.300E+11	
Cm-244	9.4880E-02	19.01	19.01	0.00E+00	1.80E+00	1.80E+00	0.5750	1.059E+13	
Ce-134	2.2139E-06	19.01	19.01	0.00E+00	4.21E-05	4.21E-05	0.8500	2.313E+13	
Ce-136	4.3976E-04	19.01	19.01	0.00E+00	8.36E-03	8.36E-03	1.2500	5.668E+12	
Ce-137	1.4887E+01	19.01	19.01	0.00E+00	2.83E+02	2.83E+02	1.7500	6.812E+09	
Eu-154	3.7942E-01	19.01	19.01	0.00E+00	7.10E+00	7.10E+00	2.2500	2.846E+07	
Eu-155	8.4892E-03	19.01	19.01	0.00E+00	1.61E-01	1.61E-01	2.7500	5.071E+07	
Fe-55	5.3750E-03	19.01	19.01	0.00E+00	1.02E-01	1.02E-01	3.5000	2.761E+04	
H-3	1.0472E-01	19.01	19.01	0.00E+00	1.99E+00	1.99E+00	5.0000	1.607E+04	
I-129	1.0818E-05	19.01	19.01	0.00E+00	2.02E-04	2.02E-04	7.0000	1.329E+05	
K-40	2.2717E-01	19.01	19.01	0.00E+00	4.32E+00	4.32E+00	11.0000	1.516E+02	
Np-237	1.6400E-04	19.01	19.01	0.00E+00	3.12E-03	3.12E-03			
Pb-210	2.9689E-06	19.01	19.01	0.00E+00	5.45E-05	5.45E-05			
Pb-210	4.7312E-08	19.01	19.01	0.00E+00	8.99E-07	8.99E-07			
Pm-147	3.2198E-04	19.01	19.01	0.00E+00	6.12E-03	6.12E-03			
Pu-238	-1.1924E+00	19.01	19.01	0.00E+00	5.14E+00	5.14E+00			
Pu-239	-4.8600E-02	19.01	19.01	6.22E-01	0.00E+00	6.22E-01			
Pu-240	-3.0127E-01	19.01	19.01	0.00E+00	7.94E-01	7.94E-01			
Pu-241	-1.2917E+02	19.01	19.01	0.00E+00	0.00E+00	2.04E+02			
Pu-242	-1.1381E-04	19.01	19.01	0.00E+00	1.27E-03	3.44E-03			
Pu-242	1.0760E-07	19.01	19.01	0.00E+00	2.05E-06	2.05E-06			
Pu-242	8.0160E-07	19.01	19.01	0.00E+00	1.14E+05	1.14E+05			
Pu-106	1.3398E-13	19.01	19.01	0.00E+00	2.94E-12	2.94E-12			
Sr-79	1.9179E-04	19.01	19.01	0.00E+00	3.65E-03	3.65E-03			
Sr-126	1.6689E-04	19.01	19.01	0.00E+00	3.17E-03	3.17E-03			
Sr-90	1.3859E+01	19.01	19.01	0.00E+00	2.63E+02	2.63E+02			
Tc-99	8.7673E-03	19.01	19.01	0.00E+00	1.29E-01	1.29E-01			
Th-229	2.2632E-03	19.01	19.01	0.00E+00	4.29E-05	4.29E-05			
Th-230	7.5955E-06	19.01	19.01	0.00E+00	1.44E-04	1.44E-04			
Th-232	6.0208E-07	19.01	19.01	0.00E+00	1.14E-05	1.14E-05			
Th-232	7.5795E-05	19.01	19.01	0.00E+00	1.44E-03	1.44E-03			
U-232	2.0621E-04	19.01	19.01	0.00E+00	3.90E-03	3.90E-03			
U-233	3.6129E-04	19.01	19.01	0.00E+00	6.87E-03	6.87E-03			
U-234	1.2788E-02	19.01	19.01	0.00E+00	2.43E-01	2.43E-01			
U-235	5.8772E-04	19.01	19.01	0.00E+00	1.12E-02	1.12E-02			
U-236	2.3485E-04	19.01	19.01	0.00E+00	4.46E-03	4.46E-03			
U-238	1.1741E-04	19.01	19.01	0.00E+00	2.23E-03	2.23E-03			
Y-90	1.3981E+01	19.01	19.01	0.00E+00	2.63E+02	2.63E+02			
Other Radionuclides					9.77E+02	9.77E+02			
								Thermal Power	
								Nominal Heat Output (Watts)	
								Bounding Heat Output (Watts)	
								Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SPD	Used
Reactor Moderator: UO ₂ WATER	(Worst Case)
Fuel Cladding: SST	SST/Inconel
BOL H ₂ O Constituents: Pu	U, Th, & Pu
BOL Enrichment %:	0 to 100

Basic for Parameter Differences:

The fuel don't closely match any existing template, therefore the worst case template was used.

Burnup Summary (MWd)

From SPD	Estimated
Nominal: 19.01	19.01
Bounding: 19.01	19.01

Basic for burnup used is estimate:

Nominal burnup set equal to bounding burnup.
 Bounding burnup estimated by assuming BOL heavy metal mass was Wt% EOL.

Checks

Nominal: 14.21	Estimated Burnup/ Given Burnup
Bounding: 14.21	Estimated EOL H ₂ O Wt% EOL H ₂ O

Reactor shutdown, core removal, storage, shipping or other data 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: ERR (ASSEMBLIES)
SNF ID #: 68
Fuel Units & Descr: 190 - 5 X 5 ROD ARRAY
Heavy Metal Mass: BOL=5056.66kg; EOL=5041.023kg
ROD Storage Site: NEEL

Fuel decay start date: 1966
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: 60 years

Estimated
Canister usage:
18"x10"
10.56

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 Avg. MeV Total Photons/sec (bounding)
Ac-227	1.0595E-04	27,366.64	65,736.58	0.00E+00	2.90E+00	6.96E+00	0.0150
Am-241	2.4968E-04	27,366.64	65,736.58	0.00E+00	6.83E+00	1.64E+01	0.0250
Am-242m	1.3847E-06	27,366.64	65,736.58	0.00E+00	3.79E-02	9.10E-02	0.0375
Am-243	3.1103E-07	27,366.64	65,736.58	0.00E+00	8.51E-03	2.04E-02	0.0675
C-14	9.2267E-05	27,366.64	65,736.58	0.00E+00	2.53E+00	6.07E+00	0.0650
Cl-36	1.8103E-06	27,366.64	65,736.58	0.00E+00	4.95E-02	1.19E-01	0.0650
Cm-243	2.1248E-07	27,366.64	65,736.58	0.00E+00	5.81E-03	1.40E-02	0.1250
Cm-244	7.9666E-06	27,366.64	65,736.58	0.00E+00	2.18E-01	5.24E-01	0.2250
Co-60	1.2143E-04	27,366.64	65,736.58	0.00E+00	3.32E+00	7.98E+00	0.3750
Cs-134	1.8535E-07	27,366.64	65,736.58	0.00E+00	4.53E-03	1.09E-02	0.5750
Cs-135	2.8639E-05	27,366.64	65,736.58	0.00E+00	7.84E-01	1.88E+00	0.8500
Cs-137	1.0449E+00	27,366.64	65,736.58	0.00E+00	2.86E+04	6.87E+04	1.2500
Eu-154	2.5679E-03	27,366.64	65,736.58	0.00E+00	7.03E+01	1.69E+02	1.7500
Eu-155	8.1175E-05	27,366.64	65,736.58	0.00E+00	2.22E+00	5.34E+00	2.2500
Fe-55	4.2194E-08	27,366.64	65,736.58	0.00E+00	1.15E-03	2.77E-03	2.7500
H-3	9.1673E-04	27,366.64	65,736.58	0.00E+00	2.51E+01	6.03E+01	3.5000
I-129	1.5853E-06	27,366.64	65,736.58	0.00E+00	4.34E-02	1.04E-01	5.0000
Kr-85	2.3741E-02	27,366.64	65,736.58	0.00E+00	6.50E+02	1.56E+03	7.0000
Np-237	1.2747E-07	27,366.64	65,736.58	0.00E+00	3.49E-03	8.38E-03	11.0000
Pa-231	1.2007E-04	27,366.64	65,736.58	0.00E+00	3.29E+00	7.89E+00	
Pb-210	1.8424E-08	27,366.64	65,736.58	0.00E+00	5.04E-04	1.21E-03	
Pm-147	4.9829E-06	27,366.64	65,736.58	0.00E+00	1.36E-01	3.28E-01	
Pu-238	3.7744E-04	27,366.64	65,736.58	0.00E+00	1.03E+01	2.48E+01	
Pu-239	2.7510E-05	27,366.64	65,736.58	0.00E+00	7.53E-01	1.81E+00	
Pu-240	1.6175E-06	27,366.64	65,736.58	0.00E+00	4.43E-01	1.06E+00	
Pu-241	7.1379E-04	27,366.64	65,736.58	0.00E+00	1.95E+01	4.69E+01	
Pu-242	4.0631E-08	27,366.64	65,736.58	0.00E+00	1.12E-03	2.68E-03	
Ra-226	2.9038E-08	27,366.64	65,736.58	0.00E+00	7.95E-04	1.91E-03	
Ra-228	4.6352E-06	27,366.64	65,736.58	0.00E+00	1.27E-01	3.05E-01	
Ru-106	1.3321E-15	27,366.64	65,736.58	0.00E+00	3.65E-11	8.76E-11	
Se-79	3.5407E-05	27,366.64	65,736.58	0.00E+00	9.69E-01	2.33E+00	
Sn-126	3.9638E-05	27,366.64	65,736.58	0.00E+00	1.09E+00	2.62E+00	
Sr-90	1.0449E+00	27,366.64	65,736.58	0.00E+00	2.86E+04	6.87E+04	
Tc-99	3.2525E-04	27,366.64	65,736.58	0.00E+00	8.90E+00	2.14E+01	
Th-229	8.2305E-05	27,366.64	65,736.58	0.00E+00	2.25E+00	5.41E+00	
Th-230	1.2533E-06	27,366.64	65,736.58	0.00E+00	3.43E-02	8.24E-02	
Th-232	-9.0328E-08	27,366.64	0.00	5.34E-01	5.32E-01	5.34E-01	
Ti-208	1.2085E-02	27,366.64	65,736.58	0.00E+00	3.31E+02	7.94E+02	
U-232	3.2729E-02	27,366.64	65,736.58	0.00E+00	8.96E+02	2.15E+03	
U-233	-3.3244E-03	27,366.64	0.00	1.80E+03	1.70E+03	1.60E+03	
U-234	8.1769E-04	27,366.64	65,736.58	0.00E+00	2.24E+01	5.38E+01	
U-235	5.7813E-08	27,366.64	65,736.58	3.67E-04	1.95E-03	4.17E-03	
U-236	1.3273E-07	27,366.64	65,736.58	0.00E+00	3.63E-03	8.73E-03	
U-238	-3.1121E-10	27,366.64	0.00	2.35E-04	2.26E-04	2.35E-04	
Y-90	1.0449E+00	27,366.64	65,736.58	0.00E+00	2.86E+04	6.87E+04	
Other Radionuclides					3.35E+04	8.04E+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:	SST	ZIRC	This fuel matches LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	92.94902719	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	27,366.64	15,217.36	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	65,736.58	30,434.70	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.24	0.56	1.00
Bounding:	0.58	0.46	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ERR (RODS)
SNF ID #: 1057
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass: BOL=4.293kg; EOL=4.242kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
Estimates as of: 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: 50 years

Estimated
Canister usage:
18"x10"
0.17

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0595E-04	49.83	99.65	0.00E+00	5.28E-03	1.06E-02	Avg. MeV	
Am-241	2.4968E-04	49.83	99.65	0.00E+00	1.24E-02	2.49E-02	0.0150	5.767E+12
Am-242m	1.3847E-06	49.83	99.65	0.00E+00	6.90E-05	1.38E-04	0.0250	1.185E+12
Am-243	3.1103E-07	49.83	99.65	0.00E+00	1.55E-05	3.10E-05	0.0375	1.012E+12
C-14	9.2267E-05	49.83	99.65	0.00E+00	4.60E-03	9.19E-03	0.0575	1.107E+12
Cl-36	1.8103E-06	49.83	99.65	0.00E+00	9.02E-05	1.80E-04	0.0850	7.160E+11
Cm-243	2.1248E-07	49.83	99.65	0.00E+00	1.06E-05	2.12E-05	0.1250	4.380E+11
Cm-244	7.9666E-06	49.83	99.65	0.00E+00	3.97E-04	7.94E-04	0.2250	6.467E+11
Co-60	1.2143E-04	49.83	99.65	0.00E+00	6.05E-03	1.21E-02	0.3750	2.554E+11
Cs-134	1.6535E-07	49.83	99.65	0.00E+00	8.24E-06	1.65E-05	0.5750	3.935E+12
Cs-135	2.8639E-05	49.83	99.65	0.00E+00	1.43E-03	2.85E-03	0.8500	6.768E+10
Cs-137	1.0449E+00	49.83	99.65	0.00E+00	5.21E+01	1.04E+02	1.2500	2.059E+10
Eu-154	2.5679E-03	49.83	99.65	0.00E+00	1.28E-01	2.56E-01	1.7500	5.386E+08
Eu-155	8.1175E-05	49.83	99.65	0.00E+00	4.04E-03	8.09E-03	2.2500	1.200E+06
Fe-55	4.2194E-08	49.83	99.65	0.00E+00	2.10E-06	4.20E-06	2.7500	4.229E+10
H-3	9.1673E-04	49.83	99.65	0.00E+00	4.57E-02	9.14E-02	3.5000	1.550E+02
I-129	1.5853E-06	49.83	99.65	0.00E+00	7.90E-05	1.58E-04	5.0000	4.789E+01
Kr-85	2.3741E-02	49.83	99.65	0.00E+00	1.18E+00	2.37E+00	7.0000	3.393E+00
Np-237	1.2747E-07	49.83	99.65	0.00E+00	6.35E-06	1.27E-05	11.0000	2.483E-01
Pa-231	1.2007E-04	49.83	99.65	0.00E+00	5.98E-03	1.20E-02		
Pb-210	1.8424E-08	49.83	99.65	0.00E+00	9.18E-07	1.84E-06		
Pm-147	4.9829E-06	49.83	99.65	0.00E+00	2.48E-04	4.97E-04		
Pu-238	3.7744E-04	49.83	99.65	0.00E+00	1.88E-02	3.76E-02		
Pu-239	2.7510E-05	49.83	99.65	0.00E+00	1.37E-03	2.74E-03		
Pu-240	1.6175E-05	49.83	99.65	0.00E+00	8.08E-04	1.61E-03		
Pu-241	7.1379E-04	49.83	99.65	0.00E+00	3.56E-02	7.11E-02		
Pu-242	4.0831E-06	49.83	99.65	0.00E+00	2.03E-06	4.07E-06		
Ra-226	2.9038E-08	49.83	99.65	0.00E+00	1.45E-06	2.89E-06		
Ra-228	4.6352E-06	49.83	99.65	0.00E+00	2.31E-04	4.62E-04		
Ru-106	1.3321E-15	49.83	99.65	0.00E+00	6.64E-14	1.33E-13		
Se-79	3.5407E-05	49.83	99.65	0.00E+00	1.76E-03	3.53E-03		
Sm-126	3.9838E-05	49.83	99.65	0.00E+00	1.98E-03	3.97E-03		
Sr-90	1.0449E+00	49.83	99.65	0.00E+00	5.21E+01	1.04E+02		
Tc-99	3.2525E-04	49.83	99.65	0.00E+00	1.62E-02	3.24E-02		
Th-229	8.2305E-05	49.83	99.65	0.00E+00	4.10E-03	8.20E-03		
Th-230	1.2533E-06	49.83	99.65	0.00E+00	6.24E-05	1.25E-04		
Th-232	-9.0328E-08	49.83	0.00	4.53E-04	4.49E-04	4.53E-04		
Ti-208	1.2085E-02	49.83	99.65	0.00E+00	6.02E-01	1.20E+00		
U-232	3.2729E-02	49.83	99.65	0.00E+00	1.63E+00	3.26E+00		
U-233	-3.3244E-03	49.83	0.00	1.52E+00	1.36E+00	1.52E+00		
U-234	8.1769E-04	49.83	99.65	0.00E+00	4.07E-02	8.15E-02		
U-235	5.7813E-06	49.83	99.65	3.12E-07	3.19E-06	6.07E-06		
U-238	1.3273E-07	49.83	99.65	0.00E+00	6.61E-06	1.32E-05		
U-238	-3.1121E-10	49.83	0.00	1.99E-07	1.84E-07	1.99E-07		
Y-90	1.0449E+00	49.83	99.65	0.00E+00	5.21E+01	1.04E+02		
Other Radionuclides					6.09E+01	1.22E+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 LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	SST	ZIRC	
BOL HM Constituents:	Th and U	Th and U	
BOL Enrichment %:	93.0868939	60 to 100	

Burnup Summary (MWd) ^a			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:	28.26	49.83	
Bounding:	45.49	99.65	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.52	1.76	
Bounding:	1.04	2.19	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ESSOR (UALX-HEU) ITALY
SNF ID #: 762
Fuel Units & Descr: 12 - 18 CURVED PLATES
Heavy Metal Mass: BOL=7.2kg; EOL=5.73kg
ROD Storage Site: SRS

Fuel decay start date: 2006
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: 20 years

Estimated
Canister usage:
18"x10"
1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/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	6.6313E-10	1,960.33	3,920.66	0.00E+00	1.30E-06	2.60E-06	Avg. MeV	
Am-241	2.0060E-03	1,960.33	3,920.66	0.00E+00	3.93E+00	7.86E+00	0.0150	4.139E+14
Am-242m	4.2429E-07	1,960.33	3,920.66	0.00E+00	8.32E-04	1.66E-03	0.0250	8.606E+13
Am-243	1.4899E-06	1,960.33	3,920.66	0.00E+00	2.92E-03	5.84E-03	0.0375	7.506E+13
C-14	5.7135E-09	1,960.33	3,920.66	0.00E+00	1.12E-05	2.24E-05	0.0575	8.040E+13
Cl-36	1.3124E-32	1,960.33	3,920.66	0.00E+00	2.57E-29	5.15E-29	0.0850	4.858E+13
Cm-243	1.6443E-07	1,960.33	3,920.66	0.00E+00	3.22E-04	6.45E-04	0.1250	3.288E+13
Cm-244	2.9330E-05	1,960.33	3,920.66	0.00E+00	5.75E-02	1.15E-01	0.2250	4.192E+13
Co-60	5.3186E-06	1,960.33	3,920.66	0.00E+00	1.04E-02	2.09E-02	0.3750	1.825E+13
Cs-134	3.1563E-03	1,960.33	3,920.66	0.00E+00	6.19E+00	1.24E+01	0.5750	2.977E+14
Cs-135	3.4477E-06	1,960.33	3,920.66	0.00E+00	6.78E-03	1.35E-02	0.8500	5.032E+12
Cs-137	2.0313E+00	1,960.33	3,920.66	0.00E+00	3.98E+03	7.96E+03	1.2500	2.874E+12
Eu-154	2.4513E-02	1,960.33	3,920.66	0.00E+00	4.81E+01	9.61E+01	1.7500	1.319E+11
Eu-155	4.8175E-03	1,960.33	3,920.66	0.00E+00	9.44E+00	1.89E+01	2.2500	1.157E+07
Fe-55	1.2397E-04	1,960.33	3,920.66	0.00E+00	2.43E-01	4.86E-01	2.7500	6.541E+06
H-3	4.5697E-03	1,960.33	3,920.66	0.00E+00	8.96E+00	1.79E+01	3.5000	3.005E+04
I-129	7.5300E-07	1,960.33	3,920.66	0.00E+00	1.48E-03	2.95E-03	5.0000	1.899E+03
Kr-85	1.0850E-01	1,960.33	3,920.66	0.00E+00	2.13E+02	4.25E+02	7.0000	1.875E+02
Np-237	9.5561E-06	1,960.33	3,920.66	0.00E+00	1.87E-02	3.75E-02	11.0000	2.102E+01
Pa-231	2.0359E-09	1,960.33	3,920.66	0.00E+00	3.99E-06	7.98E-06		
Pb-210	4.9728E-11	1,960.33	3,920.66	0.00E+00	9.75E-08	1.95E-07		
Pm-147	4.8502E-02	1,960.33	3,920.66	0.00E+00	9.51E+01	1.90E+02		
Pu-238	1.8254E-02	1,960.33	3,920.66	0.00E+00	3.58E+01	7.16E+01		
Pu-239	4.2810E-04	1,960.33	3,920.66	0.00E+00	8.39E-01	1.68E+00		
Pu-240	2.4368E-04	1,960.33	3,920.66	0.00E+00	4.78E-01	9.55E-01		
Pu-241	3.3415E-02	1,960.33	3,920.66	0.00E+00	6.55E+01	1.31E+02		
Pu-242	3.6329E-07	1,960.33	3,920.66	0.00E+00	7.12E-04	1.42E-03		
Ra-226	2.2854E-10	1,960.33	3,920.66	0.00E+00	4.48E-07	8.96E-07		
Ra-228	1.2426E-14	1,960.33	3,920.66	0.00E+00	2.44E-11	4.87E-11		
Ru-106	6.3589E-06	1,960.33	3,920.66	0.00E+00	1.25E-02	2.49E-02		
Se-79	1.2933E-05	1,960.33	3,920.66	0.00E+00	2.54E-02	5.07E-02		
Sn-126	1.1574E-05	1,960.33	3,920.66	0.00E+00	2.27E-02	4.54E-02		
Sr-90	1.9248E+00	1,960.33	3,920.66	0.00E+00	3.77E+03	7.55E+03		
Tc-99	4.2239E-04	1,960.33	3,920.66	0.00E+00	8.28E-01	1.66E+00		
Th-229	5.0953E-12	1,960.33	3,920.66	0.00E+00	9.99E-09	2.00E-08		
Th-230	4.1885E-08	1,960.33	3,920.66	0.00E+00	8.21E-05	1.64E-04		
Th-232	1.9270E-14	1,960.33	3,920.66	0.00E+00	3.78E-11	7.56E-11		
Ti-208	4.6024E-08	1,960.33	3,920.66	0.00E+00	9.02E-05	1.80E-04		
U-232	1.2582E-07	1,960.33	3,920.66	0.00E+00	2.47E-04	4.93E-04	Thermal Power	
U-233	2.5825E-09	1,960.33	3,920.66	0.00E+00	5.06E-06	1.01E-05	Nominal Heat	Bounding
U-234	1.8450E-04	1,960.33	3,920.66	0.00E+00	3.62E-01	7.23E-01	Output (Watts)	Heat Output (Watts)
U-235	-2.7235E-06	1,960.33	0.00	1.56E-02	1.03E-02	1.56E-02	4.87E+01	9.35E+01
U-236	1.5493E-05	1,960.33	3,920.66	0.00E+00	3.04E-02	6.07E-02	Total	Total
U-238	-4.2851E-09	1,960.33	0.00	1.96E-04	1.87E-04	1.96E-04		
Y-90	1.9254E+00	1,960.33	3,920.66	0.00E+00	3.77E+03	7.55E+03		
Other Radionuclides					3.79E+03	7.58E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.5282863	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		1,960.33
Bounding:		3,920.66

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.80	
Bounding:	1.60	

Estimated EOL HM/Given EOL HM

1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FMRB (GERMANY)
SNF ID #: 577
Fuel Units & Descr: 92 - MTR TYPE
Heavy Metal Mass: BOL=13.138kg; EOL=11.668kg
ROD Storage Site: SRS

Fuel decay start date: 1994
Estimate 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"
3.83

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-08	1,394.01	2,788.03	0.00E+00	2.80E-08	5.60E-08	Avg. MeV	
Am-241	2.5251E-09	1,394.01	2,788.03	0.00E+00	3.52E+00	7.04E+00	0.0150	2.053E+14
Am-242m	3.9624E-07	1,394.01	2,788.03	0.00E+00	5.52E-04	1.10E-03	0.0250	4.264E+13
Am-243	1.4880E-06	1,394.01	2,788.03	0.00E+00	2.07E-03	4.15E-03	0.0375	3.706E+13
C-14	5.7053E-09	1,394.01	2,788.03	0.00E+00	7.95E-06	1.59E-05	0.0575	3.989E+13
Cl-38	1.3124E-32	1,394.01	2,788.03	0.00E+00	1.83E-29	3.66E-29	0.0850	2.404E+13
Cm-243	1.1419E-07	1,394.01	2,788.03	0.00E+00	1.59E-04	3.18E-04	0.1250	1.588E+13
Cm-244	1.6522E-05	1,394.01	2,788.03	0.00E+00	2.30E-02	4.61E-02	0.2250	2.075E+13
Co-60	7.4047E-07	1,394.01	2,788.03	0.00E+00	1.03E-03	2.06E-03	0.3750	9.028E+12
Cs-134	2.0455E-05	1,394.01	2,788.03	0.00E+00	2.85E-02	5.70E-02	0.5750	1.492E+14
Cs-135	3.4477E-06	1,394.01	2,788.03	0.00E+00	4.81E-03	9.61E-03	0.8500	1.822E+12
Cs-137	1.4365E+00	1,394.01	2,788.03	0.00E+00	2.00E+03	4.01E+03	1.2500	8.814E+11
Eu-154	7.3230E-03	1,394.01	2,788.03	0.00E+00	1.02E+01	2.04E+01	1.7500	4.961E+10
Eu-155	5.9259E-04	1,394.01	2,788.03	0.00E+00	8.26E-01	1.65E+00	2.2500	4.148E+08
Fe-55	2.2791E-06	1,394.01	2,788.03	0.00E+00	3.18E-03	6.35E-03	2.7500	3.959E+06
H-3	1.9698E-03	1,394.01	2,788.03	0.00E+00	2.75E+00	5.49E+00	3.5000	2.296E+03
I-129	7.5300E-07	1,394.01	2,788.03	0.00E+00	1.05E-03	2.10E-03	5.0000	9.381E-02
Kr-85	4.1176E-02	1,394.01	2,788.03	0.00E+00	5.74E+01	1.15E+02	7.0000	1.027E+02
Np-237	9.5752E-06	1,394.01	2,788.03	0.00E+00	1.33E-02	2.67E-02	11.0000	1.145E+01
Pb-210	3.9379E-09	1,394.01	2,788.03	0.00E+00	5.49E-06	1.10E-05		
Pb-210	3.3115E-10	1,394.01	2,788.03	0.00E+00	4.62E-07	9.23E-07		
Pm-147	9.2402E-04	1,394.01	2,788.03	0.00E+00	1.29E+00	2.58E+00		
Pu-238	1.6217E-02	1,394.01	2,788.03	0.00E+00	2.26E+01	4.52E+01		
Pu-239	4.2810E-04	1,394.01	2,788.03	0.00E+00	5.97E-01	1.19E+00		
Pu-240	2.4333E-04	1,394.01	2,788.03	0.00E+00	3.39E-01	6.78E-01		
Pu-241	1.6242E-02	1,394.01	2,788.03	0.00E+00	2.26E+01	4.53E+01		
Pu-242	3.6329E-07	1,394.01	2,788.03	0.00E+00	5.06E-04	1.01E-03		
Ra-226	9.0114E-10	1,394.01	2,788.03	0.00E+00	1.26E-06	2.51E-06		
Ra-228	3.1019E-14	1,394.01	2,788.03	0.00E+00	4.32E-11	8.65E-11		
Ru-106	2.1225E-10	1,394.01	2,788.03	0.00E+00	2.96E-07	5.92E-07		
Se-79	1.2930E-05	1,394.01	2,788.03	0.00E+00	1.80E-02	3.60E-02		
Sn-126	1.1571E-05	1,394.01	2,788.03	0.00E+00	1.61E-02	3.23E-02		
Sr-90	1.3472E+00	1,394.01	2,788.03	0.00E+00	1.88E+03	3.76E+03		
Tc-99	4.2239E-04	1,394.01	2,788.03	0.00E+00	5.89E-01	1.18E+00		
Th-229	1.2407E-11	1,394.01	2,788.03	0.00E+00	1.73E-08	3.46E-08		
Th-230	8.3497E-08	1,394.01	2,788.03	0.00E+00	1.16E-04	2.33E-04		
Th-232	3.8371E-14	1,394.01	2,788.03	0.00E+00	5.35E-11	1.07E-10		
Th-232	4.0414E-08	1,394.01	2,788.03	0.00E+00	5.63E-05	1.13E-04		
U-232	1.0948E-07	1,394.01	2,788.03	0.00E+00	1.53E-04	3.05E-04		
U-233	3.6275E-08	1,394.01	2,788.03	0.00E+00	5.06E-06	1.01E-05		
U-234	1.8562E-04	1,394.01	2,788.03	0.00E+00	2.59E-01	5.18E-01		
U-235	-2.7235E-06	1,394.01	0.00	2.59E-02	2.21E-02	2.59E-02		
U-236	1.5493E-05	1,394.01	2,788.03	0.00E+00	2.16E-02	4.32E-02		
U-238	-4.2851E-09	1,394.01	0.00	3.86E-04	3.80E-04	3.86E-04		
Y-90	1.3475E+00	1,394.01	2,788.03	0.00E+00	1.88E+03	3.76E+03		
Other Radionuclides					1.91E+03	3.82E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	91.25787542	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		1,394.01	
		2,788.03	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.34	0.67	
			1.01

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (U3O8 LEU) GERMANY
SNF ID #: 581
Fuel Units & Descr: 7 - MTR TYPE
Heavy Metal Mass: BOL=9.566kg; EOL=8.635kg
ROD Storage Site: SRS

*Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
*Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116639
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.29

II. Estimates	a1	x ₀	x ₀	b	y ₀	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	2.0068E-09	881.01	1,762.02	0.00E+00	1.77E-06	3.54E-06	Avg. MeV	
Am-241	2.5251E-03	881.01	1,762.02	0.00E+00	2.22E+00	4.45E+00	0.0150	1.298E+14
Am-242m	3.9624E-07	881.01	1,762.02	0.00E+00	3.49E-04	6.98E-04	0.0250	2.695E+13
Am-243	1.4880E-06	881.01	1,762.02	0.00E+00	1.31E-03	2.62E-03	0.0375	2.342E+13
C-14	5.7053E-09	881.01	1,762.02	0.00E+00	5.03E-06	1.01E-05	0.0575	2.521E+13
Cl-36	1.3124E-32	881.01	1,762.02	0.00E+00	1.16E-29	2.31E-29	0.0850	1.519E+13
Cm-243	1.1419E-07	881.01	1,762.02	0.00E+00	1.01E-04	2.01E-04	0.1250	1.003E+13
Cm-244	1.6522E-05	881.01	1,762.02	0.00E+00	1.46E-02	2.91E-02	0.2250	1.311E+13
Co-60	7.4047E-07	881.01	1,762.02	0.00E+00	6.52E-04	1.30E-03	0.3750	5.705E+12
Cs-134	2.0455E-05	881.01	1,762.02	0.00E+00	1.80E-02	3.60E-02	0.5750	8.429E+13
Cs-135	3.4477E-06	881.01	1,762.02	0.00E+00	3.04E-03	6.07E-03	0.8500	1.152E+12
Cs-137	1.4365E+00	881.01	1,762.02	0.00E+00	1.27E+03	2.53E+03	1.2500	5.571E+11
Eu-154	7.3230E-03	881.01	1,762.02	0.00E+00	6.45E+00	1.29E+01	1.7500	3.135E+10
Eu-155	5.8259E-04	881.01	1,762.02	0.00E+00	5.22E-01	1.04E+00	2.2500	2.821E+06
Fe-55	2.2791E-06	881.01	1,762.02	0.00E+00	2.01E-03	4.02E-03	2.7500	2.502E+06
H-3	1.9698E-03	881.01	1,762.02	0.00E+00	1.74E+00	3.47E+00	3.5000	1.463E+03
I-129	7.5300E-07	881.01	1,762.02	0.00E+00	6.63E-04	1.33E-03	5.0000	5.981E+02
Kr-85	4.1176E-02	881.01	1,762.02	0.00E+00	3.63E+01	7.26E+01	7.0000	6.548E+01
Np-237	9.5752E-06	881.01	1,762.02	0.00E+00	8.44E-03	1.69E-02	11.0000	7.303E+00
Pa-231	3.9379E-09	881.01	1,762.02	0.00E+00	3.47E-06	6.94E-06		
Pb-210	3.3115E-10	881.01	1,762.02	0.00E+00	2.92E-07	5.84E-07		
Pm-147	9.2402E-04	881.01	1,762.02	0.00E+00	8.14E-01	1.63E+00		
Pu-238	1.6217E-02	881.01	1,762.02	0.00E+00	1.43E+01	2.86E+01		
Pu-239	4.2810E-04	881.01	1,762.02	0.00E+00	3.77E-01	7.54E-01		
Pu-240	2.4333E-04	881.01	1,762.02	0.00E+00	2.14E-01	4.29E-01		
Pu-241	1.6242E-02	881.01	1,762.02	0.00E+00	1.43E+01	2.86E+01		
Pu-242	3.6329E-07	881.01	1,762.02	0.00E+00	3.20E-04	6.40E-04		
Ra-226	9.0114E-10	881.01	1,762.02	0.00E+00	7.94E-07	1.59E-06		
Ra-228	3.1019E-14	881.01	1,762.02	0.00E+00	2.73E-11	5.47E-11		
Ru-106	2.1225E-10	881.01	1,762.02	0.00E+00	1.87E-07	3.74E-07		
Se-79	1.2930E-05	881.01	1,762.02	0.00E+00	1.14E-02	2.28E-02		
Sn-126	1.1571E-05	881.01	1,762.02	0.00E+00	1.02E-02	2.04E-02		
Sr-90	1.3472E+00	881.01	1,762.02	0.00E+00	1.19E+03	2.37E+03		
Tc-99	4.2239E-04	881.01	1,762.02	0.00E+00	3.72E-01	7.44E-01		
Th-229	1.2407E-11	881.01	1,762.02	0.00E+00	1.09E-08	2.19E-08		
Th-230	8.3497E-08	881.01	1,762.02	0.00E+00	7.36E-05	1.47E-04		
Th-232	3.8371E-14	881.01	1,762.02	0.00E+00	3.38E-11	6.76E-11		
Ti-208	4.0414E-08	881.01	1,762.02	0.00E+00	3.56E-05	7.12E-05		
U-232	1.0948E-07	881.01	1,762.02	0.00E+00	9.65E-05	1.93E-04		
U-233	3.6275E-09	881.01	1,762.02	0.00E+00	3.20E-06	6.39E-06		
U-234	1.8562E-04	881.01	1,762.02	0.00E+00	1.64E-01	3.27E-01		
U-235	-2.7235E-06	881.01	0.00	4.08E-03	1.68E-03	4.08E-03		
U-236	1.5493E-05	881.01	1,762.02	0.00E+00	1.36E-02	2.73E-02		
U-238	-4.2851E-09	881.01	0.00	2.58E-03	2.58E-03	2.58E-03		
Y-90	1.3475E+00	881.01	1,762.02	0.00E+00	1.19E+03	2.37E+03		
Other Radionuclides					1.21E+03	2.41E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.73077542	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		881.01	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,762.02	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.29		1.01
Bounding:	0.59		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (U3Si2 LEU) GERMANY
SNF ID #: 741
Fuel Units & Descr: 109 - MTR TYPE
Heavy Metal Mass: BOL=161.56kg; EOL=150.932kg
ROD Storage Site: SRS

Fuel decay start date: 1994
Estimate as of: 2030
Template: ATR (Light Water, Alum., 80 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"
4.54

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0069E-09	10,064.45	20,128.90	0.00E+00	2.02E-05	4.04E-05	Avg. MeV	
Am-241	2.5251E-03	10,064.45	20,128.90	0.00E+00	2.54E+01	5.08E+01	0.0150	1.483E+15
Am-242m	3.9624E-07	10,064.45	20,128.90	0.00E+00	3.99E-03	7.98E-03	0.0250	3.078E+14
Am-243	1.4880E-06	10,064.45	20,128.90	0.00E+00	1.50E-02	3.00E-02	0.0375	2.676E+14
C-14	5.7053E-09	10,064.45	20,128.90	0.00E+00	5.74E-05	1.15E-04	0.0675	2.880E+14
Cl-36	1.3124E-32	10,064.45	20,128.90	0.00E+00	1.32E-28	2.64E-28	0.0850	1.735E+14
Cr-243	1.1419E-07	10,064.45	20,128.90	0.00E+00	1.15E-03	2.30E-03	0.1250	1.146E+14
Cr-244	1.6522E-05	10,064.45	20,128.90	0.00E+00	1.66E-01	3.33E-01	0.2250	1.498E+14
Co-60	7.4047E-07	10,064.45	20,128.90	0.00E+00	7.45E-03	1.49E-02	0.3750	6.518E+13
Cs-134	2.0455E-05	10,064.45	20,128.90	0.00E+00	2.06E-01	4.12E-01	0.5750	1.077E+15
Cs-135	3.4477E-06	10,064.45	20,128.90	0.00E+00	3.47E-02	6.94E-02	0.8500	1.318E+13
Cs-137	1.4365E+00	10,064.45	20,128.90	0.00E+00	1.45E+04	2.89E+04	1.2500	6.364E+12
Eu-154	7.3230E-03	10,064.45	20,128.90	0.00E+00	7.37E+01	1.47E+02	1.7500	3.582E+11
Eu-155	5.9259E-04	10,064.45	20,128.90	0.00E+00	5.96E+00	1.19E+01	2.2500	2.985E+07
Fe-55	2.2791E-06	10,064.45	20,128.90	0.00E+00	2.29E-02	4.59E-02	2.7500	2.856E+07
H-3	1.9698E-03	10,064.45	20,128.90	0.00E+00	1.98E+01	3.96E+01	3.5000	1.679E+04
I-129	7.5300E-07	10,064.45	20,128.90	0.00E+00	7.58E-03	1.52E-02	5.0000	6.865E+03
Kr-85	4.1176E-02	10,064.45	20,128.90	0.00E+00	4.14E+02	8.29E+02	7.0000	7.518E+02
Np-237	9.5752E-06	10,064.45	20,128.90	0.00E+00	9.64E-02	1.93E-01	11.0000	8.386E+01
Pa-231	3.9379E-09	10,064.45	20,128.90	0.00E+00	3.96E-05	7.93E-05		
Pb-210	3.3115E-10	10,064.45	20,128.90	0.00E+00	3.33E-06	6.67E-06		
Pm-147	9.2402E-04	10,064.45	20,128.90	0.00E+00	9.30E+00	1.86E+01		
Pu-238	1.6217E-02	10,064.45	20,128.90	0.00E+00	1.63E+02	3.26E+02		
Pu-239	4.2810E-04	10,064.45	20,128.90	0.00E+00	4.31E+00	8.62E+00		
Pu-240	2.4333E-04	10,064.45	20,128.90	0.00E+00	2.45E+00	4.90E+00		
Pu-241	1.6242E-02	10,064.45	20,128.90	0.00E+00	1.63E+02	3.27E+02		
Pu-242	3.6329E-07	10,064.45	20,128.90	0.00E+00	3.66E-03	7.31E-03		
Ra-226	9.0114E-10	10,064.45	20,128.90	0.00E+00	9.07E-06	1.81E-05		
Ra-228	3.1019E-14	10,064.45	20,128.90	0.00E+00	3.12E-10	6.24E-10		
Ru-106	2.1225E-10	10,064.45	20,128.90	0.00E+00	2.14E-06	4.27E-06		
Se-79	1.2930E-05	10,064.45	20,128.90	0.00E+00	1.30E-01	2.60E-01		
Sn-126	1.1571E-05	10,064.45	20,128.90	0.00E+00	1.16E-01	2.33E-01		
Sr-90	1.3472E+00	10,064.45	20,128.90	0.00E+00	1.36E+04	2.71E+04		
Tc-99	4.2239E-04	10,064.45	20,128.90	0.00E+00	4.25E+00	8.50E+00		
Th-229	1.2407E-11	10,064.45	20,128.90	0.00E+00	1.25E-07	2.50E-07		
Th-230	8.3497E-08	10,064.45	20,128.90	0.00E+00	8.40E-04	1.68E-03		
Th-232	3.8371E-14	10,064.45	20,128.90	0.00E+00	3.86E-10	7.72E-10		
Ti-208	4.0414E-08	10,064.45	20,128.90	0.00E+00	4.07E-04	8.13E-04		
U-232	1.0948E-07	10,064.45	20,128.90	0.00E+00	1.10E-03	2.20E-03		
U-233	3.6275E-09	10,064.45	20,128.90	0.00E+00	3.65E-05	7.30E-05		
U-234	1.8562E-04	10,064.45	20,128.90	0.00E+00	1.87E+00	3.74E+00		
U-235	-2.7235E-06	10,064.45	0.00	6.92E-02	4.18E-02	6.92E-02		
U-236	1.5493E-05	10,064.45	20,128.90	0.00E+00	1.56E-01	3.12E-01		
U-238	-4.2851E-09	10,064.45	0.00	4.35E-02	4.35E-02	4.35E-02		
Y-90	1.3475E+00	10,064.45	20,128.90	0.00E+00	1.36E+04	2.71E+04		
Other Radionuclides					1.38E+04	2.76E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	19.81106509	80 to 100	

Burnup Summary (MWd) ^a			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:		10,064.45	
Bounding:		20,128.90	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.20		
Bounding:	0.40		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (UAX HEL) GERMANY
 SNF ID #: 742
 Fuel Units & Descr: 141 - MTR TYPE
 Heavy Metal Mass: BOL-23.42kg; EOL-16.539kg
 ROD Storage Site: SNS

Fuel decay start date: 1995
 Estimates as of: 2030
 Template: ATR (Light Water, Atom. 60 to 100%, U)
 Template Burnup(MWd/G): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 35 years

Estimated
 Casklet usage:
 18.710
 5.88

Radionuclide	CAIWD From Template	m	X _a	Bounding Fuel Burnup (MWd/G) ¹	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Y _a	Y _b	Gamma Sources
									Photon Energy Group
Ac-227	2.0068E-09	6.51E-25	13.032 50	0.00E+00	1.31E-05	2.62E-05			0.0150
Am-241	2.5251E-03	6.51E-25	13.032 50	0.00E+00	1.65E+01	3.29E+01			0.0150
Am-242m	3.9624E-07	6.51E-25	13.032 50	0.00E+00	2.58E-03	5.16E-03			0.0250
Am-243	1.4880E-06	6.51E-25	13.032 50	0.00E+00	8.70E-03	1.94E-02			0.0375
C-14	6.7053E-09	6.51E-25	13.032 50	0.00E+00	3.72E-05	7.44E-05			0.0575
C-36	1.3124E-32	6.51E-25	13.032 50	0.00E+00	8.55E-29	1.71E-28			0.0850
Co-243	1.1419E-07	6.51E-25	13.032 50	0.00E+00	7.44E-04	1.49E-03			0.1250
Co-244	1.6522E-05	6.51E-25	13.032 50	0.00E+00	1.08E-01	2.15E-01			0.2250
Co-60	7.0407E-07	6.51E-25	13.032 50	0.00E+00	4.83E-03	9.65E-03			0.3750
Co-134	2.0465E-05	6.51E-25	13.032 50	0.00E+00	1.33E-01	2.67E-01			0.5750
Co-135	3.4477E-06	6.51E-25	13.032 50	0.00E+00	2.25E-02	4.49E-02			0.2650
Co-137	1.4365E+00	6.51E-25	13.032 50	0.00E+00	9.36E+03	1.87E+04			1.2650
Eu-154	7.3920E-03	6.51E-25	13.032 50	0.00E+00	4.77E+01	9.54E+01			1.7500
Eu-155	6.9259E-04	6.51E-25	13.032 50	0.00E+00	3.86E+00	7.72E+00			2.2600
Fe-55	2.2791E-06	6.51E-25	13.032 50	0.00E+00	1.49E-02	2.97E-02			2.7500
H-3	1.8698E-03	6.51E-25	13.032 50	0.00E+00	1.28E+01	2.57E+01			2.7500
I-129	7.5300E-07	6.51E-25	13.032 50	0.00E+00	4.91E-03	9.81E-03			5.0000
K-40	4.1176E-02	6.51E-25	13.032 50	0.00E+00	2.68E+02	5.37E+02			7.0000
Nd-237	9.9792E-06	6.51E-25	13.032 50	0.00E+00	6.24E-02	1.25E-01			11.0000
Pa-231	3.9379E-09	6.51E-25	13.032 50	0.00E+00	2.57E-05	5.13E-05			
Pb-210	3.3115E-10	6.51E-25	13.032 50	0.00E+00	2.16E-06	4.32E-06			
Pm-147	9.2402E-04	6.51E-25	13.032 50	0.00E+00	6.02E+00	1.20E+01			
Pu-238	1.6217E-02	6.51E-25	13.032 50	0.00E+00	1.06E+02	2.11E+02			
Pu-239	4.2810E-04	6.51E-25	13.032 50	0.00E+00	2.79E+00	5.58E+00			
Pu-240	2.4333E-04	6.51E-25	13.032 50	0.00E+00	1.59E+00	3.17E+00			
Pu-241	1.6242E-02	6.51E-25	13.032 50	0.00E+00	1.05E+02	2.12E+02			
Pu-242	3.6329E-07	6.51E-25	13.032 50	0.00E+00	2.27E-03	4.73E-03			
Ra-226	9.0114E-10	6.51E-25	13.032 50	0.00E+00	5.67E-05	1.17E-05			
Ra-228	3.1019E-14	6.51E-25	13.032 50	0.00E+00	2.02E-10	4.04E-10			
Ru-106	2.1225E-10	6.51E-25	13.032 50	0.00E+00	1.38E-06	2.77E-06			
Sr-78	1.2930E-05	6.51E-25	13.032 50	0.00E+00	8.40E-02	1.69E-01			
Sr-126	1.1571E-05	6.51E-25	13.032 50	0.00E+00	7.54E-02	1.51E-01			
Sr-90	1.3472E+00	6.51E-25	13.032 50	0.00E+00	8.78E+03	1.76E+04			
Tc-99	4.2239E-04	6.51E-25	13.032 50	0.00E+00	2.75E+00	5.50E+00			
Ti-229	1.2407E-11	6.51E-25	13.032 50	0.00E+00	8.09E-08	1.62E-07			
Ti-230	8.3497E-08	6.51E-25	13.032 50	0.00E+00	5.44E-04	1.09E-03			
Ti-232	8.6371E-14	6.51E-25	13.032 50	0.00E+00	2.50E-10	5.00E-10			
Ti-238	4.0414E-08	6.51E-25	13.032 50	0.00E+00	2.63E-04	5.27E-04			
U-232	1.0948E-07	6.51E-25	13.032 50	0.00E+00	7.13E-04	1.43E-03			
U-233	3.6275E-09	6.51E-25	13.032 50	0.00E+00	2.36E-05	4.73E-05			
U-234	1.8562E-04	6.51E-25	13.032 50	0.00E+00	1.21E+00	2.42E+00			
U-235	2.7235E-06	6.51E-25	13.032 50	0.00E+00	4.70E-02	9.40E-02			
U-236	1.5493E-05	6.51E-25	13.032 50	0.00E+00	1.01E-01	2.02E-01			
U-238	4.2851E-09	6.51E-25	13.032 50	0.00E+00	6.35E-04	1.27E-03			
Y-90	1.3475E+00	6.51E-25	13.032 50	0.00E+00	8.92E+03	1.78E+04			

Thermal Power	
Nominal Heat Output (Watts)	2.18E+02
Bounding Heat Output (Watts)	2.18E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	
From BFO	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: ALUM	ALUM
BOL HMI Constituents: U	U
BOL Enrichment %: 92.6481755	60 to 100

Burnup Summary (MWd/G) ²	
From BFO	Estimated
Nominal: 13.032 50	6.51E-25
Bounding: 13.032 50	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks	
Nominal: 0.88	Estimated Burnup/ Given Burnup
Bounding: 1.77	Estimated EOL MW/Chen EOL HMI

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (JALX+HEU) GERMANY
SNF ID #: 933
Fuel Units & Descr: 195 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=39.312kg; EOL=26.871kg
ROD Storage Site: SRS

Fuel decay start date: 1995
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: 35 years

Estimated
Canister usage:
18"x10"
5.42

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.5869E-10	11,459.44	22,918.88	0.00E+00	1.10E-05	2.20E-05	Avg. MeV	
Am-241	1.0109E-02	11,459.44	22,918.88	0.00E+00	1.16E+02	2.32E+02	0.0150	1.693E+15
Am-242m	1.2789E-06	11,459.44	22,918.88	0.00E+00	1.47E-02	2.93E-02	0.0250	3.478E+14
Am-243	3.7047E-05	11,459.44	22,918.88	0.00E+00	4.25E-01	8.49E-01	0.0375	3.049E+14
C-14	2.6416E-08	11,459.44	22,918.88	0.00E+00	3.03E-04	6.05E-04	0.0575	3.280E+14
Cl-36	4.4441E-31	11,459.44	22,918.88	0.00E+00	5.09E-27	1.02E-26	0.0850	1.963E+14
Cm-243	3.9605E-06	11,459.44	22,918.88	0.00E+00	4.54E-02	9.08E-02	0.1250	1.324E+14
Cm-244	2.6227E-03	11,459.44	22,918.88	0.00E+00	3.01E+01	6.01E+01	0.2250	1.696E+14
Co-60	6.7740E-06	11,459.44	22,918.88	0.00E+00	7.76E-02	1.55E-01	0.3750	7.361E+13
Cs-134	6.8894E-05	11,459.44	22,918.88	0.00E+00	7.89E-01	1.58E+00	0.5750	1.230E+16
Cs-135	4.2564E-06	11,459.44	22,918.88	0.00E+00	4.88E-02	9.76E-02	0.8500	1.821E+13
Cs-137	1.4399E+00	11,459.44	22,918.88	0.00E+00	1.65E+04	3.30E+04	1.2500	1.088E+13
Eu-154	1.5522E-02	11,459.44	22,918.88	0.00E+00	1.78E+02	3.56E+02	1.7500	5.147E+11
Eu-155	1.7588E-03	11,459.44	22,918.88	0.00E+00	2.02E+01	4.03E+01	2.2500	3.563E+07
Fe-55	2.4933E-05	11,459.44	22,918.88	0.00E+00	2.86E-01	5.71E-01	2.7500	3.582E+07
H-3	1.9945E-03	11,459.44	22,918.88	0.00E+00	2.29E+01	4.57E+01	3.5000	9.523E+05
I-129	6.8403E-07	11,459.44	22,918.88	0.00E+00	7.61E-03	1.52E-02	5.0000	4.047E+05
Kr-85	4.1002E-02	11,459.44	22,918.88	0.00E+00	4.70E+02	9.40E+02	7.0000	4.633E+04
Np-237	3.1610E-05	11,459.44	22,918.88	0.00E+00	3.62E-01	7.24E-01	11.0000	5.302E+03
Pa-231	1.8876E-09	11,459.44	22,918.88	0.00E+00	2.16E-05	4.33E-05		
Pb-210	8.3840E-11	11,459.44	22,918.88	0.00E+00	9.61E-07	1.92E-06		
Pm-147	4.6501E-04	11,459.44	22,918.88	0.00E+00	5.33E+00	1.07E+01		
Pu-238	1.3645E-01	11,459.44	22,918.88	0.00E+00	1.56E+03	3.13E+03		
Pu-239	6.9502E-04	11,459.44	22,918.88	0.00E+00	7.96E+00	1.59E+01		
Pu-240	3.8183E-04	11,459.44	22,918.88	0.00E+00	4.38E+00	8.75E+00		
Pu-241	6.5310E-02	11,459.44	22,918.88	0.00E+00	7.48E+02	1.50E+03		
Pu-242	3.0911E-06	11,459.44	22,918.88	0.00E+00	3.54E-02	7.08E-02		
Ra-226	2.3512E-10	11,459.44	22,918.88	0.00E+00	2.69E-06	5.39E-06		
Ra-228	3.3666E-14	11,459.44	22,918.88	0.00E+00	3.82E-10	7.65E-10		
Ru-106	2.4490E-10	11,459.44	22,918.88	0.00E+00	2.81E-06	5.61E-06		
Se-79	1.2333E-05	11,459.44	22,918.88	0.00E+00	1.41E-01	2.83E-01		
Sn-126	1.0194E-05	11,459.44	22,918.88	0.00E+00	1.17E-01	2.34E-01		
Sr-90	1.3348E+00	11,459.44	22,918.88	0.00E+00	1.53E+04	3.06E+04		
Tc-99	3.8056E-04	11,459.44	22,918.88	0.00E+00	4.36E+00	8.72E+00		
Th-229	1.7868E-11	11,459.44	22,918.88	0.00E+00	2.05E-07	4.10E-07		
Th-230	2.3348E-08	11,459.44	22,918.88	0.00E+00	2.68E-04	5.35E-04		
Th-232	4.1288E-14	11,459.44	22,918.88	0.00E+00	4.73E-10	9.46E-10		
Th-208	4.3190E-08	11,459.44	22,918.88	0.00E+00	4.95E-04	9.90E-04		
U-232	1.1707E-07	11,459.44	22,918.88	0.00E+00	1.34E-03	2.68E-03		
U-233	7.2175E-09	11,459.44	22,918.88	0.00E+00	8.27E-05	1.65E-04		
U-234	6.1543E-05	11,459.44	22,918.88	0.00E+00	7.05E-01	1.41E+00		
U-235	2.8661E-06	11,459.44	0.00	6.79E-02	3.50E-02	6.79E-02		
U-236	1.6701E-05	11,459.44	22,918.88	0.00E+00	1.91E-01	3.83E-01		
U-238	9.4194E-09	11,459.44	0.00	2.66E-03	2.55E-03	2.66E-03		
Y-90	1.3348E+00	11,459.44	22,918.88	0.00E+00	1.53E+04	3.06E+04		
Other Radionuclides					1.58E+04	3.16E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Claddings:	HEAVY WATER	HEAVY WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	79.8992512	40 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		11,459.44	
Bounding:		22,918.88	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (JALX-MEU) GERMANY
SNF ID #: 1000
Fuel Units & Descr: 10 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=3.781kg; EOL=3.338kg
ROD Storage Site: SRS

*Fuel decay start date: 1993
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: 35 years

Estimated
Canister usage:
18"x10"
0.28

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	9.5869E-10	408.05	816.10	0.00E+00	3.91E-07	7.82E-07	0.0150 6.028E+13
Am-241	1.0109E-02	408.05	816.10	0.00E+00	4.13E+00	8.25E+00	0.0250 1.239E+13
Am-242m	1.2789E-06	408.05	816.10	0.00E+00	5.22E-04	1.04E-03	0.0375 1.086E+13
Am-243	3.7047E-05	408.05	816.10	0.00E+00	1.51E-02	3.02E-02	0.0575 1.168E+13
C-14	2.6416E-08	408.05	816.10	0.00E+00	1.06E-05	2.16E-05	0.0850 6.899E+12
Cl-36	4.4441E-31	408.05	816.10	0.00E+00	1.81E-28	3.63E-28	0.1250 4.713E+12
Cm-243	3.9605E-06	408.05	816.10	0.00E+00	1.62E-03	3.23E-03	0.2250 8.039E+12
Cm-244	2.6227E-03	408.05	816.10	0.00E+00	1.07E+00	2.14E+00	0.3750 2.821E+12
Co-60	6.7740E-06	408.05	816.10	0.00E+00	2.76E-03	5.53E-03	0.5750 4.378E+13
Cs-134	6.8894E-05	408.05	816.10	0.00E+00	2.81E-02	5.62E-02	0.8500 6.484E+11
Cs-135	4.2564E-06	408.05	816.10	0.00E+00	1.74E-03	3.47E-03	1.2500 3.874E+11
Cs-137	1.4399E+00	408.05	816.10	0.00E+00	5.88E+02	1.18E+03	1.7500 1.833E+10
Eu-154	1.5522E-02	408.05	816.10	0.00E+00	6.33E+00	1.27E+01	2.2500 1.289E+06
Eu-155	1.7588E-03	408.05	816.10	0.00E+00	7.18E-01	1.44E+00	2.7500 1.275E+06
Fe-55	2.4933E-05	408.05	816.10	0.00E+00	1.02E-02	2.03E-02	3.5000 3.391E+04
H-3	1.9945E-03	408.05	816.10	0.00E+00	8.14E-01	1.63E+00	5.0000 1.441E+04
I-129	6.6403E-07	408.05	816.10	0.00E+00	2.71E-04	5.42E-04	7.0000 1.850E+03
Kr-85	4.1002E-02	408.05	816.10	0.00E+00	1.67E+01	3.35E+01	11.0000 1.888E+02
Np-237	3.1610E-05	408.05	816.10	0.00E+00	1.29E-02	2.58E-02	
Pa-231	1.8876E-09	408.05	816.10	0.00E+00	7.70E-07	1.54E-06	
Pb-210	8.3840E-11	408.05	816.10	0.00E+00	3.42E-08	6.84E-08	
Pm-147	4.8501E-04	408.05	816.10	0.00E+00	1.90E-01	3.79E-01	
Pu-238	1.3645E-01	408.05	816.10	0.00E+00	6.57E+01	1.11E+02	
Pu-239	6.9502E-04	408.05	816.10	0.00E+00	2.84E-01	5.67E-01	
Pu-240	3.8183E-04	408.05	816.10	0.00E+00	1.56E-01	3.12E-01	
Pu-241	6.5310E-02	408.05	816.10	0.00E+00	2.66E+01	5.33E+01	
Pu-242	3.0911E-06	408.05	816.10	0.00E+00	1.26E-03	2.52E-03	
Ra-226	2.3512E-10	408.05	816.10	0.00E+00	9.59E-08	1.92E-07	
Ra-228	3.3366E-14	408.05	816.10	0.00E+00	1.36E-11	2.72E-11	
Ru-106	2.4490E-10	408.05	816.10	0.00E+00	9.99E-08	2.00E-07	
Se-79	1.2333E-05	408.05	816.10	0.00E+00	5.03E-03	1.01E-02	
Sn-126	1.0184E-05	408.05	816.10	0.00E+00	4.16E-03	8.32E-03	
Sr-90	1.3348E+00	408.05	816.10	0.00E+00	5.45E+02	1.09E+03	
Tc-99	3.8056E-04	408.05	816.10	0.00E+00	1.55E-01	3.11E-01	
Th-229	1.7868E-11	408.05	816.10	0.00E+00	7.29E-09	1.46E-08	
Th-230	2.3348E-08	408.05	816.10	0.00E+00	9.53E-06	1.91E-05	
Th-232	4.1288E-14	408.05	816.10	0.00E+00	1.68E-11	3.37E-11	
Ti-208	4.3190E-08	408.05	816.10	0.00E+00	1.76E-05	3.52E-05	
U-232	1.1707E-07	408.05	816.10	0.00E+00	4.78E-05	9.55E-05	
U-233	7.2175E-09	408.05	816.10	0.00E+00	2.95E-06	5.89E-06	
U-234	6.1543E-05	408.05	816.10	0.00E+00	2.51E-02	5.02E-02	
U-235	-2.8661E-06	408.05	0.00	3.67E-03	2.50E-03	3.67E-03	
U-236	1.6701E-05	408.05	816.10	0.00E+00	6.81E-03	1.36E-02	
U-238	-9.4194E-09	408.05	0.00	7.00E-04	6.97E-04	7.00E-04	
Y-90	1.3348E+00	408.05	816.10	0.00E+00	5.45E+02	1.09E+03	
Other Radionuclides					5.63E+02	1.13E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	44.86296013	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		408.05	
Bounding:		816.10	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.25		
Bounding:	0.49		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: FRJ TUBES (U308 LEU) GERMANY

SNF ID #: 999

Fuel Units & Descr: 3 - CONCENTRIC TUBES

Heavy Metal Mass: BOL=3.038kg; EOL=3.008kg

ROD Storage Site: SRS

Fuel decay start date: 1998

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: 25 years

Estimated
Canister usage:
18"x10"
0.13

II. Estimates

	m	X ₀	X ₀	b	Y ₀	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	1.4973E-09	28.23	56.46	0.00E+00	4.23E-08	8.45E-08	Avg. MeV	
Am-241	2.6120E-02	28.23	56.46	0.00E+00	7.37E-01	1.47E+00	0.0150	5.075E+12
Am-242m	8.7133E-06	28.23	56.46	0.00E+00	2.46E-04	4.92E-04	0.0250	1.053E+12
Am-243	6.3980E-06	28.23	56.46	0.00E+00	1.81E-04	3.61E-04	0.0375	9.236E+11
C-14	2.9600E-08	28.23	56.46	0.00E+00	8.38E-07	1.67E-06	0.0575	1.001E+12
Cl-36	5.9507E-35	28.23	56.46	0.00E+00	1.68E-33	3.36E-33	0.0850	5.928E+11
Cm-243	1.9560E-06	28.23	56.46	0.00E+00	5.52E-05	1.10E-04	0.1250	3.955E+11
Cm-244	9.0867E-05	28.23	56.46	0.00E+00	2.57E-03	5.13E-03	0.2250	5.112E+11
Co-60	8.4667E-06	28.23	56.46	0.00E+00	2.39E-04	4.78E-04	0.3750	2.222E+11
Cs-134	3.9780E-04	28.23	56.46	0.00E+00	1.12E-02	2.24E-02	0.5750	3.788E+12
Cs-135	4.8607E-06	28.23	56.46	0.00E+00	1.37E-04	2.74E-04	0.8500	5.049E+10
Cs-137	1.8020E+00	28.23	56.46	0.00E+00	5.09E+01	1.02E+02	1.2500	2.731E+10
Eu-154	1.3960E-02	28.23	56.46	0.00E+00	3.94E-01	7.88E-01	1.7500	1.388E+09
Eu-155	2.0313E-03	28.23	56.46	0.00E+00	5.73E-02	1.15E-01	2.2500	1.035E+05
Fe-55	3.7360E-04	28.23	56.46	0.00E+00	1.05E-02	2.11E-02	2.7500	1.491E+04
H-3	3.5233E-03	28.23	56.46	0.00E+00	9.95E-02	1.99E-01	3.5000	2.861E+02
I-129	7.1600E-07	28.23	56.46	0.00E+00	2.02E-05	4.04E-05	5.0000	1.136E+02
Kr-85	7.4133E-02	28.23	56.46	0.00E+00	2.09E+00	4.19E+00	7.0000	1.283E+01
Np-237	3.8020E-06	28.23	56.46	0.00E+00	1.07E-04	2.15E-04	11.0000	1.458E+00
Pa-231	3.7020E-09	28.23	56.46	0.00E+00	1.05E-07	2.09E-07		
Pb-210	1.4067E-13	28.23	56.46	0.00E+00	3.97E-12	7.94E-12		
Pm-147	1.2360E-02	28.23	56.46	0.00E+00	3.49E-01	6.98E-01		
Pu-238	5.3133E-03	28.23	56.46	0.00E+00	1.50E-01	3.00E-01		
Pu-239	1.0313E-02	28.23	56.46	0.00E+00	2.91E-01	5.82E-01		
Pu-240	5.4153E-03	28.23	56.46	0.00E+00	1.53E-01	3.06E-01		
Pu-241	2.9540E-01	28.23	56.46	0.00E+00	8.34E+00	1.67E+01		
Pu-242	3.0713E-08	28.23	56.46	0.00E+00	8.67E-05	1.73E-04		
Ra-226	5.9440E-13	28.23	56.46	0.00E+00	1.68E-11	3.36E-11		
Ra-228	1.6733E-14	28.23	56.46	0.00E+00	4.72E-13	9.45E-13		
Ru-106	2.7233E-07	28.23	56.46	0.00E+00	7.69E-06	1.54E-05		
Se-79	1.2533E-05	28.23	56.46	0.00E+00	3.54E-04	7.08E-04		
Sn-126	1.1393E-05	28.23	56.46	0.00E+00	3.22E-04	6.43E-04		
Sr-90	1.6333E+00	28.23	56.46	0.00E+00	4.61E+01	9.22E+01		
Tc-99	4.3533E-04	28.23	56.46	0.00E+00	1.23E-02	2.46E-02		
Th-229	1.0827E-12	28.23	56.46	0.00E+00	3.06E-11	6.11E-11		
Th-230	1.0793E-10	28.23	56.46	0.00E+00	3.05E-09	6.09E-09		
Th-232	2.2773E-14	28.23	56.46	0.00E+00	6.43E-13	1.29E-12		
Ti-208	7.3067E-09	28.23	56.46	0.00E+00	2.06E-07	4.13E-07		
U-232	1.9833E-08	28.23	56.46	0.00E+00	5.60E-07	1.12E-06		
U-233	6.0453E-10	28.23	56.46	0.00E+00	1.71E-08	3.41E-08		
U-234	6.1000E-07	28.23	56.46	0.00E+00	1.72E-05	3.44E-05		
U-235	2.5335E-08	28.23	0.00	1.30E-03	1.22E-03	1.30E-03		
U-236	1.3000E-05	28.23	56.46	0.00E+00	3.67E-04	7.34E-04		
U-238	-1.4207E-08	28.23	0.00	8.20E-04	8.19E-04	8.20E-04		
Y-90	1.6340E+00	28.23	56.46	0.00E+00	4.61E+01	9.23E+01		
Other Radionuclides					4.83E+01	9.66E+01		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
6.05E-01	1.21E+00	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Claddings:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.73	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 0.25	Estimated 28.23	
Bounding:		56.46	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 0.21	Estimated Burnup/ Given Burnup 113.31	
Bounding:	0.42		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRM (UALX HEU 45%) GERMANY
SNF ID #: 805
Fuel Units & Descr: 50 - MTR TYPE
Heavy Metal Mass: BOL=28.18kg: EOL=23.47kg
ROD Storage Site: SRS

Fuel decay start date: 1995
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"
2.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CVMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	4,460.46	8,920.92	0.00E+00	8.95E-06	1.79E-05	Avg. MeV	
Am-241	2.5251E-03	4,460.46	8,920.92	0.00E+00	1.13E+01	2.25E+01	0.0150	6.570E+14
Am-242m	3.9624E-07	4,460.46	8,920.92	0.00E+00	1.77E-03	3.53E-03	0.0250	1.364E+14
Am-243	1.4880E-06	4,460.46	8,920.92	0.00E+00	6.64E-03	1.33E-02	0.0375	1.186E+14
C-14	5.7053E-09	4,460.46	8,920.92	0.00E+00	2.54E-05	5.09E-05	0.0575	1.276E+14
Cl-36	1.3124E-32	4,460.46	8,920.92	0.00E+00	5.85E-29	1.17E-28	0.0850	7.691E+13
Cm-243	1.1419E-07	4,460.46	8,920.92	0.00E+00	5.09E-04	1.02E-03	0.1250	5.080E+13
Cm-244	1.6522E-05	4,460.46	8,920.92	0.00E+00	7.37E-02	1.47E-01	0.2250	6.840E+13
Co-60	7.4047E-07	4,460.46	8,920.92	0.00E+00	3.30E-03	6.61E-03	0.3750	2.889E+13
Cs-134	2.0455E-05	4,460.46	8,920.92	0.00E+00	9.12E-02	1.82E-01	0.5750	4.774E+14
Cs-135	3.4477E-06	4,460.46	8,920.92	0.00E+00	1.54E-02	3.08E-02	0.8500	5.831E+12
Cs-137	1.4365E+00	4,460.46	8,920.92	0.00E+00	6.41E+03	1.28E+04	1.2500	2.820E+12
Eu-154	7.3230E-03	4,460.46	8,920.92	0.00E+00	3.27E+01	6.53E+01	1.7500	1.587E+11
Eu-155	5.9259E-04	4,460.46	8,920.92	0.00E+00	2.84E+00	5.29E+00	2.2500	1.327E+07
Fe-55	2.2791E-06	4,460.46	8,920.92	0.00E+00	1.02E-02	2.03E-02	2.7500	1.267E+07
H-3	1.9698E-03	4,460.46	8,920.92	0.00E+00	8.79E+00	1.76E+01	3.5000	7.365E+03
I-129	7.5300E-07	4,460.46	8,920.92	0.00E+00	3.36E-03	6.72E-03	5.0000	3.010E+03
Kr-85	4.1176E-02	4,460.46	8,920.92	0.00E+00	1.84E+02	3.67E+02	7.9000	3.294E+02
Np-237	9.5752E-06	4,460.46	8,920.92	0.00E+00	4.27E-02	8.54E-02	11.0000	3.674E+01
Pa-231	3.9379E-09	4,460.46	8,920.92	0.00E+00	1.76E-05	3.51E-05		
Pb-210	3.3115E-10	4,460.46	8,920.92	0.00E+00	1.48E-06	2.95E-06		
Pm-147	9.2402E-04	4,460.46	8,920.92	0.00E+00	4.12E+00	8.24E+00		
Pu-238	1.6217E-02	4,460.46	8,920.92	0.00E+00	7.23E+01	1.45E+02		
Pu-239	4.2810E-04	4,460.46	8,920.92	0.00E+00	1.91E+00	3.82E+00		
Pu-240	2.4333E-04	4,460.46	8,920.92	0.00E+00	1.09E+00	2.17E+00		
Pu-241	1.6242E-02	4,460.46	8,920.92	0.00E+00	7.24E+01	1.45E+02		
Pu-242	3.8329E-07	4,460.46	8,920.92	0.00E+00	1.82E-03	3.24E-03		
Ra-226	9.0114E-10	4,460.46	8,920.92	0.00E+00	4.02E-06	8.04E-06		
Ra-228	3.1019E-14	4,460.46	8,920.92	0.00E+00	1.38E-10	2.77E-10		
Ru-106	2.1225E-10	4,460.46	8,920.92	0.00E+00	9.47E-07	1.89E-06		
Se-79	1.2930E-05	4,460.46	8,920.92	0.00E+00	5.77E-02	1.15E-01		
Sn-126	1.1571E-05	4,460.46	8,920.92	0.00E+00	5.16E-02	1.03E-01		
Sr-90	1.3472E+00	4,460.46	8,920.92	0.00E+00	6.01E+03	1.20E+04		
Tc-99	4.2239E-04	4,460.46	8,920.92	0.00E+00	1.88E+00	3.77E+00		
Th-229	1.2407E-11	4,460.46	8,920.92	0.00E+00	5.53E-08	1.11E-07		
Th-230	8.3497E-08	4,460.46	8,920.92	0.00E+00	3.72E-04	7.45E-04		
Th-232	3.8371E-14	4,460.46	8,920.92	0.00E+00	1.71E-10	3.42E-10		
Ti-206	4.0414E-08	4,460.46	8,920.92	0.00E+00	1.80E-04	3.61E-04		
U-232	1.0948E-07	4,460.46	8,920.92	0.00E+00	4.88E-04	9.77E-04		
U-233	3.6275E-09	4,460.46	8,920.92	0.00E+00	1.82E-05	3.24E-05		
U-234	1.8562E-04	4,460.46	8,920.92	0.00E+00	8.28E-01	1.66E+00		
U-235	-2.7235E-06	4,460.46	0.00	2.74E-02	1.52E-02	2.74E-02		
U-236	1.5493E-05	4,460.46	8,920.92	0.00E+00	6.91E-02	1.38E-01		
U-238	-4.2851E-09	4,460.46	0.00	5.21E-03	5.19E-03	5.21E-03		
Y-90	1.3475E+00	4,460.46	8,920.92	0.00E+00	6.01E+03	1.20E+04		
Other Radionuclides					6.10E+03	1.22E+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:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	44.97952648	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	688.61	4,460.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		8,920.92	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.50	6.50	1.01
Bounding:	1.01		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRM (UALX HEU) GERMANY
SNF ID #: 808
Fuel Units & Descr: 31 - MTR TYPE
Heavy Metal Mass: BOL=6.395kg; EOL=3.171kg
ROD Storage Site: SRS

Fuel decay start date: 1995
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"
1.29

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	3,053.19	6,058.47	0.00E+00	6.13E-06	1.22E-05	Avg. MeV	
Am-241	2.5251E-03	3,053.19	6,058.47	0.00E+00	7.71E+00	1.53E+01	0.0150	4.461E+14
Am-242m	3.9624E-07	3,053.19	6,058.47	0.00E+00	1.21E-03	2.40E-03	0.0250	9.283E+13
Am-243	1.4880E-06	3,053.19	6,058.47	0.00E+00	4.54E-03	9.01E-03	0.0375	8.051E+13
C-14	5.7053E-09	3,053.19	6,058.47	0.00E+00	1.74E-05	3.46E-05	0.0575	8.686E+13
Cl-36	1.3124E-32	3,053.19	6,058.47	0.00E+00	4.01E-29	7.95E-29	0.0850	5.221E+13
Cm-243	1.1419E-07	3,053.19	6,058.47	0.00E+00	3.49E-04	6.92E-04	0.1250	3.449E+13
Cm-244	1.6522E-05	3,053.19	6,058.47	0.00E+00	5.04E-02	1.00E-01	0.2250	4.508E+13
Co-60	7.4047E-07	3,053.19	6,058.47	0.00E+00	2.26E-03	4.48E-03	0.3750	1.961E+13
Cs-134	2.0455E-05	3,053.19	6,058.47	0.00E+00	6.25E-02	1.24E-01	0.5750	3.241E+14
Cs-135	3.4477E-06	3,053.19	6,058.47	0.00E+00	1.05E-02	2.09E-02	0.8500	3.959E+12
Cs-137	1.4365E+00	3,053.19	6,058.47	0.00E+00	4.39E+03	8.70E+03	1.2500	1.915E+12
Eu-154	7.3230E-03	3,053.19	6,058.47	0.00E+00	2.24E+01	4.44E+01	1.7500	1.078E+11
Eu-155	5.9259E-04	3,053.19	6,058.47	0.00E+00	1.81E+00	3.59E+00	2.2500	9.010E+06
Fe-55	2.2791E-06	3,053.19	6,058.47	0.00E+00	6.96E-03	1.38E-02	2.7500	8.600E+06
H-3	1.9698E-03	3,053.19	6,058.47	0.00E+00	6.01E+00	1.19E+01	3.5000	4.982E+03
I-129	7.5300E-07	3,053.19	6,058.47	0.00E+00	2.30E-03	4.56E-03	5.0000	2.036E+03
Kr-85	4.1176E-02	3,053.19	6,058.47	0.00E+00	1.26E+02	2.49E+02	7.0000	2.228E+02
Np-237	9.5752E-06	3,053.19	6,058.47	0.00E+00	2.92E-02	5.80E-02	11.0000	2.484E+01
Pa-231	3.9379E-09	3,053.19	6,058.47	0.00E+00	1.20E-05	2.38E-05		
Pb-210	3.3115E-10	3,053.19	6,058.47	0.00E+00	1.01E-06	2.01E-06		
Pm-147	9.2402E-04	3,053.19	6,058.47	0.00E+00	2.82E+00	5.60E+00		
Pu-238	1.6217E-02	3,053.19	6,058.47	0.00E+00	4.95E+01	9.82E+01		
Pu-239	4.2810E-04	3,053.19	6,058.47	0.00E+00	1.31E+00	2.59E+00		
Pu-240	2.4333E-04	3,053.19	6,058.47	0.00E+00	7.43E-01	1.47E+00		
Pu-241	1.6242E-02	3,053.19	6,058.47	0.00E+00	4.96E+01	9.84E+01		
Pu-242	3.6329E-07	3,053.19	6,058.47	0.00E+00	1.11E-03	2.20E-03		
Ra-226	9.0114E-10	3,053.19	6,058.47	0.00E+00	2.75E-06	5.46E-06		
Ra-228	3.1019E-14	3,053.19	6,058.47	0.00E+00	9.47E-11	1.88E-10		
Ru-106	2.1225E-10	3,053.19	6,058.47	0.00E+00	6.48E-07	1.29E-06		
Se-79	1.2930E-05	3,053.19	6,058.47	0.00E+00	3.95E-02	7.83E-02		
Sn-126	1.1571E-05	3,053.19	6,058.47	0.00E+00	3.53E-02	7.01E-02		
Sr-90	1.3472E+00	3,053.19	6,058.47	0.00E+00	4.11E+03	8.16E+03		
Tc-99	4.2239E-04	3,053.19	6,058.47	0.00E+00	1.29E+00	2.56E+00		
Th-229	1.2407E-11	3,053.19	6,058.47	0.00E+00	3.79E-08	7.51E-08		
Th-230	8.3497E-08	3,053.19	6,058.47	0.00E+00	2.55E-04	5.06E-04		
Th-232	3.8371E-14	3,053.19	6,058.47	0.00E+00	1.17E-10	2.32E-10		
Ti-208	4.0414E-08	3,053.19	6,058.47	0.00E+00	1.23E-04	2.45E-04		
U-232	1.0948E-07	3,053.19	6,058.47	0.00E+00	3.34E-04	6.63E-04		
U-233	3.6275E-09	3,053.19	6,058.47	0.00E+00	1.11E-05	2.20E-05		
U-234	1.8562E-04	3,053.19	6,058.47	0.00E+00	5.67E-01	1.12E+00		
U-235	-2.7235E-08	3,053.19	0.00	1.26E-02	4.28E-03	1.26E-02		
U-238	1.5493E-05	3,053.19	6,058.47	0.00E+00	4.73E-02	9.38E-02		
U-238	-4.2851E-09	3,053.19	0.00	1.91E-04	1.78E-04	1.91E-04		
Y-90	1.3475E+00	3,053.19	6,058.47	0.00E+00	4.11E+03	8.16E+03		
Other Radionuclides					4.18E+03	8.29E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.1083593	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		3,053.19
Bounding:		6,058.47

Basis for burnup used in estimates

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.52	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM
1.06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U308-LEU) AUSTRIA

SNF ID #: 556

Fuel Units & Descr: 4 - MTR TYPE

Heavy Metal Mass: BOL = : EOL=6.96kg

ROD Storage Site: SRS

Fuel decay start date: 2010

Estimates as of: 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: 20 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) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	6,591.26	6,591.26	0.00E+00	4.37E-06	4.37E-06	Avg. MeV	
Am-241	2.0060E-03	6,591.26	6,591.26	0.00E+00	1.32E+01	1.32E+01	0.0150	6.958E+14
Am-242m	4.2429E-07	6,591.26	6,591.26	0.00E+00	2.80E-03	2.80E-03	0.0250	1.447E+14
Am-243	1.4899E-06	6,591.26	6,591.26	0.00E+00	9.82E-03	9.82E-03	0.0375	1.262E+14
C-14	5.7135E-09	6,591.26	6,591.26	0.00E+00	3.77E-05	3.77E-05	0.0575	1.362E+14
Ci-36	1.3124E-32	6,591.26	6,591.26	0.00E+00	8.65E-29	8.65E-29	0.0650	8.168E+13
Cm-243	1.6443E-07	6,591.26	6,591.26	0.00E+00	1.08E-03	1.08E-03	0.1250	5.527E+13
Cm-244	2.9330E-06	6,591.26	6,591.26	0.00E+00	1.93E-01	1.93E-01	0.2250	7.048E+13
Co-60	5.3186E-06	6,591.26	6,591.26	0.00E+00	3.51E-02	3.51E-02	0.3750	3.068E+13
Cs-134	3.1563E-03	6,591.26	6,591.26	0.00E+00	2.08E+01	2.08E+01	0.5750	5.004E+14
Cs-135	3.4477E-06	6,591.26	6,591.26	0.00E+00	2.27E-02	2.27E-02	0.8500	8.460E+12
Cs-137	2.0313E+00	6,591.26	6,591.26	0.00E+00	1.34E+04	1.34E+04	1.2500	4.831E+12
Eu-154	2.4513E-02	6,591.26	6,591.26	0.00E+00	1.62E+02	1.62E+02	1.7500	2.217E+11
Eu-155	4.8175E-03	6,591.26	6,591.26	0.00E+00	3.18E+01	3.18E+01	2.2500	1.945E+07
Fe-55	1.2397E-04	6,591.26	6,591.26	0.00E+00	8.17E-01	8.17E-01	2.7500	1.100E+07
H-3	4.5697E-03	6,591.26	6,591.26	0.00E+00	3.01E+01	3.01E+01	3.5000	5.051E+04
I-129	7.5300E-07	6,591.26	6,591.26	0.00E+00	4.96E-03	4.96E-03	5.0000	2.856E+03
Kr-85	1.0850E-01	6,591.26	6,591.26	0.00E+00	7.15E+02	7.15E+02	7.0000	3.153E+02
Np-237	9.5561E-06	6,591.26	6,591.26	0.00E+00	6.30E-02	6.30E-02	11.0000	3.534E+01
Pa-231	2.0359E-09	6,591.26	6,591.26	0.00E+00	1.34E-05	1.34E-05		
Pb-210	4.9728E-11	6,591.26	6,591.26	0.00E+00	3.28E-07	3.28E-07		
Pm-147	4.8502E-02	6,591.26	6,591.26	0.00E+00	3.20E+02	3.20E+02		
Pu-238	1.8254E-02	6,591.26	6,591.26	0.00E+00	1.20E+02	1.20E+02		
Pu-239	4.2810E-04	6,591.26	6,591.26	0.00E+00	2.82E+00	2.82E+00		
Pu-240	2.4368E-04	6,591.26	6,591.26	0.00E+00	1.61E+00	1.61E+00		
Pu-241	3.3415E-02	6,591.26	6,591.26	0.00E+00	2.20E+02	2.20E+02		
Pu-242	3.6329E-07	6,591.26	6,591.26	0.00E+00	2.39E-03	2.39E-03		
Ra-226	2.2854E-10	6,591.26	6,591.26	0.00E+00	1.51E-06	1.51E-06		
Ra-228	1.2426E-14	6,591.26	6,591.26	0.00E+00	8.19E-11	8.19E-11		
Ru-106	6.3589E-06	6,591.26	6,591.26	0.00E+00	4.19E-02	4.19E-02		
Se-79	1.2933E-05	6,591.26	6,591.26	0.00E+00	8.52E-02	8.52E-02		
Sn-126	1.1574E-05	6,591.26	6,591.26	0.00E+00	7.63E-02	7.63E-02		
Sr-90	1.9248E+00	6,591.26	6,591.26	0.00E+00	1.27E+04	1.27E+04		
Tc-99	4.2239E-04	6,591.26	6,591.26	0.00E+00	2.78E+00	2.78E+00		
Th-229	5.0953E-12	6,591.26	6,591.26	0.00E+00	3.36E-08	3.36E-08		
Th-230	4.1885E-08	6,591.26	6,591.26	0.00E+00	2.76E-04	2.76E-04		
Th-232	1.9270E-14	6,591.26	6,591.26	0.00E+00	1.27E-10	1.27E-10		
Th-208	4.6024E-08	6,591.26	6,591.26	0.00E+00	3.03E-04	3.03E-04		
U-232	1.2582E-07	6,591.26	6,591.26	0.00E+00	8.29E-04	8.29E-04		
U-233	2.5825E-09	6,591.26	6,591.26	0.00E+00	1.70E-05	1.70E-05		
U-234	1.8450E-04	6,591.26	6,591.26	0.00E+00	1.22E+00	1.22E+00		
U-235	-2.7235E-06	6,591.26	0.00	2.77E-02	9.78E-03	2.77E-02		
U-236	1.5493E-05	6,591.26	6,591.26	0.00E+00	1.02E-01	1.02E-01		
U-238	-4.2851E-09	6,591.26	0.00	2.80E-04	2.52E-04	2.80E-04		
Y-80	1.9254E+00	6,591.26	6,591.26	0.00E+00	1.27E+04	1.27E+04		
Other Radionuclides					1.27E+04	1.27E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		6,591.26
Bounding:		6,591.26

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:	1.50	
Bounding:	1.50	

Estimated EOL HM/Given EOL HM

1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U3Si2 LEU) AUSTRIA
 SNF ID #: 515
 Fuel Units & Descr: 49 - MTR TYPE
 Heavy Metal Mass: BOL=78.4kg; EOL=74.602kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimate 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: 20 years

Estimated
 Canister usage:
 18"x10"
 2.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	3,596.31	7,192.61	0.00E+00	2.38E-06	4.77E-06	Avg. MeV	
Am-241	2.0060E-03	3,596.31	7,192.61	0.00E+00	7.21E+00	1.44E+01	0.0150	7.592E+14
Am-242m	4.2420E-07	3,596.31	7,192.61	0.00E+00	1.53E-03	3.05E-03	0.0250	1.579E+14
Am-243	1.4899E-06	3,596.31	7,192.61	0.00E+00	5.36E-03	1.07E-02	0.0375	1.377E+14
C-14	5.7135E-09	3,596.31	7,192.61	0.00E+00	2.05E-05	4.11E-05	0.0575	1.475E+14
Cl-36	1.3124E-32	3,596.31	7,192.61	0.00E+00	4.72E-29	9.44E-29	0.0850	8.913E+13
Cm-243	1.6443E-07	3,596.31	7,192.61	0.00E+00	5.91E-04	1.18E-03	0.1250	6.031E+13
Cm-244	2.9330E-05	3,596.31	7,192.61	0.00E+00	1.05E-01	2.11E-01	0.2250	7.690E+13
Co-60	5.3186E-06	3,596.31	7,192.61	0.00E+00	1.91E-02	3.83E-02	0.3750	3.348E+13
Cs-134	3.1583E-03	3,596.31	7,192.61	0.00E+00	1.14E+01	2.27E+01	0.5750	5.461E+14
Cs-135	3.4477E-06	3,596.31	7,192.61	0.00E+00	1.24E-02	2.48E-02	0.8500	9.232E+12
Cs-137	2.0313E+00	3,596.31	7,192.61	0.00E+00	7.31E+03	1.46E+04	1.2500	5.272E+12
Eu-154	2.4513E-02	3,596.31	7,192.61	0.00E+00	8.82E+01	1.76E+02	1.7500	2.420E+11
Eu-155	4.8175E-03	3,596.31	7,192.61	0.00E+00	1.73E+01	3.47E+01	2.2500	2.122E+07
Fe-55	1.2397E-04	3,596.31	7,192.61	0.00E+00	4.46E-01	8.92E-01	2.7500	1.200E+07
H-3	4.5697E-03	3,596.31	7,192.61	0.00E+00	1.64E+01	3.29E+01	3.5000	5.525E+04
I-129	7.5300E-07	3,596.31	7,192.61	0.00E+00	2.71E-03	5.42E-03	5.0000	3.171E+03
Kr-85	1.0850E-01	3,596.31	7,192.61	0.00E+00	3.90E+02	7.80E+02	7.0000	3.503E+02
Np-237	9.5561E-06	3,596.31	7,192.61	0.00E+00	3.44E-02	6.87E-02	11.0000	3.928E+01
Pa-231	2.0359E-09	3,596.31	7,192.61	0.00E+00	7.32E-06	1.46E-05		
Pb-210	4.9728E-11	3,596.31	7,192.61	0.00E+00	1.79E-07	3.58E-07		
Pm-147	4.8502E-02	3,596.31	7,192.61	0.00E+00	1.74E+02	3.49E+02		
Pu-238	1.8254E-02	3,596.31	7,192.61	0.00E+00	6.56E+01	1.31E+02		
Pu-239	4.2810E-04	3,596.31	7,192.61	0.00E+00	1.54E+00	3.08E+00		
Pu-240	2.4368E-04	3,596.31	7,192.61	0.00E+00	8.76E-01	1.75E+00		
Pu-241	3.3415E-02	3,596.31	7,192.61	0.00E+00	1.20E+02	2.40E+02		
Pu-242	3.6329E-07	3,596.31	7,192.61	0.00E+00	1.31E-03	2.61E-03		
Ra-226	2.2854E-10	3,596.31	7,192.61	0.00E+00	8.22E-07	1.64E-06		
Ra-228	1.2426E-14	3,596.31	7,192.61	0.00E+00	4.47E-11	8.94E-11		
Ru-106	6.3589E-06	3,596.31	7,192.61	0.00E+00	2.29E-02	4.57E-02		
Se-79	1.2933E-05	3,596.31	7,192.61	0.00E+00	4.65E-02	9.30E-02		
Sn-126	1.1574E-05	3,596.31	7,192.61	0.00E+00	4.16E-02	8.32E-02		
Sr-90	1.9248E+00	3,596.31	7,192.61	0.00E+00	6.92E+03	1.38E+04		
Tc-99	4.2239E-04	3,596.31	7,192.61	0.00E+00	1.52E+00	3.04E+00		
Th-229	5.0953E-12	3,596.31	7,192.61	0.00E+00	1.83E-08	3.66E-08		
Th-230	4.1885E-08	3,596.31	7,192.61	0.00E+00	1.51E-04	3.01E-04		
Th-232	1.9270E-14	3,596.31	7,192.61	0.00E+00	6.93E-11	1.39E-10		
Th-208	4.6024E-08	3,596.31	7,192.61	0.00E+00	1.66E-04	3.31E-04		
U-232	1.2582E-07	3,596.31	7,192.61	0.00E+00	4.52E-04	9.05E-04		
U-233	2.5825E-09	3,596.31	7,192.61	0.00E+00	9.29E-06	1.86E-05		
U-234	1.8450E-04	3,596.31	7,192.61	0.00E+00	6.84E-01	1.33E+00		
U-235	-2.7235E-06	3,596.31	0.00	1.43E-02	4.50E-03	1.43E-02		
U-236	1.5493E-05	3,596.31	7,192.61	0.00E+00	5.57E-02	1.11E-01		
U-238	-4.2851E-09	3,596.31	0.00	2.41E-02	2.41E-02	2.41E-02		
Y-90	1.9254E+00	3,596.31	7,192.61	0.00E+00	6.92E+03	1.38E+04		
Other Radionuclides					6.96E+03	1.39E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	8.4375	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)^a

	From SFD	Estimated
Nominal:		3,596.31
Bounding:		7,192.61

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	0.29	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (JALX+HEU) AUSTRIA
SNF ID #: 654
Fuel Units & Descr: 2 - MTR TYPE
Heavy Metal Mass: BOL=0.14kg; EOL=0.12kg
ROD Storage Site: SRS

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

Estimated
Canister usage:
18"x10"
0.08

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/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	6.6313E-10	18.94	37.88	0.00E+00	1.26E-08	2.51E-08	Avg. MeV	
Am-241	2.0060E-03	18.94	37.88	0.00E+00	3.80E-02	7.60E-02	0.0150	3.999E+12
Am-242m	4.2429E-07	18.94	37.88	0.00E+00	8.04E-06	1.61E-05	0.0250	8.315E+11
Am-243	1.4899E-06	18.94	37.88	0.00E+00	2.82E-05	5.64E-05	0.0375	7.253E+11
C-14	5.7135E-09	18.94	37.88	0.00E+00	1.08E-07	2.16E-07	0.0575	7.768E+11
Cf-252	1.3124E-32	18.94	37.88	0.00E+00	2.49E-31	4.97E-31	0.0850	4.694E+11
Cm-243	1.6443E-07	18.94	37.88	0.00E+00	3.11E-06	6.23E-06	0.1250	3.176E+11
Cm-244	2.9330E-05	18.94	37.88	0.00E+00	5.56E-04	1.11E-03	0.2250	4.050E+11
Co-60	5.3186E-06	18.94	37.88	0.00E+00	1.01E-04	2.01E-04	0.3750	1.763E+11
Cs-134	3.1563E-03	18.94	37.88	0.00E+00	5.98E-02	1.20E-01	0.5750	2.876E+12
Cs-135	3.4477E-06	18.94	37.88	0.00E+00	6.53E-05	1.31E-04	0.8500	4.862E+10
Cs-137	2.0313E+00	18.94	37.88	0.00E+00	3.85E+01	7.69E+01	1.2500	2.776E+10
Eu-154	2.4513E-02	18.94	37.88	0.00E+00	4.84E-01	9.29E-01	1.7500	1.274E+09
Eu-155	4.8175E-03	18.94	37.88	0.00E+00	9.12E-02	1.82E-01	2.2500	1.118E+05
Fe-55	1.2397E-04	18.94	37.88	0.00E+00	2.35E-03	4.70E-03	2.7500	6.320E+04
H-3	4.5697E-03	18.94	37.88	0.00E+00	8.66E-02	1.73E-01	3.5000	2.903E+02
I-129	7.5300E-07	18.94	37.88	0.00E+00	1.43E-05	2.85E-05	5.0000	1.642E+01
Kr-85	1.0850E-01	18.94	37.88	0.00E+00	2.05E+00	4.11E+00	7.0000	1.813E+00
Np-237	9.5561E-06	18.94	37.88	0.00E+00	1.81E-04	3.62E-04	11.0000	2.032E-01
Pa-231	2.0359E-09	18.94	37.88	0.00E+00	3.86E-08	7.71E-08		
Pb-210	4.9728E-11	18.94	37.88	0.00E+00	9.42E-10	1.88E-09		
Pm-147	4.8502E-02	18.94	37.88	0.00E+00	9.18E-01	1.84E+00		
Pu-238	1.8254E-02	18.94	37.88	0.00E+00	3.46E-01	6.91E-01		
Pu-239	4.2810E-04	18.94	37.88	0.00E+00	8.11E-03	1.62E-02		
Pu-240	2.4368E-04	18.94	37.88	0.00E+00	4.62E-03	9.23E-03		
Pu-241	3.3415E-02	18.94	37.88	0.00E+00	6.33E-01	1.27E+00		
Pu-242	3.6329E-07	18.94	37.88	0.00E+00	6.88E-06	1.38E-05		
Ra-226	2.2854E-10	18.94	37.88	0.00E+00	4.33E-09	8.66E-09		
Ra-228	1.2426E-14	18.94	37.88	0.00E+00	2.35E-13	4.71E-13		
Ru-106	6.3589E-06	18.94	37.88	0.00E+00	1.20E-04	2.41E-04		
Se-79	1.2933E-05	18.94	37.88	0.00E+00	2.45E-04	4.90E-04		
Sn-126	1.1574E-05	18.94	37.88	0.00E+00	2.19E-04	4.38E-04		
Sr-90	1.9248E+00	18.94	37.88	0.00E+00	3.65E+01	7.29E+01		
Tc-99	4.2239E-04	18.94	37.88	0.00E+00	8.00E-03	1.60E-02		
Th-229	5.0953E-12	18.94	37.88	0.00E+00	9.85E-11	1.93E-10		
Th-230	4.1885E-08	18.94	37.88	0.00E+00	7.83E-07	1.59E-06		
Th-232	1.9270E-14	18.94	37.88	0.00E+00	3.65E-13	7.30E-13		
Ti-208	4.6024E-08	18.94	37.88	0.00E+00	8.72E-07	1.74E-06		
U-232	1.2582E-07	18.94	37.88	0.00E+00	2.38E-06	4.77E-06		
U-233	2.5825E-09	18.94	37.88	0.00E+00	4.89E-08	9.78E-08		
U-234	1.8450E-04	18.94	37.88	0.00E+00	3.49E-03	6.99E-03		
U-235	-2.7235E-06	18.94	0.00	2.82E-04	2.30E-04	2.82E-04		
U-236	1.5493E-05	18.94	37.88	0.00E+00	2.93E-04	5.87E-04		
U-238	-4.2851E-09	18.94	0.00	3.22E-06	3.14E-06	3.22E-06		
Y-90	1.9254E+00	18.94	37.88	0.00E+00	3.65E+01	7.29E+01		
Other Radionuclides					3.66E+01	7.33E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		18.94
Bounding:		37.88

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:	0.43	
Bounding:	0.86	

Estimated EOL HM/Given EOL HM
1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (UALX-HEU) AUSTRIA

SNF ID #: 738

Fuel Units & Descr: 14 - MTR TYPE

Heavy Metal Mass: BOL=5.6kg; EOL=4.858kg

ROD Storage Shr: SRS

Fuel decay start date:

2010

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:

20 years

Estimated

Canister usage:

16"x10"

0.58

II. Estimates

Radionuclide	m	x_a	x_b	b	y_a	y_b	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	702.69	1,405.38	0.00E+00	4.66E-07	9.32E-07	Avg. MeV	
Am-241	2.0060E-03	702.69	1,405.38	0.00E+00	1.41E+00	2.82E+00	0.0150	1.484E+14
Am-242m	4.2429E-07	702.69	1,405.38	0.00E+00	2.98E-04	5.96E-04	0.0250	3.085E+13
Am-243	1.4899E-06	702.69	1,405.38	0.00E+00	1.05E-03	2.09E-03	0.0375	2.691E+13
C-14	5.7135E-09	702.69	1,405.38	0.00E+00	4.01E-06	8.03E-06	0.0575	2.582E+13
Cl-36	1.3124E-32	702.69	1,405.38	0.00E+00	9.22E-30	1.84E-29	0.0850	1.741E+13
Cm-243	1.6443E-07	702.69	1,405.38	0.00E+00	1.16E-04	2.31E-04	0.1250	1.178E+13
Cm-244	2.9330E-05	702.69	1,405.38	0.00E+00	2.06E-02	4.12E-02	0.2250	1.503E+13
Co-60	5.3186E-06	702.69	1,405.38	0.00E+00	3.74E-03	7.47E-03	0.3750	6.541E+12
Cs-134	3.1563E-03	702.69	1,405.38	0.00E+00	2.22E+00	4.44E+00	0.5750	1.067E+14
Cs-135	3.4477E-06	702.69	1,405.38	0.00E+00	2.42E-03	4.85E-03	0.8500	1.804E+12
Cs-137	2.0313E+00	702.69	1,405.38	0.00E+00	1.43E+03	2.85E+03	1.2500	1.030E+12
Eu-154	2.4513E-02	702.69	1,405.38	0.00E+00	1.72E+01	3.44E+01	1.7500	4.728E+10
Eu-155	4.8175E-03	702.69	1,405.38	0.00E+00	3.39E+00	6.77E+00	2.2500	4.147E+06
Fe-55	1.2397E-04	702.69	1,405.38	0.00E+00	8.71E-02	1.74E-01	2.7500	2.345E+06
H-3	4.5697E-03	702.69	1,405.38	0.00E+00	3.21E+00	6.42E+00	3.5000	1.077E+04
I-129	7.5300E-07	702.69	1,405.38	0.00E+00	5.29E-04	1.06E-03	5.0000	6.092E+02
Kr-85	1.0850E-01	702.69	1,405.38	0.00E+00	7.62E+01	1.52E+02	7.0000	6.725E+01
Np-237	9.5581E-06	702.69	1,405.38	0.00E+00	6.71E-03	1.34E-02	11.0000	7.537E+00
Pa-231	2.0359E-09	702.69	1,405.38	0.00E+00	1.43E-06	2.86E-06		
Pb-210	4.9728E-11	702.69	1,405.38	0.00E+00	3.49E-08	6.99E-08		
Pm-147	4.8502E-02	702.69	1,405.38	0.00E+00	3.41E+01	6.82E+01		
Pu-238	1.8254E-02	702.69	1,405.38	0.00E+00	1.28E+01	2.57E+01		
Pu-239	4.2810E-04	702.69	1,405.38	0.00E+00	3.01E-01	6.02E-01		
Pu-240	2.4368E-04	702.69	1,405.38	0.00E+00	1.71E-01	3.42E-01		
Pu-241	3.3415E-02	702.69	1,405.38	0.00E+00	2.35E+01	4.70E+01		
Pu-242	3.6329E-07	702.69	1,405.38	0.00E+00	2.55E-04	5.11E-04		
Ra-226	2.2854E-10	702.69	1,405.38	0.00E+00	1.61E-07	3.21E-07		
Ra-228	1.2426E-14	702.69	1,405.38	0.00E+00	8.73E-12	1.75E-11		
Ru-106	6.3589E-06	702.69	1,405.38	0.00E+00	4.47E-03	8.94E-03		
Se-79	1.2933E-05	702.69	1,405.38	0.00E+00	9.09E-03	1.82E-02		
Sn-126	1.1574E-05	702.69	1,405.38	0.00E+00	8.13E-03	1.63E-02		
Sr-90	1.9248E+00	702.69	1,405.38	0.00E+00	1.35E+03	2.71E+03		
Tc-99	4.2239E-04	702.69	1,405.38	0.00E+00	2.97E-01	5.94E-01		
Th-229	5.0953E-12	702.69	1,405.38	0.00E+00	3.58E-09	7.16E-09		
Th-230	4.1885E-08	702.69	1,405.38	0.00E+00	2.94E-05	5.89E-05		
Th-232	1.9270E-14	702.69	1,405.38	0.00E+00	1.35E-11	2.71E-11		
Ti-208	4.6024E-08	702.69	1,405.38	0.00E+00	3.23E-05	6.47E-05		
U-232	1.2582E-07	702.69	1,405.38	0.00E+00	8.84E-05	1.77E-04		
U-233	2.5825E-09	702.69	1,405.38	0.00E+00	1.81E-06	3.63E-06		
U-234	1.8450E-04	702.69	1,405.38	0.00E+00	1.30E-01	2.59E-01		
U-235	-2.7235E-06	702.69	0.00	1.13E-02	9.36E-03	1.13E-02		
U-236	1.5493E-05	702.69	1,405.38	0.00E+00	1.09E-02	2.18E-02		
U-238	-4.2851E-09	702.69	0.00	1.29E-04	1.26E-04	1.29E-04		
Y-90	1.9254E+00	702.69	1,405.38	0.00E+00	1.35E+03	2.71E+03		
Other Radionuclides					1.36E+03	2.72E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		702.69
Bounding:		1,405.38

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.80	

Estimated EOL HM/Given EOL HM

1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR FMRB (GERMANY)
SNF ID #: 1066
Fuel Units & Descr: 18 - MTR TYPE
Heavy Metal Mass: BOL=2.57kg; EOL=2.282kg
ROD Storage Site: SRS

Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00118689
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.75

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	272.74	545.48	0.00E+00	5.47E-07	1.09E-06	Avg. MeV	
Am-241	2.5251E-03	272.74	545.48	0.00E+00	6.89E-01	1.38E+00	0.0150	4.018E+13
Am-242m	3.9624E-07	272.74	545.48	0.00E+00	1.08E-04	2.16E-04	0.0250	8.342E+12
Am-243	1.4880E-06	272.74	545.48	0.00E+00	4.06E-04	8.12E-04	0.0375	7.251E+12
C-14	5.7053E-09	272.74	545.48	0.00E+00	1.56E-06	3.11E-06	0.0575	7.805E+12
Cf-252	1.3124E-32	272.74	545.48	0.00E+00	3.58E-30	7.16E-30	0.0850	4.703E+12
Cm-243	1.1419E-07	272.74	545.48	0.00E+00	3.11E-05	6.23E-05	0.1250	3.106E+12
Cm-244	1.6522E-05	272.74	545.48	0.00E+00	4.51E-03	9.01E-03	0.2250	4.060E+12
Co-60	7.4047E-07	272.74	545.48	0.00E+00	2.02E-04	4.04E-04	0.3750	1.766E+12
Cs-134	2.0455E-05	272.74	545.48	0.00E+00	5.58E-03	1.12E-02	0.5750	2.919E+13
Cs-135	3.4477E-06	272.74	545.48	0.00E+00	9.40E-04	1.88E-03	0.8500	3.586E+11
Cs-137	1.4365E+00	272.74	545.48	0.00E+00	3.92E+02	7.84E+02	1.2500	1.725E+11
Eu-154	7.3230E-03	272.74	545.48	0.00E+00	2.00E+00	3.99E+00	1.7500	9.706E+09
Eu-155	5.9259E-04	272.74	545.48	0.00E+00	1.62E-01	3.23E-01	2.2500	8.115E+05
Fe-55	2.2791E-06	272.74	545.48	0.00E+00	6.22E-04	1.24E-03	2.7500	7.746E+05
H-3	1.9698E-03	272.74	545.48	0.00E+00	5.37E-01	1.07E+00	3.5000	4.492E+02
I-129	7.5300E-07	272.74	545.48	0.00E+00	2.05E-04	4.11E-04	5.0000	1.835E+02
Kr-85	4.1176E-02	272.74	545.48	0.00E+00	1.12E+01	2.25E+01	7.0000	2.009E+01
Np-237	9.5752E-06	272.74	545.48	0.00E+00	2.61E-03	5.22E-03	11.0000	2.239E+00
Pa-231	3.9379E-09	272.74	545.48	0.00E+00	1.07E-06	2.15E-06		
Pb-210	3.3115E-10	272.74	545.48	0.00E+00	9.03E-08	1.81E-07		
Pm-147	9.2402E-04	272.74	545.48	0.00E+00	2.52E-01	5.04E-01		
Pu-238	1.6217E-02	272.74	545.48	0.00E+00	4.42E+00	8.85E+00		
Pu-239	4.2810E-04	272.74	545.48	0.00E+00	1.17E-01	2.34E-01		
Pu-240	2.4333E-04	272.74	545.48	0.00E+00	6.64E-02	1.33E-01		
Pu-241	1.6242E-02	272.74	545.48	0.00E+00	4.43E+00	8.86E+00		
Pu-242	3.6329E-07	272.74	545.48	0.00E+00	9.91E-05	1.98E-04		
Ra-226	9.0144E-10	272.74	545.48	0.00E+00	2.46E-07	4.92E-07		
Ra-228	3.1019E-14	272.74	545.48	0.00E+00	8.46E-12	1.69E-11		
Ru-106	2.1225E-10	272.74	545.48	0.00E+00	5.79E-08	1.16E-07		
Se-79	1.2930E-05	272.74	545.48	0.00E+00	3.53E-03	7.06E-03		
Sn-126	1.1571E-05	272.74	545.48	0.00E+00	3.18E-03	6.31E-03		
Sr-90	1.3472E+00	272.74	545.48	0.00E+00	3.67E+02	7.35E+02		
Tc-99	4.2239E-04	272.74	545.48	0.00E+00	1.15E-01	2.30E-01		
Th-229	1.2407E-11	272.74	545.48	0.00E+00	3.38E-09	6.77E-09		
Th-230	8.3497E-08	272.74	545.48	0.00E+00	2.28E-05	4.55E-05		
Th-232	3.8371E-14	272.74	545.48	0.00E+00	1.05E-11	2.09E-11		
Th-238	4.0414E-08	272.74	545.48	0.00E+00	1.10E-05	2.20E-05		
U-232	1.0948E-07	272.74	545.48	0.00E+00	2.99E-05	5.97E-05		
U-233	3.6275E-09	272.74	545.48	0.00E+00	9.89E-07	1.98E-06		
U-234	1.8562E-04	272.74	545.48	0.00E+00	5.06E-02	1.01E-01		
U-235	-2.7235E-06	272.74	0.00	5.07E-03	4.33E-03	5.07E-03		
U-236	1.5493E-05	272.74	545.48	0.00E+00	4.23E-03	8.45E-03		
U-238	-4.2851E-09	272.74	0.00	7.55E-05	7.44E-05	7.55E-05		
Y-90	1.3475E+00	272.74	545.48	0.00E+00	3.68E+02	7.35E+02		
Other Radionuclides					3.73E+02	7.46E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.25787542	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		272.74
Bounding:		545.48

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:	0.34	
Bounding:	0.67	

Estimated EOL HM/Given EOL HM
1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX HEU) AUSTRALIA
 SNF ID #: 649
 Fuel Units & Descr: 12 - ASSEMBLY
 Heavy Metal Mass: BOL=3.32kg; EOL=3.317kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.50

II. Estimates

Radionuclide	m	Z ₀	Z ₁	b	Y ₀	Y ₁	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	3.41	6.82	0.00E+00	2.26E-09	4.52E-09	Avg. MeV	
Am-241	2.0060E-03	3.41	6.82	0.00E+00	6.84E-03	1.37E-02	0.0150	7.199E+11
Am-242m	4.2429E-07	3.41	6.82	0.00E+00	1.45E-06	2.89E-06	0.0250	1.497E+11
Am-243	1.4899E-06	3.41	6.82	0.00E+00	5.08E-06	1.02E-05	0.0375	1.305E+11
C-14	5.7135E-09	3.41	6.82	0.00E+00	1.95E-08	3.90E-08	0.0575	1.398E+11
Cl-36	1.3124E-32	3.41	6.82	0.00E+00	4.47E-32	8.95E-32	0.0850	8.451E+10
Cm-243	1.6443E-07	3.41	6.82	0.00E+00	5.61E-07	1.12E-06	0.1250	5.721E+10
Cm-244	2.9330E-05	3.41	6.82	0.00E+00	1.00E-04	2.00E-04	0.2250	7.304E+10
Co-60	5.3186E-06	3.41	6.82	0.00E+00	1.81E-05	3.63E-05	0.3750	3.174E+10
Cs-134	3.1563E-03	3.41	6.82	0.00E+00	1.08E-02	2.15E-02	0.5750	5.177E+11
Cs-135	3.4477E-06	3.41	6.82	0.00E+00	1.18E-05	2.35E-05	0.8500	8.752E+09
Cs-137	2.0313E+00	3.41	6.82	0.00E+00	6.93E+00	1.39E+01	1.2500	4.997E+09
Eu-154	2.4513E-02	3.41	6.82	0.00E+00	8.36E-02	1.67E-01	1.7500	2.294E+08
Eu-155	4.8175E-03	3.41	6.82	0.00E+00	1.64E-02	3.28E-02	2.2500	2.012E+04
Fe-55	1.2397E-04	3.41	6.82	0.00E+00	4.23E-04	8.45E-04	2.7500	1.138E+04
H-3	4.5697E-03	3.41	6.82	0.00E+00	1.56E-02	3.12E-02	3.5000	5.307E+01
I-129	7.5300E-07	3.41	6.82	0.00E+00	2.57E-06	5.13E-06	5.0000	3.297E+00
Kr-85	1.0850E-01	3.41	6.82	0.00E+00	3.70E-01	7.40E-01	7.0000	3.850E-01
Np-237	9.5561E-06	3.41	6.82	0.00E+00	3.26E-05	6.52E-05	11.0000	4.098E-02
Pa-231	2.0359E-09	3.41	6.82	0.00E+00	6.94E-09	1.39E-08		
Pb-210	4.9728E-11	3.41	6.82	0.00E+00	1.70E-10	3.39E-10		
Pm-147	4.8502E-02	3.41	6.82	0.00E+00	1.65E-01	3.31E-01		
Pu-238	1.8254E-02	3.41	6.82	0.00E+00	6.22E-02	1.24E-01		
Pu-239	4.2810E-04	3.41	6.82	0.00E+00	1.46E-03	2.92E-03		
Pu-240	2.4368E-04	3.41	6.82	0.00E+00	8.31E-04	1.66E-03		
Pu-241	3.3415E-02	3.41	6.82	0.00E+00	1.14E-01	2.28E-01		
Pu-242	3.6329E-07	3.41	6.82	0.00E+00	1.24E-06	2.48E-06		
Ra-226	2.2854E-10	3.41	6.82	0.00E+00	7.79E-10	1.56E-09		
Ra-228	1.2426E-14	3.41	6.82	0.00E+00	4.24E-14	8.47E-14		
Ru-106	6.3589E-06	3.41	6.82	0.00E+00	2.17E-05	4.34E-05		
Se-79	1.2933E-05	3.41	6.82	0.00E+00	4.41E-05	8.82E-05		
Sn-126	1.1574E-05	3.41	6.82	0.00E+00	3.95E-05	7.89E-05		
Sr-90	1.9248E+00	3.41	6.82	0.00E+00	6.56E+00	1.31E+01		
Tc-99	4.2239E-04	3.41	6.82	0.00E+00	1.44E-03	2.88E-03		
Th-229	5.0953E-12	3.41	6.82	0.00E+00	1.74E-11	3.47E-11		
Th-230	4.1885E-08	3.41	6.82	0.00E+00	1.43E-07	2.86E-07		
Th-232	1.9270E-14	3.41	6.82	0.00E+00	6.57E-14	1.31E-13		
Ti-206	4.6024E-08	3.41	6.82	0.00E+00	1.57E-07	3.14E-07		
U-232	1.2582E-07	3.41	6.82	0.00E+00	4.29E-07	8.58E-07		
U-233	2.5825E-09	3.41	6.82	0.00E+00	8.80E-09	1.76E-08		
U-234	1.8450E-04	3.41	6.82	0.00E+00	6.29E-04	1.26E-03		
U-235	-2.7235E-06	3.41	0.00	6.46E-03	6.45E-03	6.46E-03		
U-236	1.5493E-05	3.41	6.82	0.00E+00	5.28E-05	1.06E-04		
U-238	-4.2851E-09	3.41	0.00	1.12E-04	1.12E-04	1.12E-04		
Y-90	1.9254E+00	3.41	6.82	0.00E+00	6.56E+00	1.31E+01		
Other Radionuclides					6.59E+00	1.32E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SPD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.99938815	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)

	From SPD	Estimated
Nominal:		3.41
Bounding:		6.82

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) JAPAN
SNF ID #: 603
Fuel Units & Descr: 12 - MTR TYPE
Heavy Metal Mass: BOL=3.553kg; EOL=3.553kg
ROD Storage Site: SRS

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

Estimated
Canister usage:
18"x10"
0.33

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	6.6313E-10	67.30	134.60	0.00E+00	4.46E-08	8.93E-08	Avg. MeV	
Am-241	2.0060E-03	67.30	134.60	0.00E+00	1.35E-01	2.70E-01	0.0150	1.421E+13
Am-242m	4.2429E-07	67.30	134.60	0.00E+00	2.86E-05	5.71E-05	0.0250	2.954E+12
Am-243	1.4899E-06	67.30	134.60	0.00E+00	1.00E-04	2.01E-04	0.0375	2.577E+12
C-14	5.7135E-09	67.30	134.60	0.00E+00	3.85E-07	7.69E-07	0.0675	2.760E+12
Cl-36	1.3124E-32	67.30	134.60	0.00E+00	8.83E-31	1.77E-30	0.0850	1.868E+12
Cm-243	1.6443E-07	67.30	134.60	0.00E+00	1.11E-05	2.21E-05	0.1250	1.129E+12
Cm-244	2.6330E-05	67.30	134.60	0.00E+00	1.97E-03	3.95E-03	0.2250	1.439E+12
Co-60	5.3186E-06	67.30	134.60	0.00E+00	3.58E-04	7.16E-04	0.3750	6.265E+11
Cs-134	3.1563E-03	67.30	134.60	0.00E+00	2.12E-01	4.25E-01	0.5750	1.022E+13
Cs-135	3.4477E-06	67.30	134.60	0.00E+00	2.32E-04	4.64E-04	0.8500	1.728E+11
Cs-137	2.0313E+00	67.30	134.60	0.00E+00	1.37E+02	2.73E+02	1.2500	9.865E+10
Eu-154	2.4513E-02	67.30	134.60	0.00E+00	1.65E+00	3.30E+00	1.7500	4.528E+09
Eu-155	4.8175E-03	67.30	134.60	0.00E+00	3.24E-01	6.48E-01	2.2500	3.972E+06
Fe-55	1.2397E-04	67.30	134.60	0.00E+00	8.34E-03	1.67E-02	2.7500	2.245E+05
H-3	4.5697E-03	67.30	134.60	0.00E+00	3.08E-01	6.15E-01	3.5000	1.032E+03
I-129	7.5300E-07	67.30	134.60	0.00E+00	5.07E-05	1.01E-04	6.0000	5.867E+01
Kr-85	1.0850E-01	67.30	134.60	0.00E+00	7.30E+00	1.46E+01	7.0000	6.478E+00
Np-237	9.5561E-06	67.30	134.60	0.00E+00	6.43E-04	1.29E-03	11.0000	7.261E-01
Pa-231	2.0359E-09	67.30	134.60	0.00E+00	1.37E-07	2.74E-07		
Pb-210	4.9728E-11	67.30	134.60	0.00E+00	3.35E-09	6.69E-09		
Pm-147	4.8502E-02	67.30	134.60	0.00E+00	3.26E+00	6.53E+00		
Pu-238	1.8254E-02	67.30	134.60	0.00E+00	1.23E+00	2.46E+00		
Pu-239	4.2810E-04	67.30	134.60	0.00E+00	2.88E-02	5.76E-02		
Pu-240	2.4368E-04	67.30	134.60	0.00E+00	1.64E-02	3.28E-02		
Pu-241	3.3415E-02	67.30	134.60	0.00E+00	2.25E+00	4.50E+00		
Pu-242	3.6329E-07	67.30	134.60	0.00E+00	2.44E-05	4.89E-05		
Ra-226	2.2854E-10	67.30	134.60	0.00E+00	1.54E-08	3.08E-08		
Ra-228	1.2426E-14	67.30	134.60	0.00E+00	8.36E-13	1.67E-12		
Ru-106	6.3589E-06	67.30	134.60	0.00E+00	4.28E-04	8.56E-04		
Se-79	1.2933E-05	67.30	134.60	0.00E+00	8.70E-04	1.74E-03		
Sn-126	1.1574E-05	67.30	134.60	0.00E+00	7.79E-04	1.56E-03		
Sr-90	1.9248E+00	67.30	134.60	0.00E+00	1.30E+02	2.59E+02		
Tc-99	4.2239E-04	67.30	134.60	0.00E+00	2.84E-02	5.69E-02		
Th-229	5.0953E-12	67.30	134.60	0.00E+00	3.43E-10	6.86E-10		
Th-230	4.1885E-08	67.30	134.60	0.00E+00	2.82E-06	5.64E-06		
Th-232	1.9270E-14	67.30	134.60	0.00E+00	1.30E-12	2.59E-12		
Ti-208	4.8024E-08	67.30	134.60	0.00E+00	3.10E-06	6.19E-06		
U-232	1.2582E-07	67.30	134.60	0.00E+00	8.47E-06	1.69E-05		
U-233	2.5825E-09	67.30	134.60	0.00E+00	1.74E-07	3.48E-07		
U-234	1.8450E-04	67.30	134.60	0.00E+00	1.24E-02	2.48E-02		
U-235	-2.7235E-06	67.30	0.00	6.90E-03	6.71E-03	6.90E-03		
U-236	1.5493E-05	67.30	134.60	0.00E+00	1.04E-03	2.09E-03		
U-238	-4.2851E-09	67.30	0.00	1.22E-04	1.21E-04	1.22E-04		
Y-90	1.9254E+00	67.30	134.60	0.00E+00	1.30E+02	2.59E+02		
Other Radionuclides					1.30E+02	2.60E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	89.81998522	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	67.30	67.30	
Bounding:	134.60	134.60	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.06	0.06	
Bounding:	0.12	0.12	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX+HEU) JAPAN
SNF ID #: 605
Fuel Units & Descr: 81 - MTR TYPE
Heavy Metal Mass: BOL=24.81kg; EOL=24.78kg
ROD Storage Site: SRS

*Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
*Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116698
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
3.38

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	30.68	61.37	0.00E+00	2.03E-08	4.07E-08	Avg. MeV	
Am-241	2.0060E-03	30.68	61.37	0.00E+00	6.16E-02	1.23E-01	0.0150	6.479E+12
Am-242m	4.2429E-07	30.68	61.37	0.00E+00	1.30E-05	2.60E-05	0.0250	1.347E+12
Am-243	1.4899E-06	30.68	61.37	0.00E+00	4.57E-05	9.14E-05	0.0375	1.175E+12
C-14	5.7135E-09	30.68	61.37	0.00E+00	1.75E-07	3.51E-07	0.0575	1.258E+12
Cl-36	1.3124E-32	30.68	61.37	0.00E+00	4.03E-31	8.05E-31	0.0850	7.606E+11
Cm-243	1.6443E-07	30.68	61.37	0.00E+00	5.05E-06	1.01E-05	0.1250	5.149E+11
Cm-244	2.9330E-05	30.68	61.37	0.00E+00	9.00E-04	1.80E-03	0.2250	6.572E+11
Co-60	5.3186E-06	30.68	61.37	0.00E+00	1.63E-04	3.26E-04	0.3750	2.856E+11
Cs-134	3.1563E-03	30.68	61.37	0.00E+00	9.68E-02	1.94E-01	0.5750	4.659E+12
Cs-135	3.4477E-08	30.68	61.37	0.00E+00	1.06E-04	2.12E-04	0.8500	7.877E+10
Cs-137	2.0313E+00	30.68	61.37	0.00E+00	6.23E+01	1.25E+02	1.2500	4.498E+10
Eu-154	2.4513E-02	30.68	61.37	0.00E+00	7.52E-01	1.50E+00	1.7500	2.064E+09
Eu-155	4.8175E-03	30.68	61.37	0.00E+00	1.48E-01	2.96E-01	2.2500	1.811E+05
Fe-55	1.2397E-04	30.68	61.37	0.00E+00	3.80E-03	7.61E-03	2.7500	1.024E+05
H-3	4.5697E-03	30.68	61.37	0.00E+00	1.40E-01	2.80E-01	3.5000	4.751E+02
I-129	7.5300E-07	30.68	61.37	0.00E+00	2.31E-05	4.62E-05	5.0000	2.860E+01
Kr-85	1.0850E-01	30.68	61.37	0.00E+00	3.33E+00	6.66E+00	7.0000	3.182E+00
Np-237	9.5581E-06	30.68	61.37	0.00E+00	2.93E-04	5.86E-04	11.0000	3.547E-01
Pa-231	2.0359E-09	30.68	61.37	0.00E+00	6.25E-08	1.25E-07		
Pb-210	4.9728E-11	30.68	61.37	0.00E+00	1.53E-09	3.05E-09		
Pm-147	4.8502E-02	30.68	61.37	0.00E+00	1.49E+00	2.98E+00		
Pu-238	1.8254E-02	30.68	61.37	0.00E+00	5.80E-01	1.12E+00		
Pu-239	4.2810E-04	30.68	61.37	0.00E+00	1.31E-02	2.63E-02		
Pu-240	2.4368E-04	30.68	61.37	0.00E+00	7.48E-03	1.50E-02		
Pu-241	3.3415E-02	30.68	61.37	0.00E+00	1.03E+00	2.05E+00		
Pu-242	3.6329E-07	30.68	61.37	0.00E+00	1.11E-05	2.23E-05		
Ra-226	2.2854E-10	30.68	61.37	0.00E+00	7.01E-09	1.40E-08		
Ra-228	1.2426E-14	30.68	61.37	0.00E+00	3.81E-13	7.63E-13		
Ru-106	6.3589E-06	30.68	61.37	0.00E+00	1.95E-04	3.90E-04		
Se-79	1.2933E-05	30.68	61.37	0.00E+00	3.97E-04	7.94E-04		
Sn-126	1.1574E-05	30.68	61.37	0.00E+00	3.55E-04	7.10E-04		
Sr-90	1.9248E+00	30.68	61.37	0.00E+00	5.91E+01	1.18E+02		
Tc-99	4.2230E-04	30.68	61.37	0.00E+00	1.30E-02	2.59E-02		
Th-229	5.0953E-12	30.68	61.37	0.00E+00	1.56E-10	3.13E-10		
Th-230	4.1885E-08	30.68	61.37	0.00E+00	1.29E-06	2.57E-06		
Th-232	1.9270E-14	30.68	61.37	0.00E+00	5.91E-13	1.18E-12		
Th-208	4.6024E-08	30.68	61.37	0.00E+00	1.41E-06	2.82E-06		
U-232	1.2582E-07	30.68	61.37	0.00E+00	3.86E-06	7.72E-06		
U-233	2.5825E-09	30.68	61.37	0.00E+00	7.92E-08	1.58E-07	Thermal Power	
U-234	1.8450E-04	30.68	61.37	0.00E+00	5.66E-03	1.13E-02	Nominal Heat	Bounding
U-235	-2.7235E-06	30.68	0.00	4.99E-02	4.98E-02	4.99E-02	Output	Heat Output
U-236	1.5493E-05	30.68	61.37	0.00E+00	4.75E-04	9.51E-04	(Watts)	(Watts)
U-238	-4.2851E-09	30.68	0.00	5.84E-04	5.84E-04	5.84E-04	7.33E-01	1.46E+00
Y-90	1.9254E+00	30.68	61.37	0.00E+00	5.91E+01	1.18E+02	Total	Total
Other Radionuclides					5.93E+01	1.19E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000613	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		30.68
Bounding:		61.37

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (JALX-HEU) NETHERLANDS
 SNF ID #: 609
 Fuel Units & Descr: 14 - MTR TYPE
 Heavy Metal Mass: BOL=3.192kg; EOL=3.188kg
 ROD Storage Site: SRS

*Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.58

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)	Gamma Sources
Ac-227	6.6313E-10	3.98	7.96	0.00E+00	2.64E-09	5.28E-09	Photon Energy Group
Am-241	2.0060E-03	3.98	7.96	0.00E+00	7.98E-03	1.60E-02	Total Photons/sec (bounding)
Am-242m	4.2429E-07	3.98	7.96	0.00E+00	1.69E-06	3.38E-06	Avg. MeV
Am-243	1.4899E-06	3.98	7.96	0.00E+00	5.93E-06	1.19E-05	0.0150 8.399E+11
C-14	5.7135E-09	3.98	7.96	0.00E+00	2.27E-08	4.55E-08	0.0250 1.746E+11
Cl-36	1.3124E-32	3.98	7.96	0.00E+00	5.22E-32	1.04E-31	0.0375 1.523E+11
Cm-243	1.6443E-07	3.98	7.96	0.00E+00	6.54E-07	1.31E-06	0.0575 1.831E+11
Cm-244	2.9330E-05	3.98	7.96	0.00E+00	1.17E-04	2.33E-04	0.0850 9.859E+10
Co-60	5.3186E-06	3.98	7.96	0.00E+00	2.12E-05	4.23E-05	0.1250 6.674E+10
Cs-134	3.1563E-03	3.98	7.96	0.00E+00	1.26E-02	2.51E-02	0.2250 8.519E+10
Cs-135	3.4477E-06	3.98	7.96	0.00E+00	1.37E-05	2.74E-05	0.3750 3.703E+10
Cs-137	2.0313E+00	3.98	7.96	0.00E+00	8.08E+00	1.62E+01	0.5750 6.040E+11
Eu-154	2.4513E-02	3.98	7.96	0.00E+00	9.75E-02	1.95E-01	0.8500 1.021E+10
Eu-155	4.8175E-03	3.98	7.96	0.00E+00	1.92E-02	3.83E-02	1.2500 5.830E+09
Fe-55	1.2397E-04	3.98	7.96	0.00E+00	4.93E-04	9.86E-04	1.7500 2.678E+08
H-3	4.5697E-03	3.98	7.96	0.00E+00	1.82E-02	3.64E-02	2.2500 2.348E+04
I-129	7.5300E-07	3.98	7.96	0.00E+00	3.00E-06	5.99E-06	2.7500 1.327E+04
Kr-85	1.0850E-01	3.98	7.96	0.00E+00	4.32E-01	8.63E-01	3.5000 6.158E+01
Np-237	9.5561E-06	3.98	7.96	0.00E+00	3.80E-05	7.60E-05	5.0000 3.705E+00
Pa-231	2.0359E-09	3.98	7.96	0.00E+00	8.10E-09	1.62E-08	7.0000 4.086E-01
Pb-210	4.9728E-11	3.98	7.96	0.00E+00	1.98E-10	3.96E-10	11.0000 4.595E-02
Pm-147	4.8502E-02	3.98	7.96	0.00E+00	1.93E-01	3.86E-01	
Pu-238	1.8254E-02	3.98	7.96	0.00E+00	7.26E-02	1.45E-01	
Pu-239	4.2810E-04	3.98	7.96	0.00E+00	1.70E-03	3.41E-03	
Pu-240	2.4368E-04	3.98	7.96	0.00E+00	9.69E-04	1.94E-03	
Pu-241	3.3415E-02	3.98	7.96	0.00E+00	1.33E-01	2.66E-01	
Pu-242	3.6329E-07	3.98	7.96	0.00E+00	1.44E-06	2.89E-06	
Ra-226	2.2854E-10	3.98	7.96	0.00E+00	9.09E-10	1.82E-09	
Ra-228	1.2426E-14	3.98	7.96	0.00E+00	4.94E-14	9.89E-14	
Ru-106	6.3589E-06	3.98	7.96	0.00E+00	2.53E-05	5.06E-05	
Se-79	1.2933E-05	3.98	7.96	0.00E+00	5.14E-05	1.03E-04	
Sn-126	1.1574E-05	3.98	7.96	0.00E+00	4.60E-05	9.21E-05	
Sr-90	1.8248E+00	3.98	7.96	0.00E+00	7.66E+00	1.53E+01	
Tc-99	4.2239E-04	3.98	7.96	0.00E+00	1.68E-03	3.36E-03	
Th-229	5.0953E-12	3.98	7.96	0.00E+00	2.03E-11	4.05E-11	
Th-230	4.1885E-08	3.98	7.96	0.00E+00	1.67E-07	3.33E-07	
Th-232	1.9270E-14	3.98	7.96	0.00E+00	7.66E-14	1.53E-13	
Ti-208	4.6024E-08	3.98	7.96	0.00E+00	1.83E-07	3.66E-07	
U-232	1.2582E-07	3.98	7.96	0.00E+00	5.00E-07	1.00E-06	
U-233	2.5825E-08	3.98	7.96	0.00E+00	1.03E-06	2.05E-06	
U-234	1.8450E-04	3.98	7.96	0.00E+00	7.34E-04	1.47E-03	
U-235	-2.7235E-06	3.98	0.00	8.42E-03	6.40E-03	6.42E-03	
U-236	1.5493E-05	3.98	7.96	0.00E+00	6.16E-05	1.23E-04	
U-238	-4.2851E-09	3.98	0.00	7.51E-05	7.51E-05	7.51E-05	
Y-90	1.9254E+00	3.98	7.96	0.00E+00	7.66E+00	1.53E+01	
Other Radionuclides					7.69E+00	1.54E+01	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999964	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		3.98
Bounding:		7.96

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:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM
 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) TAIWAN
 SNF ID #: 628
 Fuel Units & Descr: 35 - MTR TYPE
 Heavy Metal Mass: BOL=4.764kg; EOL=4.76kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 80 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (BHT): 0.00116689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 1.46

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	6.6313E-10	3.31	6.63	0.00E+00	2.20E-09	4.40E-09	Avg. MeV	
Am-241	2.0060E-03	3.31	6.63	0.00E+00	6.65E-03	1.33E-02	0.0150	7.000E+11
Am-242m	4.2429E-07	3.31	6.63	0.00E+00	1.41E-06	2.81E-06	0.0250	1.455E+11
Am-243	1.4899E-06	3.31	6.63	0.00E+00	4.94E-06	9.88E-06	0.0375	1.269E+11
C-14	5.7135E-09	3.31	6.63	0.00E+00	1.89E-08	3.79E-08	0.0575	1.359E+11
Cl-36	1.3124E-32	3.31	6.63	0.00E+00	4.35E-32	8.70E-32	0.0850	8.217E+10
Cm-243	1.6443E-07	3.31	6.63	0.00E+00	5.45E-07	1.09E-06	0.1250	5.564E+10
Cm-244	2.9330E-05	3.31	6.63	0.00E+00	9.72E-05	1.94E-04	0.2250	7.107E+10
Co-60	5.3186E-06	3.31	6.63	0.00E+00	1.76E-05	3.53E-05	0.3750	3.086E+10
Cs-134	3.1563E-03	3.31	6.63	0.00E+00	1.05E-02	2.09E-02	0.5750	5.033E+11
Cs-135	3.4477E-06	3.31	6.63	0.00E+00	1.14E-05	2.29E-05	0.8500	8.509E+09
Cs-137	2.0313E+00	3.31	6.63	0.00E+00	6.73E+00	1.35E+01	1.2500	4.859E+09
Eu-154	2.4513E-02	3.31	6.63	0.00E+00	8.12E-02	1.62E-01	1.7500	2.230E+08
Eu-155	4.8175E-03	3.31	6.63	0.00E+00	1.60E-02	3.19E-02	2.2500	1.956E+04
Fe-55	1.2397E-04	3.31	6.63	0.00E+00	4.11E-04	8.22E-04	2.7500	1.106E+04
H-3	4.5697E-03	3.31	6.63	0.00E+00	1.51E-02	3.03E-02	3.5000	5.171E+01
I-129	7.5300E-07	3.31	6.63	0.00E+00	2.50E-06	4.99E-06	5.0000	3.252E+00
Kr-85	1.0850E-01	3.31	6.63	0.00E+00	3.60E-01	7.19E-01	7.0000	3.596E-01
Np-237	9.5581E-06	3.31	6.63	0.00E+00	3.17E-05	6.33E-05	11.0000	4.039E-02
Pa-231	2.0359E-09	3.31	6.63	0.00E+00	6.75E-09	1.35E-08		
Pb-210	4.9728E-11	3.31	6.63	0.00E+00	1.65E-10	3.30E-10		
Pm-147	4.8502E-02	3.31	6.63	0.00E+00	1.61E-01	3.22E-01		
Pu-238	1.8254E-02	3.31	6.63	0.00E+00	6.05E-02	1.21E-01		
Pu-239	4.2810E-04	3.31	6.63	0.00E+00	1.42E-03	2.84E-03		
Pu-240	2.4368E-04	3.31	6.63	0.00E+00	8.08E-04	1.62E-03		
Pu-241	3.3415E-02	3.31	6.63	0.00E+00	1.11E-01	2.22E-01		
Pu-242	3.6329E-07	3.31	6.63	0.00E+00	1.20E-06	2.41E-06		
Ra-226	2.2854E-10	3.31	6.63	0.00E+00	7.58E-10	1.52E-09		
Ra-228	1.2426E-14	3.31	6.63	0.00E+00	4.12E-14	8.24E-14		
Ru-106	6.3589E-06	3.31	6.63	0.00E+00	2.11E-05	4.22E-05		
Se-79	1.2933E-05	3.31	6.63	0.00E+00	4.29E-05	8.57E-05		
Sn-126	1.1574E-05	3.31	6.63	0.00E+00	3.84E-05	7.67E-05		
Sr-90	1.9248E+00	3.31	6.63	0.00E+00	6.38E+00	1.28E+01		
Tc-99	4.2239E-04	3.31	6.63	0.00E+00	1.40E-03	2.80E-03		
Th-229	5.0953E-12	3.31	6.63	0.00E+00	1.69E-11	3.38E-11		
Th-230	4.1885E-08	3.31	6.63	0.00E+00	1.39E-07	2.78E-07		
Th-232	1.9270E-14	3.31	6.63	0.00E+00	6.39E-14	1.28E-13		
Ti-206	4.6024E-08	3.31	6.63	0.00E+00	1.53E-07	3.05E-07		
U-232	1.2582E-07	3.31	6.63	0.00E+00	4.17E-07	8.34E-07		
U-233	2.5825E-09	3.31	6.63	0.00E+00	8.56E-09	1.71E-08		
U-234	1.8450E-04	3.31	6.63	0.00E+00	6.12E-04	1.22E-03		
U-235	-2.7235E-06	3.31	0.00	9.59E-03	9.58E-03	9.59E-03		
U-236	1.5493E-05	3.31	6.63	0.00E+00	5.14E-05	1.03E-04		
U-238	-4.2851E-09	3.31	0.00	1.09E-04	1.09E-04	1.09E-04		
Y-90	1.9254E+00	3.31	6.63	0.00E+00	6.38E+00	1.28E+01		
Other Radionuclides					6.41E+00	1.28E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1900561	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		3.31
Bounding:		6.63

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.00	

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: FRR MTR (UALX-LEU) ARGENTINA
SNF ID #: 547
Fuel Units & Descr: 30 - ASSEMBLY
Heavy Metal Mass: BOL=18.75kg; EOL=18.714kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
1.25

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	34.09	68.19	0.00E+00	2.26E-08	4.52E-08	Avg. MeV	
Am-241	2.0060E-03	34.09	68.19	0.00E+00	6.84E-02	1.37E-01	0.0150	7.198E+12
Am-242m	4.2429E-07	34.09	68.19	0.00E+00	1.45E-05	2.89E-05	0.0250	1.497E+12
Am-243	1.4899E-06	34.09	68.19	0.00E+00	5.08E-05	1.02E-04	0.0375	1.305E+12
C-14	5.7135E-09	34.09	68.19	0.00E+00	1.95E-07	3.90E-07	0.0575	1.398E+12
Cl-36	1.3124E-32	34.09	68.19	0.00E+00	4.47E-31	8.95E-31	0.0850	8.450E+11
Cm-243	1.6443E-07	34.09	68.19	0.00E+00	5.61E-06	1.12E-05	0.1250	5.718E+11
Cm-244	2.8330E-05	34.09	68.19	0.00E+00	1.00E-03	2.00E-03	0.2250	7.282E+11
Co-60	5.3186E-06	34.09	68.19	0.00E+00	1.81E-04	3.63E-04	0.3750	3.174E+11
Cs-134	3.1563E-03	34.09	68.19	0.00E+00	1.08E-01	2.15E-01	0.5750	5.177E+12
Cs-135	3.4477E-06	34.09	68.19	0.00E+00	1.18E-04	2.35E-04	0.8500	8.752E+10
Cs-137	2.0313E+00	34.09	68.19	0.00E+00	6.93E+01	1.39E+02	1.2500	4.897E+10
Eu-154	2.4513E-02	34.09	68.19	0.00E+00	8.36E-01	1.67E+00	1.7500	2.294E+09
Eu-155	4.8175E-03	34.09	68.19	0.00E+00	1.64E-01	3.28E-01	2.2500	2.013E+05
Fe-55	1.2397E-04	34.09	68.19	0.00E+00	4.23E-03	8.45E-03	2.7500	1.138E+05
H-3	4.5697E-03	34.09	68.19	0.00E+00	1.56E-01	3.12E-01	3.5000	5.497E+02
I-129	7.5300E-07	34.09	68.19	0.00E+00	2.57E-05	5.13E-05	5.0000	4.118E+01
Kr-85	1.0850E-01	34.09	68.19	0.00E+00	3.70E+00	7.40E+00	7.0000	4.602E+00
Np-237	9.5561E-06	34.09	68.19	0.00E+00	3.26E-04	6.52E-04	11.0000	5.197E-01
Pa-231	2.0359E-09	34.09	68.19	0.00E+00	6.94E-08	1.39E-07		
Pb-210	4.9728E-11	34.09	68.19	0.00E+00	1.70E-09	3.39E-09		
Pm-147	4.8502E-02	34.09	68.19	0.00E+00	1.65E+00	3.31E+00		
Pu-238	1.8254E-02	34.09	68.19	0.00E+00	6.22E-01	1.24E+00		
Pu-239	4.2810E-04	34.09	68.19	0.00E+00	1.46E-02	2.92E-02		
Pu-240	2.4368E-04	34.09	68.19	0.00E+00	8.31E-03	1.66E-02		
Pu-241	3.3415E-02	34.09	68.19	0.00E+00	1.14E+00	2.28E+00		
Pu-242	3.6329E-07	34.09	68.19	0.00E+00	1.24E-05	2.48E-05		
Ra-226	2.2854E-10	34.09	68.19	0.00E+00	7.79E-09	1.56E-08		
Ra-228	1.2426E-14	34.09	68.19	0.00E+00	4.24E-13	8.47E-13		
Ru-106	6.3589E-06	34.09	68.19	0.00E+00	2.17E-04	4.34E-04		
Se-79	1.2933E-05	34.09	68.19	0.00E+00	4.41E-04	8.82E-04		
Sn-126	1.1574E-05	34.09	68.19	0.00E+00	3.95E-04	7.89E-04		
Sr-90	1.9248E+00	34.09	68.19	0.00E+00	6.56E+01	1.31E+02		
Tc-99	4.2239E-04	34.09	68.19	0.00E+00	1.44E-02	2.88E-02		
Th-229	5.0953E-12	34.09	68.19	0.00E+00	1.74E-10	3.47E-10		
Th-230	4.1885E-08	34.09	68.19	0.00E+00	1.43E-06	2.86E-06		
Th-232	1.8270E-14	34.09	68.19	0.00E+00	6.57E-13	1.31E-12		
Th-208	4.6024E-08	34.09	68.19	0.00E+00	1.57E-06	3.14E-06		
U-232	1.2582E-07	34.09	68.19	0.00E+00	4.29E-06	8.58E-06		
U-233	2.5825E-09	34.09	68.19	0.00E+00	8.80E-08	1.76E-07		
U-234	1.8450E-04	34.09	68.19	0.00E+00	6.29E-03	1.26E-02		
U-235	-2.7235E-06	34.09	0.00	8.10E-03	8.01E-03	8.10E-03		
U-236	1.5493E-05	34.09	68.19	0.00E+00	5.28E-04	1.06E-03		
U-238	-4.2851E-09	34.09	0.00	5.04E-03	5.04E-03	5.04E-03		
Y-90	1.9254E+00	34.09	68.19	0.00E+00	6.56E+01	1.31E+02		
Other Radionuclides					6.59E+01	1.32E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		34.09	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		68.19	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) JAPAN
SNF ID #: 551
Fuel Units & Deser: 27 - ASSEMBLY
Heavy Metal Mass: BOL=17.482kg; EOL=17.469kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
1.13

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	12.78	25.57	0.00E+00	8.48E-09	1.70E-08	Avg. MeV	
Am-241	2.0060E-03	12.78	25.57	0.00E+00	2.56E-02	5.13E-02	0.0150	2.699E+12
Am-242m	4.2429E-07	12.78	25.57	0.00E+00	5.42E-06	1.08E-05	0.0250	5.813E+11
Am-243	1.4899E-08	12.78	25.57	0.00E+00	1.90E-05	3.81E-05	0.0375	4.896E+11
C-14	5.7135E-09	12.78	25.57	0.00E+00	7.30E-08	1.46E-07	0.0675	5.243E+11
Cl-38	1.3124E-32	12.78	25.57	0.00E+00	1.68E-31	3.36E-31	0.0850	3.189E+11
Cm-243	1.6443E-07	12.78	25.57	0.00E+00	2.10E-06	4.20E-06	0.1250	2.145E+11
Cm-244	2.9330E-05	12.78	25.57	0.00E+00	3.75E-04	7.50E-04	0.2250	2.735E+11
Co-60	5.3186E-08	12.78	25.57	0.00E+00	6.80E-05	1.36E-04	0.3750	1.190E+11
Ce-134	3.1563E-03	12.78	25.57	0.00E+00	4.04E-02	8.07E-02	0.5750	1.941E+12
Ce-135	3.4477E-08	12.78	25.57	0.00E+00	4.41E-05	8.82E-05	0.8500	3.282E+10
Ce-137	2.0313E+00	12.78	25.57	0.00E+00	2.60E+01	5.19E+01	1.2500	1.874E+10
Eu-154	2.4513E-02	12.78	25.57	0.00E+00	3.13E-01	6.27E-01	1.7500	8.602E+08
Eu-155	4.8175E-03	12.78	25.57	0.00E+00	6.16E-02	1.23E-01	2.2500	7.550E+04
Fe-55	1.2397E-04	12.78	25.57	0.00E+00	1.58E-03	3.17E-03	2.7500	4.269E+04
H-3	4.5697E-03	12.78	25.57	0.00E+00	5.84E-02	1.17E-01	3.5000	2.212E+02
I-129	7.5300E-07	12.78	25.57	0.00E+00	9.63E-06	1.93E-05	5.0000	2.194E+01
Kr-85	1.0850E-01	12.78	25.57	0.00E+00	1.39E+00	2.77E+00	7.0000	2.474E+00
Np-237	9.5561E-08	12.78	25.57	0.00E+00	1.22E-04	2.44E-04	11.0000	2.809E-01
Pa-231	2.0359E-08	12.78	25.57	0.00E+00	2.60E-08	5.21E-08		
Pb-210	4.9728E-11	12.78	25.57	0.00E+00	6.36E-10	1.27E-09		
Pm-147	4.8502E-02	12.78	25.57	0.00E+00	6.20E-01	1.24E+00		
Pu-238	1.8254E-02	12.78	25.57	0.00E+00	2.33E-01	4.67E-01		
Pu-239	4.2810E-04	12.78	25.57	0.00E+00	5.47E-03	1.09E-02		
Pu-240	2.4368E-04	12.78	25.57	0.00E+00	3.12E-03	6.23E-03		
Pu-241	3.3415E-02	12.78	25.57	0.00E+00	4.27E-01	8.54E-01		
Pu-242	3.6329E-07	12.78	25.57	0.00E+00	4.64E-06	9.29E-06		
Ra-226	2.2854E-10	12.78	25.57	0.00E+00	2.92E-09	5.84E-09		
Ra-228	1.2426E-14	12.78	25.57	0.00E+00	1.59E-13	3.18E-13		
Ru-106	6.3589E-08	12.78	25.57	0.00E+00	8.13E-05	1.63E-04		
Se-79	1.2933E-05	12.78	25.57	0.00E+00	1.65E-04	3.31E-04		
Sn-126	1.1574E-05	12.78	25.57	0.00E+00	1.48E-04	2.96E-04		
Sr-90	1.9248E+00	12.78	25.57	0.00E+00	2.46E+01	4.92E+01		
Tc-99	4.2239E-04	12.78	25.57	0.00E+00	5.40E-03	1.08E-02		
Th-229	5.0953E-12	12.78	25.57	0.00E+00	6.51E-11	1.30E-10		
Th-230	4.1885E-08	12.78	25.57	0.00E+00	5.35E-07	1.07E-06		
Th-232	1.9270E-14	12.78	25.57	0.00E+00	2.46E-13	4.93E-13		
Ti-208	4.6024E-08	12.78	25.57	0.00E+00	5.88E-07	1.18E-06		
U-232	1.2582E-07	12.78	25.57	0.00E+00	1.61E-06	3.22E-06		
U-233	2.5825E-09	12.78	25.57	0.00E+00	3.30E-08	6.60E-08		
U-234	1.8450E-04	12.78	25.57	0.00E+00	2.36E-03	4.72E-03		
U-235	-2.7235E-06	12.78	0.00	7.56E-03	7.52E-03	7.56E-03		
U-238	1.5493E-05	12.78	25.57	0.00E+00	1.98E-04	3.96E-04		
U-238	-4.2851E-08	12.78	0.00	4.70E-03	4.70E-03	4.70E-03		
Y-90	1.9254E+00	12.78	25.57	0.00E+00	2.46E+01	4.92E+01		
Other Radionuclides					2.47E+01	4.95E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000092	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:		12.78
Bounding:		25.57

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.00	

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: FRR MTR (UAX-LEU) TAIWAN
SNF ID #: 555
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass: BOL=34.797kg; EOL=34.797kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.96

II. Estimates	m	λ_n	λ_b	b	γ_n	γ_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	6.6313E-10	659.06	1,318.13	0.00E+00	4.37E-07	8.74E-07	Avg. MeV	
Am-241	2.0060E-03	659.06	1,318.13	0.00E+00	1.32E+00	2.64E+00	0.0150	1.391E+14
Am-242m	4.2429E-07	659.06	1,318.13	0.00E+00	2.80E-04	5.59E-04	0.0250	2.893E+13
Am-243	1.4899E-06	659.06	1,318.13	0.00E+00	9.82E-04	1.96E-03	0.0375	2.624E+13
C-14	5.7135E-09	659.06	1,318.13	0.00E+00	3.77E-06	7.53E-06	0.0575	2.703E+13
Cl-36	1.3124E-32	659.06	1,318.13	0.00E+00	8.65E-30	1.73E-29	0.0650	1.633E+13
Cm-243	1.6443E-07	659.06	1,318.13	0.00E+00	1.08E-04	2.17E-04	0.1250	1.105E+13
Cm-244	2.9330E-05	659.06	1,318.13	0.00E+00	1.93E-02	3.87E-02	0.2250	1.409E+13
Co-60	5.3186E-06	659.06	1,318.13	0.00E+00	3.51E-03	7.01E-03	0.3750	6.135E+12
Cs-134	3.1563E-03	659.06	1,318.13	0.00E+00	2.08E+00	4.16E+00	0.5750	1.001E+14
Cs-135	3.4477E-06	659.06	1,318.13	0.00E+00	2.27E-03	4.54E-03	0.8500	1.892E+12
Cs-137	2.0313E+00	659.06	1,318.13	0.00E+00	1.34E+03	2.68E+03	1.2500	9.861E+11
Eu-154	2.4513E-02	659.06	1,318.13	0.00E+00	1.62E+01	3.23E+01	1.7500	4.434E+10
Eu-155	4.8175E-03	659.06	1,318.13	0.00E+00	3.18E+00	6.35E+00	2.2500	3.890E+06
Fe-55	1.2397E-04	659.06	1,318.13	0.00E+00	8.17E-02	1.63E-01	2.7500	2.199E+06
H-3	4.5697E-03	659.06	1,318.13	0.00E+00	3.01E+00	6.02E+00	3.5000	1.015E+04
I-129	7.5300E-07	659.06	1,318.13	0.00E+00	4.96E-04	9.93E-04	5.0000	5.928E+02
Kr-85	1.0850E-01	659.06	1,318.13	0.00E+00	7.15E+01	1.43E+02	7.0000	6.562E+01
Np-237	9.5561E-06	659.06	1,318.13	0.00E+00	6.30E-03	1.26E-02	11.0000	7.351E+00
Pa-231	2.0359E-09	659.06	1,318.13	0.00E+00	1.34E-06	2.68E-06		
Pb-210	4.9728E-11	659.06	1,318.13	0.00E+00	3.28E-08	6.55E-08		
Pm-147	4.8502E-02	659.06	1,318.13	0.00E+00	3.20E+01	6.39E+01		
Pu-238	1.8254E-02	659.06	1,318.13	0.00E+00	1.20E+01	2.41E+01		
Pu-239	4.2810E-04	659.06	1,318.13	0.00E+00	2.82E-01	5.64E-01		
Pu-240	2.4368E-04	659.06	1,318.13	0.00E+00	1.61E-01	3.21E-01		
Pu-241	3.3415E-02	659.06	1,318.13	0.00E+00	2.20E+01	4.40E+01		
Pu-242	3.6329E-07	659.06	1,318.13	0.00E+00	2.39E-04	4.79E-04		
Ra-226	2.2854E-10	659.06	1,318.13	0.00E+00	1.51E-07	3.01E-07		
Ra-228	1.2426E-14	659.06	1,318.13	0.00E+00	8.19E-12	1.64E-11		
Ru-106	6.3589E-06	659.06	1,318.13	0.00E+00	4.19E-03	8.38E-03		
Se-79	1.2933E-05	659.06	1,318.13	0.00E+00	8.52E-03	1.70E-02		
Sn-126	1.1574E-05	659.06	1,318.13	0.00E+00	7.63E-03	1.53E-02		
Sr-90	1.9248E+00	659.06	1,318.13	0.00E+00	1.27E+03	2.54E+03		
Tc-99	4.2239E-04	659.06	1,318.13	0.00E+00	2.78E-01	5.57E-01		
Th-229	5.0953E-12	659.06	1,318.13	0.00E+00	3.36E-09	6.72E-09		
Th-230	4.1885E-08	659.06	1,318.13	0.00E+00	2.76E-05	5.52E-05		
Th-232	1.9270E-14	659.06	1,318.13	0.00E+00	1.27E-11	2.54E-11		
Ti-206	4.6024E-08	659.06	1,318.13	0.00E+00	3.03E-05	6.07E-05		
U-232	1.2582E-07	659.06	1,318.13	0.00E+00	8.29E-05	1.66E-04		
U-233	2.5825E-09	659.06	1,318.13	0.00E+00	1.70E-06	3.40E-06	Thermal Power	
U-234	1.8450E-04	659.06	1,318.13	0.00E+00	1.22E-01	2.43E-01	Nominal Heat	Bounding
U-235	-2.7235E-06	659.06	0.00	1.49E-02	1.31E-02	1.49E-02	Output (Watts)	Heat Output (Watts)
U-236	1.5493E-05	659.06	1,318.13	0.00E+00	1.02E-02	2.04E-02	1.57E+01	3.14E+01
U-238	-4.2851E-09	659.06	0.00	9.38E-03	9.37E-03	9.38E-03	Total	Total
Y-90	1.9254E+00	659.06	1,318.13	0.00E+00	1.27E+03	2.54E+03		
Other Radionuclides					1.27E+03	2.55E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.83000026	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:		659.06	
Bounding:		1,318.13	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.06		
Bounding:	0.12		0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) VENEZUELA
SNF ID #: 559
Fuel Units & Descr: 64 - ASSEMBLY
Heavy Metal Mass: BOL=43.2kg; EOL=39.046kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimate 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: 20 years

Estimated
Canister usage:
18"x10"
2.67

II. Estimates	m	x ₀	x _b	b	y ₀	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	6.6313E-10	3,933.54	7,867.08	0.00E+00	2.61E-08	5.22E-08	Avg. MeV	
Am-241	2.0060E-03	3,933.54	7,867.08	0.00E+00	7.89E+00	1.58E+01	0.0150	8.304E+14
Am-242m	4.2429E-07	3,933.54	7,867.08	0.00E+00	1.67E-03	3.34E-03	0.0250	1.727E+14
Am-243	1.4899E-06	3,933.54	7,867.08	0.00E+00	5.86E-03	1.17E-02	0.0375	1.506E+14
C-14	5.7135E-09	3,933.54	7,867.08	0.00E+00	2.25E-05	4.49E-05	0.0675	1.613E+14
Cl-36	1.3124E-32	3,933.54	7,867.08	0.00E+00	5.16E-29	1.03E-28	0.0850	9.749E+13
Cm-243	1.6443E-07	3,933.54	7,867.08	0.00E+00	6.47E-04	1.29E-03	0.1250	6.597E+13
Cm-244	2.9330E-05	3,933.54	7,867.08	0.00E+00	1.15E-01	2.31E-01	0.2250	8.412E+13
Co-60	5.3186E-06	3,933.54	7,867.08	0.00E+00	2.09E-02	4.18E-02	0.3750	3.662E+13
Cs-134	3.1563E-03	3,933.54	7,867.08	0.00E+00	1.24E+01	2.48E+01	0.5750	5.973E+14
Cs-135	3.4477E-06	3,933.54	7,867.08	0.00E+00	1.36E-02	2.71E-02	0.8500	1.010E+13
Cs-137	2.0313E+00	3,933.54	7,867.08	0.00E+00	7.99E+03	1.60E+04	1.2500	5.766E+12
Eu-154	2.4513E-02	3,933.54	7,867.08	0.00E+00	9.64E+01	1.93E+02	1.7500	2.646E+11
Eu-155	4.8175E-03	3,933.54	7,867.08	0.00E+00	1.89E+01	3.79E+01	2.2500	2.321E+07
Fe-55	1.2397E-04	3,933.54	7,867.08	0.00E+00	4.88E-01	9.75E-01	2.7500	1.312E+07
H-3	4.5697E-03	3,933.54	7,867.08	0.00E+00	1.80E+01	3.60E+01	3.5000	6.035E+04
I-129	7.5300E-07	3,933.54	7,867.08	0.00E+00	2.96E-03	5.92E-03	5.0000	3.434E+03
Kr-85	1.0850E-01	3,933.54	7,867.08	0.00E+00	4.27E+02	8.54E+02	7.0000	3.793E+02
Np-237	9.5561E-06	3,933.54	7,867.08	0.00E+00	3.76E-02	7.52E-02	11.0000	4.252E+01
Pa-231	2.0359E-09	3,933.54	7,867.08	0.00E+00	8.01E-06	1.60E-05		
Pb-210	4.9728E-11	3,933.54	7,867.08	0.00E+00	1.96E-07	3.91E-07		
Pm-147	4.8502E-02	3,933.54	7,867.08	0.00E+00	1.91E+02	3.82E+02		
Pu-238	1.8254E-02	3,933.54	7,867.08	0.00E+00	7.18E+01	1.44E+02		
Pu-239	4.2810E-04	3,933.54	7,867.08	0.00E+00	1.68E+00	3.37E+00		
Pu-240	2.4368E-04	3,933.54	7,867.08	0.00E+00	9.59E-01	1.92E+00		
Pu-241	3.3415E-02	3,933.54	7,867.08	0.00E+00	1.31E+02	2.63E+02		
Pu-242	3.6329E-07	3,933.54	7,867.08	0.00E+00	1.43E-03	2.86E-03		
Ra-226	2.2854E-10	3,933.54	7,867.08	0.00E+00	8.99E-07	1.80E-06		
Ra-228	1.2426E-14	3,933.54	7,867.08	0.00E+00	4.89E-11	9.78E-11		
Ru-106	6.3589E-06	3,933.54	7,867.08	0.00E+00	2.50E-02	5.00E-02		
Se-79	1.2933E-05	3,933.54	7,867.08	0.00E+00	5.09E-02	1.02E-01		
Sn-126	1.1574E-05	3,933.54	7,867.08	0.00E+00	4.55E-02	9.11E-02		
Sr-90	1.9248E+00	3,933.54	7,867.08	0.00E+00	7.57E+03	1.51E+04		
Tc-99	4.2239E-04	3,933.54	7,867.08	0.00E+00	1.66E+00	3.32E+00		
Th-229	5.0953E-12	3,933.54	7,867.08	0.00E+00	2.00E-08	4.01E-08		
Th-230	4.1885E-08	3,933.54	7,867.08	0.00E+00	1.65E-04	3.30E-04		
Th-232	1.9270E-14	3,933.54	7,867.08	0.00E+00	7.58E-11	1.52E-10		
Th-238	4.6024E-08	3,933.54	7,867.08	0.00E+00	1.81E-04	3.62E-04		
U-232	1.2582E-07	3,933.54	7,867.08	0.00E+00	4.95E-04	9.90E-04		
U-233	2.5825E-09	3,933.54	7,867.08	0.00E+00	1.02E-05	2.03E-05	Thermal Power	
U-234	1.8450E-04	3,933.54	7,867.08	0.00E+00	7.28E-01	1.45E+00	Nominal Heat	Bounding
U-235	-2.7235E-06	3,933.54	0.00	1.87E-02	7.96E-03	1.67E-02	Output	Heat Output
U-236	1.5493E-05	3,933.54	7,867.08	0.00E+00	6.09E-02	1.22E-01	(Watts)	(Watts)
U-238	-4.2851E-09	3,933.54	0.00	1.16E-02	1.16E-02	1.16E-02	8.38E+01	1.88E+02
Y-90	1.9254E+00	3,933.54	7,867.08	0.00E+00	7.57E+03	1.51E+04	Total	Total
Other Radionuclides					7.61E+03	1.52E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:			
	ALUM	ALUM	
BOL HM Constituents:			
	U	U	
BOL Enrichment %:			
	20	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:		3,933.54	
Bounding:		7,867.08	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.29		
Bounding:	0.58		

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

1. Fuel and Template Information

Fuel Name: FRR MTR (U/LX-ME) JAPAN
 SNF ID #: 665
 Fuel Units & Descr: 30: MTR TYPE
 Heavy Metal Mass: BOL-21.543kg: EOL-21.559kg
 ROD Storage Sct: SRS

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 90 to 100%, U)
 Template Burnup(BWU): 367.2
 Template Decay Time: 0.0011689 20 years

Estimated
 Canister usage:
 18 x10'
 1.25

Radionuclide	CLMWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Total Photons/sec (Bouding)
Ac-227	6.631E-10	17.05	34.09	0.00E+00	1.13E-08	2.26E-08	Avg MeV	
Am-241	2.0060E-03	17.05	34.09	0.00E+00	3.42E-02	6.84E-02	0.0150	3.590E+12
Am-242m	4.2420E-07	17.05	34.09	0.00E+00	7.23E-06	1.45E-05	0.0250	7.484E+11
Am-243	1.4890E-06	17.05	34.09	0.00E+00	2.54E-05	5.08E-05	0.0375	6.527E+11
C-14	6.7135E-09	17.05	34.09	0.00E+00	8.74E-08	1.95E-07	0.0675	6.891E+11
C-36	1.3124E-32	17.05	34.09	0.00E+00	2.24E-31	4.47E-31	0.0850	4.225E+11
Co-243	1.6443E-07	17.05	34.09	0.00E+00	2.80E-06	5.61E-06	0.1250	2.860E+11
Co-244	2.8330E-06	17.05	34.09	0.00E+00	5.00E-04	1.00E-03	0.2250	3.646E+11
Co-60	6.3186E-06	17.05	34.09	0.00E+00	8.07E-05	1.61E-04	0.5750	1.587E+11
Co-134	3.1663E-03	17.05	34.09	0.00E+00	6.39E-02	1.08E-01	0.8500	2.586E+12
Co-136	3.4477E-06	17.05	34.09	0.00E+00	6.88E-05	1.18E-04	1.2500	4.379E+10
Co-137	2.0313E+00	17.05	34.09	0.00E+00	3.46E+01	6.83E+01	1.6500	2.469E+10
Eu-154	2.4513E-02	17.05	34.09	0.00E+00	4.18E-01	8.36E-01	1.7500	1.147E+09
Eu-155	4.8175E-03	17.05	34.09	0.00E+00	8.21E-02	1.64E-01	2.2500	1.005E+05
Fe-55	1.2397E-04	17.05	34.09	0.00E+00	2.11E-03	4.23E-03	2.7500	6.690E+04
H-3	4.5697E-03	17.05	34.09	0.00E+00	7.79E-02	1.56E-01	3.5000	2.832E+02
H-129	7.5300E-07	17.05	34.09	0.00E+00	1.28E-05	2.57E-05	5.0000	2.419E+01
K-40	1.0850E-01	17.05	34.09	0.00E+00	1.85E+00	3.70E+00	7.0000	2.717E+00
Np-237	9.5661E-06	17.05	34.09	0.00E+00	1.63E-04	3.26E-04	11.0000	3.070E-01
Pa-231	2.0359E-09	17.05	34.09	0.00E+00	3.47E-08	6.94E-08		
Pb-210	4.8728E-11	17.05	34.09	0.00E+00	8.48E-10	1.70E-09		
Pm-147	4.8602E-02	17.05	34.09	0.00E+00	8.27E-01	1.65E+00		
Pu-238	1.8254E-02	17.05	34.09	0.00E+00	3.11E-01	6.22E-01		
Pu-239	4.2810E-04	17.05	34.09	0.00E+00	7.30E-03	1.46E-02		
Pu-240	2.4368E-04	17.05	34.09	0.00E+00	4.15E-03	8.31E-03		
Pu-241	3.3415E-02	17.05	34.09	0.00E+00	6.70E-01	1.14E+00		
Pu-242	3.6329E-07	17.05	34.09	0.00E+00	6.18E-06	1.24E-05		
Ra-226	2.2854E-10	17.05	34.09	0.00E+00	3.90E-09	7.79E-09		
Ra-228	1.2426E-14	17.05	34.09	0.00E+00	2.12E-13	4.24E-13		
Ru-106	8.3589E-06	17.05	34.09	0.00E+00	1.08E-04	2.17E-04		
Se-78	1.2833E-06	17.05	34.09	0.00E+00	2.20E-04	4.41E-04		
Sn-126	1.1574E-05	17.05	34.09	0.00E+00	1.97E-04	3.95E-04		
Sm-90	1.8248E+00	17.05	34.09	0.00E+00	3.28E+01	6.56E+01		
Tc-99	4.2238E-04	17.05	34.09	0.00E+00	7.20E-03	1.44E-02		
Ti-223	5.0863E-12	17.05	34.09	0.00E+00	8.68E-11	1.74E-10		
Ti-230	4.1865E-08	17.05	34.09	0.00E+00	7.14E-07	1.43E-06		
Ti-232	1.8270E-14	17.05	34.09	0.00E+00	3.28E-13	6.57E-13		
Ti-808	4.8024E-08	17.05	34.09	0.00E+00	7.65E-07	1.57E-06		
U-232	1.2583E-07	17.05	34.09	0.00E+00	2.14E-06	4.29E-06		
U-233	2.5625E-09	17.05	34.09	0.00E+00	4.40E-08	8.80E-08		
U-234	1.8450E-04	17.05	34.09	0.00E+00	3.15E-03	6.29E-03		
U-235	2.7235E-06	17.05	0.00	2.09E-02	2.09E-02	2.09E-02		
U-236	1.5493E-05	17.05	34.09	0.00E+00	2.64E-04	5.28E-04		
U-238	4.2851E-09	17.05	0.00	3.98E-03	3.98E-03	3.98E-03		
Y-90	1.8254E+00	17.05	34.09	0.00E+00	3.28E+01	6.56E+01		

Thermal Power			
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)		
4.07E+01	8.13E+01		
Total	Total		

2. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: ALUM	ALUM
BOL HMI Constituents: U	U
BOL Enrichment %: 44.97911463	60 to 100

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

Burnup Summary (MWd)³

Nominal	From SFD	Estimated
Bounding:		17.05
		34.09 (Bounding Burnup assumed to be twice Nominal Burnup)

Basis for Burnup used in estimate:

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.00	
Bounding	0.01	

Estimated EOL HMI/Chen EOL HMI	
	1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR UALX HEU CANADA
SNF ID #: 294
Fuel Units & Descr: 14 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=2.204kg; EOL=2.192kg
ROD Storage Site: SRS

*Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.58

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	10.61	21.21	0.00E+00	7.03E-09	1.41E-08	Avg. MeV	
Am-241	2.0060E-03	10.61	21.21	0.00E+00	2.13E-02	4.26E-02	0.0150	2.239E+12
Am-242m	4.2429E-07	10.61	21.21	0.00E+00	4.50E-08	9.00E-08	0.0250	4.656E+11
Am-243	1.4899E-06	10.61	21.21	0.00E+00	1.58E-05	3.16E-05	0.0375	4.062E+11
C-14	5.7135E-09	10.61	21.21	0.00E+00	6.06E-08	1.21E-07	0.0575	4.350E+11
Cl-36	1.3124E-32	10.61	21.21	0.00E+00	1.39E-31	2.78E-31	0.0850	2.629E+11
Cm-243	1.6443E-07	10.61	21.21	0.00E+00	1.74E-06	3.49E-06	0.1250	1.779E+11
Cm-244	2.9330E-05	10.61	21.21	0.00E+00	3.11E-04	6.22E-04	0.2250	2.269E+11
Co-60	5.3186E-06	10.61	21.21	0.00E+00	5.64E-05	1.13E-04	0.3750	9.874E+10
Cs-134	3.1563E-03	10.61	21.21	0.00E+00	3.35E-02	6.70E-02	0.5750	1.611E+12
Cs-135	3.4477E-06	10.61	21.21	0.00E+00	3.66E-05	7.31E-05	0.8500	2.723E+10
Cs-137	2.0313E+00	10.61	21.21	0.00E+00	2.15E+01	4.31E+01	1.2500	1.555E+10
Eu-154	2.4513E-02	10.61	21.21	0.00E+00	2.60E-01	5.20E-01	1.7500	7.136E+08
Eu-155	4.8175E-03	10.61	21.21	0.00E+00	5.11E-02	1.02E-01	2.2500	6.260E+04
Fe-55	1.2397E-04	10.61	21.21	0.00E+00	1.31E-03	2.63E-03	2.7500	3.539E+04
H-3	4.5697E-03	10.61	21.21	0.00E+00	4.85E-02	9.69E-02	3.5000	1.630E+02
I-129	7.5300E-07	10.61	21.21	0.00E+00	7.99E-06	1.60E-05	5.0000	9.366E+00
Kr-85	1.0850E-01	10.61	21.21	0.00E+00	1.15E+00	2.30E+00	7.0000	1.034E+00
Np-237	9.5561E-06	10.61	21.21	0.00E+00	1.01E-04	2.03E-04	11.0000	1.160E-01
Pa-231	2.0359E-09	10.61	21.21	0.00E+00	2.16E-08	4.32E-08		
Pb-210	4.9728E-11	10.61	21.21	0.00E+00	5.27E-10	1.05E-09		
Pm-147	4.8502E-02	10.61	21.21	0.00E+00	5.14E-01	1.03E+00		
Pu-238	1.8254E-02	10.61	21.21	0.00E+00	1.94E-01	3.87E-01		
Pu-239	4.2810E-04	10.61	21.21	0.00E+00	4.54E-03	9.08E-03		
Pu-240	2.4368E-04	10.61	21.21	0.00E+00	2.58E-03	5.17E-03		
Pu-241	3.3415E-02	10.61	21.21	0.00E+00	3.54E-01	7.09E-01		
Pu-242	3.6329E-07	10.61	21.21	0.00E+00	3.85E-06	7.71E-06		
Ra-226	2.2854E-10	10.61	21.21	0.00E+00	2.42E-09	4.85E-09		
Ra-228	1.2426E-14	10.61	21.21	0.00E+00	1.32E-13	2.64E-13		
Ru-106	6.3589E-08	10.61	21.21	0.00E+00	6.74E-05	1.35E-04		
Se-79	1.2933E-05	10.61	21.21	0.00E+00	1.37E-04	2.74E-04		
Sn-126	1.1574E-05	10.61	21.21	0.00E+00	1.23E-04	2.46E-04		
Sr-90	1.9248E+00	10.61	21.21	0.00E+00	2.04E+01	4.08E+01		
Tc-99	4.2239E-04	10.61	21.21	0.00E+00	4.48E-03	8.96E-03		
Th-229	5.0953E-12	10.61	21.21	0.00E+00	5.40E-11	1.08E-10		
Th-230	4.1885E-08	10.61	21.21	0.00E+00	4.44E-07	8.89E-07		
Th-232	1.9270E-14	10.61	21.21	0.00E+00	2.04E-13	4.09E-13		
Tl-208	4.6024E-08	10.61	21.21	0.00E+00	4.88E-07	9.76E-07		
U-232	1.2582E-07	10.61	21.21	0.00E+00	1.33E-06	2.67E-06		
U-233	2.5825E-09	10.61	21.21	0.00E+00	2.74E-08	5.48E-08		
U-234	1.8450E-04	10.61	21.21	0.00E+00	1.96E-03	3.91E-03		
U-235	-2.7235E-06	10.61	0.00	4.43E-03	4.40E-03	4.43E-03		
U-236	1.5493E-05	10.61	21.21	0.00E+00	1.64E-04	3.29E-04		
U-238	-4.2851E-09	10.61	0.00	5.11E-05	5.11E-05	5.11E-05		
Y-90	1.9254E+00	10.61	21.21	0.00E+00	2.04E+01	4.08E+01		
Other Radionuclides					2.05E+01	4.10E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	93.09999644	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		10.61	
Bounding:		21.21	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.02		
Bounding:	0.03		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U308-LEU) PERU
SNF ID #: 503
Fuel Units & Descr: 6 - ASSEMBLY
Heavy Metal Mass: BOL=6kg; EOL=5.67kg
ROD Storage Site: SRS

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

Estimated
Canister usage:
18"x10"
0.25

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	312.52	625.03	0.00E+00	2.07E-07	4.14E-07	Avg. MeV	
Am-241	2.0060E-03	312.52	625.03	0.00E+00	6.27E-01	1.25E+00	0.0150	6.598E+13
Am-242m	4.2429E-07	312.52	625.03	0.00E+00	1.33E-04	2.65E-04	0.0250	1.372E+13
Am-243	1.4899E-06	312.52	625.03	0.00E+00	4.86E-04	9.31E-04	0.0375	1.197E+13
C-14	5.7135E-09	312.52	625.03	0.00E+00	1.79E-06	3.57E-06	0.0575	1.282E+13
Cl-36	1.3124E-32	312.52	625.03	0.00E+00	4.10E-30	8.20E-30	0.0650	7.745E+12
Cm-243	1.6443E-07	312.52	625.03	0.00E+00	5.14E-05	1.03E-04	0.1250	5.241E+12
Cm-244	2.8330E-05	312.52	625.03	0.00E+00	9.17E-03	1.83E-02	0.2250	6.683E+12
Co-60	5.3186E-06	312.52	625.03	0.00E+00	1.66E-03	3.32E-03	0.3750	2.909E+12
Cs-134	3.1563E-03	312.52	625.03	0.00E+00	9.86E-01	1.97E+00	0.5750	4.745E+13
Cs-135	3.4477E-06	312.52	625.03	0.00E+00	1.08E-03	2.15E-03	0.8500	8.023E+11
Cs-137	2.0313E+00	312.52	625.03	0.00E+00	6.35E+02	1.27E+03	1.2500	4.581E+11
Eu-154	2.4513E-02	312.52	625.03	0.00E+00	7.66E+00	1.53E+01	1.7500	2.103E+10
Eu-155	4.8175E-03	312.52	625.03	0.00E+00	1.51E+00	3.01E+00	2.2500	1.844E+06
Fe-55	1.2397E-04	312.52	625.03	0.00E+00	3.87E-02	7.75E-02	2.7500	1.043E+06
H-3	4.5697E-03	312.52	625.03	0.00E+00	1.43E+00	2.86E+00	3.5000	4.799E+03
I-129	7.5300E-07	312.52	625.03	0.00E+00	2.35E-04	4.71E-04	5.0000	2.745E+02
Kr-85	1.0850E-01	312.52	625.03	0.00E+00	3.39E+01	6.78E+01	7.0000	3.032E+01
Np-237	9.5561E-06	312.52	625.03	0.00E+00	2.99E-03	5.97E-03	11.0000	3.399E+00
Pa-231	2.0359E-08	312.52	625.03	0.00E+00	6.36E-07	1.27E-06		
Pb-210	4.9728E-11	312.52	625.03	0.00E+00	1.55E-08	3.11E-08		
Pm-147	4.8502E-02	312.52	625.03	0.00E+00	1.52E+01	3.03E+01		
Pu-238	1.8254E-02	312.52	625.03	0.00E+00	5.70E+00	1.14E+01		
Pu-239	4.2810E-04	312.52	625.03	0.00E+00	1.34E-01	2.68E-01		
Pu-240	2.4368E-04	312.52	625.03	0.00E+00	7.62E-02	1.52E-01		
Pu-241	3.3415E-02	312.52	625.03	0.00E+00	1.04E+01	2.09E+01		
Pu-242	3.6329E-07	312.52	625.03	0.00E+00	1.14E-04	2.27E-04		
Ra-226	2.2854E-10	312.52	625.03	0.00E+00	7.14E-08	1.43E-07		
Ra-228	1.2426E-14	312.52	625.03	0.00E+00	3.88E-12	7.77E-12		
Ru-106	6.3589E-06	312.52	625.03	0.00E+00	1.99E-03	3.97E-03		
Se-79	1.2933E-05	312.52	625.03	0.00E+00	4.04E-03	8.08E-03		
Sn-126	1.1574E-05	312.52	625.03	0.00E+00	3.62E-03	7.23E-03		
Sr-90	1.9248E+00	312.52	625.03	0.00E+00	6.02E+02	1.20E+03		
Tc-99	4.2239E-04	312.52	625.03	0.00E+00	1.32E-01	2.64E-01		
Th-229	5.0953E-12	312.52	625.03	0.00E+00	1.59E-09	3.18E-09		
Th-230	4.1885E-08	312.52	625.03	0.00E+00	1.31E-05	2.62E-05		
Th-232	1.9270E-14	312.52	625.03	0.00E+00	6.02E-12	1.20E-11		
Ti-208	4.6024E-08	312.52	625.03	0.00E+00	1.44E-05	2.88E-05		
U-232	1.2582E-07	312.52	625.03	0.00E+00	3.93E-05	7.86E-05		
U-233	2.5825E-09	312.52	625.03	0.00E+00	8.07E-07	1.61E-06		
U-234	1.8450E-04	312.52	625.03	0.00E+00	5.77E-02	1.15E-01		
U-235	2.7235E-06	312.52	0.00	2.59E-03	1.74E-03	2.59E-03		
U-236	1.5493E-05	312.52	625.03	0.00E+00	4.84E-03	9.68E-03		
U-238	4.2851E-09	312.52	0.00	1.61E-03	1.61E-03	1.61E-03		
Y-90	1.9254E+00	312.52	625.03	0.00E+00	6.02E+02	1.20E+03		
Other Radionuclides					6.04E+02	1.21E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:		312.52	
Bounding:		625.03	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
Nominal:	0.17		
Bounding:	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: FRR MTR-C (US2 LEU) CANADA
SNF ID #: 512
Fuel Units & Descr: 8 - ASSEMBLY
Heavy Metal Mass: BOL=6.52kg; EOL=5.86kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.33

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	6.6313E-10	617.46	1,234.91	0.00E+00	4.09E-07	8.19E-07	Avg. MeV	
Am-241	2.0060E-03	617.46	1,234.91	0.00E+00	1.24E+00	2.48E+00	0.0150	1.304E+14
Am-242m	4.2429E-07	617.46	1,234.91	0.00E+00	2.62E-04	5.24E-04	0.0250	2.711E+13
Am-243	1.4899E-06	617.46	1,234.91	0.00E+00	9.20E-04	1.84E-03	0.0375	2.364E+13
C-14	5.7135E-09	617.46	1,234.91	0.00E+00	3.53E-06	7.06E-06	0.0575	2.532E+13
Cl-36	1.3124E-32	617.46	1,234.91	0.00E+00	8.10E-30	1.62E-29	0.0850	1.530E+13
Cm-243	1.6443E-07	617.46	1,234.91	0.00E+00	1.02E-04	2.03E-04	0.1250	1.038E+13
Cm-244	2.9330E-05	617.46	1,234.91	0.00E+00	1.81E-02	3.62E-02	0.2250	1.320E+13
Co-60	5.3186E-06	617.46	1,234.91	0.00E+00	3.28E-03	6.57E-03	0.3750	5.748E+12
Cs-134	3.1563E-03	617.46	1,234.91	0.00E+00	1.95E+00	3.90E+00	0.5750	9.376E+13
Cs-135	3.4477E-06	617.46	1,234.91	0.00E+00	2.13E-03	4.26E-03	0.8500	1.585E+12
Cs-137	2.0313E+00	617.46	1,234.91	0.00E+00	1.25E+03	2.51E+03	1.2500	9.051E+11
Eu-154	2.4513E-02	617.46	1,234.91	0.00E+00	1.51E+01	3.03E+01	1.7500	4.154E+10
Eu-155	4.8175E-03	617.46	1,234.91	0.00E+00	2.97E+00	5.95E+00	2.2500	3.844E+06
Fe-55	1.2397E-04	617.46	1,234.91	0.00E+00	7.65E-02	1.53E-01	2.7500	2.060E+06
H-3	4.5697E-03	617.46	1,234.91	0.00E+00	2.82E+00	5.64E+00	3.5000	9.473E+03
I-129	7.5300E-07	617.46	1,234.91	0.00E+00	4.65E-04	9.30E-04	5.0000	5.390E+02
Kr-85	1.0850E-01	617.46	1,234.91	0.00E+00	6.70E+01	1.34E+02	7.0000	5.952E+01
Np-237	9.5561E-08	617.46	1,234.91	0.00E+00	5.90E-03	1.18E-02	11.0000	6.672E+00
Pa-231	2.0359E-08	617.46	1,234.91	0.00E+00	1.26E-06	2.51E-06		
Pb-210	4.9728E-11	617.46	1,234.91	0.00E+00	3.07E-08	6.14E-08		
Pm-147	4.8502E-02	617.46	1,234.91	0.00E+00	2.99E+01	5.99E+01		
Pu-238	1.8254E-02	617.46	1,234.91	0.00E+00	1.13E+01	2.25E+01		
Pu-239	4.2810E-04	617.46	1,234.91	0.00E+00	2.64E-01	5.29E-01		
Pu-240	2.4368E-04	617.46	1,234.91	0.00E+00	1.50E-01	3.01E-01		
Pu-241	3.3415E-02	617.46	1,234.91	0.00E+00	2.06E+01	4.13E+01		
Pu-242	3.6329E-07	617.46	1,234.91	0.00E+00	2.24E-04	4.49E-04		
Ra-226	2.2854E-10	617.46	1,234.91	0.00E+00	1.41E-07	2.82E-07		
Ra-228	1.2426E-14	617.46	1,234.91	0.00E+00	7.67E-12	1.53E-11		
Ru-106	6.3589E-06	617.46	1,234.91	0.00E+00	3.93E-03	7.85E-03		
Se-79	1.2933E-05	617.46	1,234.91	0.00E+00	7.99E-03	1.60E-02		
Sn-126	1.1574E-05	617.46	1,234.91	0.00E+00	7.15E-03	1.43E-02		
Sr-90	1.9248E+00	617.46	1,234.91	0.00E+00	1.19E+03	2.38E+03		
Tc-99	4.2239E-04	617.46	1,234.91	0.00E+00	2.61E-01	5.22E-01		
Th-229	5.0953E-12	617.46	1,234.91	0.00E+00	3.15E-09	6.29E-09		
Th-230	4.1885E-08	617.46	1,234.91	0.00E+00	2.59E-05	5.17E-05		
Th-232	1.9270E-14	617.46	1,234.91	0.00E+00	1.19E-11	2.38E-11		
Th-208	4.6024E-08	617.46	1,234.91	0.00E+00	2.84E-05	5.68E-05		
U-232	1.2582E-07	617.46	1,234.91	0.00E+00	7.77E-05	1.55E-04	Thermal Power	
U-233	2.5825E-09	617.46	1,234.91	0.00E+00	1.59E-06	3.19E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8450E-04	617.46	1,234.91	0.00E+00	1.14E-01	2.28E-01	1.47E+01	2.94E+01
U-235	-2.7235E-06	617.46	0.00	2.82E-03	1.14E-03	2.82E-03	Total	Total
U-236	1.5493E-05	617.46	1,234.91	0.00E+00	9.57E-03	1.91E-02		
U-238	-4.2851E-09	617.46	0.00	1.75E-03	1.75E-03	1.75E-03		
Y-90	1.9254E+00	617.46	1,234.91	0.00E+00	1.19E+03	2.38E+03		
Other Radionuclides					1.19E+03	2.39E+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	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	20.00000037	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		617.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,234.91	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.50		1.01
Bounding:	0.50		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) GERMANY
SNF ID #: 517
Fuel Units & Descr: 26 - ASSEMBLY
Heavy Metal Mass: BOL=30.94kg; EOL=26.114kg
ROD Storage Site: SRS

*Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20% U)
*Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated
Canister usage:
16"x10"
1.06

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.4556E-09	4,606.13	9,212.25	0.00E+00	1.13E-05	2.26E-05	Avg. MeV	
Am-241	3.8752E-03	4,606.13	9,212.25	0.00E+00	1.78E+01	3.57E+01	0.0150	9.454E+14
Am-242m	1.8617E-06	4,606.13	9,212.25	0.00E+00	8.58E-03	1.72E-02	0.0250	1.952E+14
Am-243	2.3293E-07	4,606.13	9,212.25	0.00E+00	1.07E-03	2.15E-03	0.0375	2.043E+14
C-14	4.3233E-05	4,606.13	9,212.25	0.00E+00	1.99E-01	3.98E-01	0.0575	1.889E+14
Cl-36	4.3023E-08	4,606.13	9,212.25	0.00E+00	1.98E-04	3.96E-04	0.0650	1.150E+14
Cm-243	1.9053E-07	4,606.13	9,212.25	0.00E+00	8.78E-04	1.76E-03	0.1250	1.291E+14
Cm-244	1.7744E-06	4,606.13	9,212.25	0.00E+00	8.17E-03	1.63E-02	0.2250	1.042E+14
Co-60	4.3188E-03	4,606.13	9,212.25	0.00E+00	1.99E+01	3.98E+01	0.3750	4.282E+13
Cs-134	6.7188E-04	4,606.13	9,212.25	0.00E+00	3.09E+00	6.19E+00	0.5750	6.821E+14
Cs-135	3.1549E-05	4,606.13	9,212.25	0.00E+00	1.45E-01	2.91E-01	0.8500	7.258E+13
Cs-137	1.9489E+00	4,606.13	9,212.25	0.00E+00	8.98E+03	1.80E+04	1.2500	7.818E+13
Eu-154	4.0301E-01	4,606.13	9,212.25	0.00E+00	1.86E+03	3.71E+03	1.7500	2.342E+12
Eu-155	5.4000E-02	4,606.13	9,212.25	0.00E+00	2.49E+02	4.97E+02	2.2500	3.712E+07
Fe-55	1.5955E-04	4,606.13	9,212.25	0.00E+00	7.35E-01	1.47E+00	2.7500	6.179E+06
H-3	4.8571E-03	4,606.13	9,212.25	0.00E+00	2.15E+01	4.29E+01	3.5000	4.231E+04
I-129	7.3805E-07	4,606.13	9,212.25	0.00E+00	3.40E-03	6.80E-03	6.0000	5.197E+03
Kr-85	9.5684E-02	4,606.13	9,212.25	0.00E+00	4.41E+02	8.81E+02	7.0000	5.866E+02
Np-237	1.4618E-06	4,606.13	9,212.25	0.00E+00	6.73E-03	1.35E-02	11.0000	6.671E+01
Pa-231	6.4782E-09	4,606.13	9,212.25	0.00E+00	2.98E-05	5.97E-05		
Pb-210	6.3158E-14	4,606.13	9,212.25	0.00E+00	2.91E-10	5.82E-10		
Pm-147	3.9564E-02	4,606.13	9,212.25	0.00E+00	1.82E+02	3.64E+02		
Pu-238	1.2008E-03	4,606.13	9,212.25	0.00E+00	5.53E+00	1.11E+01		
Pu-239	5.6917E-03	4,606.13	9,212.25	0.00E+00	2.62E+01	5.24E+01		
Pu-240	2.2617E-03	4,606.13	9,212.25	0.00E+00	1.04E+01	2.08E+01		
Pu-241	6.1113E-02	4,606.13	9,212.25	0.00E+00	2.81E+02	5.63E+02		
Pu-242	3.0602E-07	4,606.13	9,212.25	0.00E+00	1.41E-03	2.82E-03		
Ra-226	2.6707E-13	4,606.13	9,212.25	0.00E+00	1.23E-09	2.46E-09		
Ra-228	2.2556E-10	4,606.13	9,212.25	0.00E+00	1.04E-06	2.08E-06		
Ru-106	3.1293E-06	4,606.13	9,212.25	0.00E+00	1.44E-02	2.88E-02		
Se-79	1.2935E-05	4,606.13	9,212.25	0.00E+00	5.96E-02	1.19E-01		
Sn-126	1.2238E-05	4,606.13	9,212.25	0.00E+00	5.64E-02	1.13E-01		
Sr-90	1.8195E+00	4,606.13	9,212.25	0.00E+00	8.38E+03	1.68E+04		
Tc-99	4.4120E-04	4,606.13	9,212.25	0.00E+00	2.03E+00	4.06E+00		
Th-229	3.3308E-10	4,606.13	9,212.25	0.00E+00	1.53E-06	3.07E-06		
Th-230	4.6526E-11	4,606.13	9,212.25	0.00E+00	2.14E-07	4.29E-07		
Th-232	2.3744E-10	4,606.13	9,212.25	0.00E+00	1.09E-06	2.19E-06		
Ti-208	1.8195E-08	4,606.13	9,212.25	0.00E+00	8.38E-05	1.68E-04		
U-232	4.0088E-08	4,606.13	9,212.25	0.00E+00	2.26E-04	4.52E-04		
U-233	1.3140E-07	4,606.13	9,212.25	0.00E+00	6.05E-04	1.21E-03		
U-234	2.2571E-07	4,606.13	9,212.25	0.00E+00	1.04E-03	2.08E-03		
U-235	-2.6159E-06	4,606.13	0.00	1.34E-02	1.32E-03	1.34E-02		
U-236	1.2719E-05	4,606.13	9,212.25	0.00E+00	5.86E-02	1.17E-01		
U-238	-3.8857E-08	4,606.13	0.00	8.32E-03	8.14E-03	8.32E-03		
Y-90	1.8211E+00	4,606.13	9,212.25	0.00E+00	8.39E+03	1.68E+04		
Other Radionuclides					9.65E+03	1.93E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.999995	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		4,606.13
Bounding:		9,212.25

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.03	
Bounding:	8.06	

Estimated EOL HM/Given EOL HM
1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: FRR MTR-C (U3S2 LEU) GREECE
 SNF ID #: S31
 Fuel Units & Descr: 16 - ASSSEMBLY
 Heavy Metal Mass: BOL=11.07kg; EOL=10.294kg
 ROD Storage Slic: SRS

Fuel decay start date: 2010
Estimate as of: 2000
Template: ATR (Light Water, Ann. 60 to 100%, U)
***Template Burnup (MWd):** 3672
Template BOL Heavy Metal Mass (MT): 0.00116688
Template Decay Time: 20 years

**Estimated
 Container Usage:**
 18 x 10'
 0.75

IL Estimate	m	%	%	b	Y _a	Y _b	Gamma Source
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	6.631E-10	734.70	1,469.40	0.00E+00	4.87E-07	9.74E-07	Avg. 144V
Am-241	2.0080E-03	734.70	1,469.40	0.00E+00	1.47E+00	2.99E+00	0.0150
Am-242m	4.2429E-07	734.70	1,469.40	0.00E+00	3.12E-04	6.23E-04	0.0250
Am-243	1.4899E-06	734.70	1,469.40	0.00E+00	1.09E-03	2.19E-03	0.0375
C-14	5.7135E-09	734.70	1,469.40	0.00E+00	4.20E-06	8.40E-06	0.0575
Ci-38	1.3124E-32	734.70	1,469.40	0.00E+00	9.64E-30	1.93E-29	0.0850
Cm-243	1.6442E-07	734.70	1,469.40	0.00E+00	1.21E-04	2.42E-04	0.1250
Cm-244	2.9330E-05	734.70	1,469.40	0.00E+00	2.15E-02	4.31E-02	0.2250
Co-60	5.3186E-06	734.70	1,469.40	0.00E+00	3.91E-03	7.82E-03	0.3750
Co-134	3.1656E-03	734.70	1,469.40	0.00E+00	2.32E+00	4.64E+00	0.5750
Co-135	3.4477E-06	734.70	1,469.40	0.00E+00	2.53E-03	5.07E-03	0.8500
Co-137	2.0313E+00	734.70	1,469.40	0.00E+00	1.49E+03	2.98E+03	1.2500
Eu-154	2.4615E-02	734.70	1,469.40	0.00E+00	1.80E+01	3.60E+01	1.7500
Eu-156	4.8175E-03	734.70	1,469.40	0.00E+00	3.54E+00	7.08E+00	2.2500
Fe-55	1.2397E-04	734.70	1,469.40	0.00E+00	8.11E-02	1.62E-01	2.7500
H-3	4.5697E-03	734.70	1,469.40	0.00E+00	3.39E+00	6.71E+00	3.5000
I-129	7.5300E-07	734.70	1,469.40	0.00E+00	5.53E-04	1.11E-03	5.0000
Kr-85	1.0350E-01	734.70	1,469.40	0.00E+00	7.87E+01	1.59E+02	7.0000
Np-237	9.5561E-08	734.70	1,469.40	0.00E+00	7.02E-03	1.40E-02	11.0000
Pa-231	2.0359E-09	734.70	1,469.40	0.00E+00	1.50E-06	2.99E-06	
Pb-210	4.9729E-11	734.70	1,469.40	0.00E+00	3.65E-08	7.31E-08	
Pm-147	4.8502E-02	734.70	1,469.40	0.00E+00	3.56E+01	7.13E+01	
Pu-238	1.8254E-02	734.70	1,469.40	0.00E+00	1.34E+01	2.68E+01	
Pu-239	4.2810E-04	734.70	1,469.40	0.00E+00	3.19E-01	6.39E-01	
Pu-240	2.4398E-04	734.70	1,469.40	0.00E+00	1.79E-01	3.58E-01	
Pu-241	3.3415E-02	734.70	1,469.40	0.00E+00	2.45E+01	4.91E+01	
Pu-242	3.6329E-07	734.70	1,469.40	0.00E+00	2.67E-04	5.34E-04	
Pu-246	2.2654E-10	734.70	1,469.40	0.00E+00	1.69E-07	3.38E-07	
Ra-226	1.2429E-14	734.70	1,469.40	0.00E+00	8.13E-12	1.63E-11	
Ru-106	6.3589E-06	734.70	1,469.40	0.00E+00	4.67E-03	9.34E-03	
Sm-126	1.1574E-05	734.70	1,469.40	0.00E+00	9.50E-03	1.90E-02	
Se-78	1.9249E+00	734.70	1,469.40	0.00E+00	8.50E-03	1.70E-02	
Te-99	4.2239E-04	734.70	1,469.40	0.00E+00	3.10E-01	6.21E-01	
Th-229	5.0563E-12	734.70	1,469.40	0.00E+00	3.74E-09	7.49E-09	
Th-230	4.1895E-08	734.70	1,469.40	0.00E+00	3.08E-05	6.15E-05	
Th-232	1.9270E-14	734.70	1,469.40	0.00E+00	1.42E-11	2.83E-11	
Th-236	4.6024E-08	734.70	1,469.40	0.00E+00	3.39E-05	6.79E-05	
U-232	1.2582E-07	734.70	1,469.40	0.00E+00	9.24E-05	1.85E-04	
U-233	2.5825E-09	734.70	1,469.40	0.00E+00	1.90E-08	3.79E-08	
U-234	1.8450E-04	734.70	1,469.40	0.00E+00	1.39E-01	2.71E-01	
U-235	2.7232E-06	734.70	1,469.40	0.00E+00	2.79E-03	4.79E-03	
U-236	1.5482E-05	734.70	1,469.40	0.00E+00	1.14E-02	2.28E-02	
U-238	4.2351E-08	734.70	1,469.40	0.00E+00	2.97E-03	5.93E-03	
U-239	1.9254E+00	734.70	1,469.40	0.00E+00	1.41E+03	2.83E+03	
Other Radionuclides					1.42E+03	2.84E+03	

Thermal Power	
Nominal Heat Output (Watts)	1.75E+01
Bounding Heat Output (Watts)	3.50E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			
From SFD		Used	
Reactor Moderator:	Light Water	Light Water	
Fuel Cladding:	ALUM	ALUM	
BOL H/M Constituents:	U	U	
BOL Enrichment %:	20.00000024	60 to 100	

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

Burnup Summary (MWd) ³	
Nominal:	Estimated
Bounding:	734.70 (Nominal burnup calculated from the heavy metal mass destroyed. 1,469.40 (Bounding burnup assumed to be twice nominal burnup.

Basis for burnup used in estimates:

Checks	
Nominal:	Burnup Multiplier
Bounding:	Estimated Burnup/ Given Burnup
	Estimated EOL H/M/Given EOL H/M
	1.00

Reactor shutdown, core removal, storage, shipping or other data 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/MH).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (US2 LEU) JAPAN
 SNF ID #: 289
 Fuel Units & Descr: 17 - ASSEMBLY
 Heavy Metal Mass: BOL=8.925kg; EOL=8.6kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Alk., 60 to 100%, U)
 Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 0.71

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.8313E-10	307.50	614.99	0.00E+00	2.04E-07	4.08E-07	Avg. MeV	
Am-241	2.0060E-03	307.50	614.99	0.00E+00	6.17E-01	1.23E+00	0.0150	6.492E+13
Am-242m	4.2429E-07	307.50	614.99	0.00E+00	1.30E-04	2.61E-04	0.0250	1.360E+13
Am-243	1.4899E-06	307.50	614.99	0.00E+00	4.58E-04	9.16E-04	0.0375	1.177E+13
C-14	5.7135E-09	307.50	614.99	0.00E+00	1.76E-06	3.51E-06	0.0575	1.261E+13
Cl-36	1.3124E-32	307.50	614.99	0.00E+00	4.04E-30	8.07E-30	0.0850	7.821E+12
Cm-243	1.6443E-07	307.50	614.99	0.00E+00	5.06E-05	1.01E-04	0.1250	5.157E+12
Cm-244	2.9330E-05	307.50	614.99	0.00E+00	9.02E-03	1.80E-02	0.2250	6.576E+12
Co-60	5.3186E-06	307.50	614.99	0.00E+00	1.84E-03	3.27E-03	0.3750	2.862E+12
Cs-134	3.1563E-03	307.50	614.99	0.00E+00	9.71E-01	1.94E+00	0.5750	4.869E+13
Cs-135	3.4477E-06	307.50	614.99	0.00E+00	1.06E-03	2.12E-03	0.8500	7.894E+11
Cs-137	2.0313E+00	307.50	614.99	0.00E+00	6.25E+02	1.25E+03	1.2500	4.507E+11
Eu-154	2.4513E-02	307.50	614.99	0.00E+00	7.54E+00	1.51E+01	1.7500	2.069E+10
Eu-155	4.8175E-03	307.50	614.99	0.00E+00	1.48E+00	2.96E+00	2.2500	1.815E+06
Fe-55	1.2397E-04	307.50	614.99	0.00E+00	3.81E-02	7.62E-02	2.7500	1.026E+06
H-3	4.5697E-03	307.50	614.99	0.00E+00	1.41E+00	2.81E+00	3.5000	4.726E+03
I-129	7.5300E-07	307.50	614.99	0.00E+00	2.32E-04	4.63E-04	5.0000	2.719E+02
Kr-85	1.0850E-01	307.50	614.99	0.00E+00	3.34E+01	6.67E+01	7.0000	3.005E+01
Np-237	9.5561E-06	307.50	614.99	0.00E+00	2.94E-03	5.88E-03	11.0000	3.369E+00
Pa-231	2.0359E-08	307.50	614.99	0.00E+00	6.26E-07	1.25E-06		
Pb-210	4.9728E-11	307.50	614.99	0.00E+00	1.53E-08	3.06E-08		
Pm-147	4.8502E-02	307.50	614.99	0.00E+00	1.49E+01	2.98E+01		
Pu-238	1.8254E-02	307.50	614.99	0.00E+00	5.61E+00	1.12E+01		
Pu-239	4.2810E-04	307.50	614.99	0.00E+00	1.32E-01	2.63E-01		
Pu-240	2.4368E-04	307.50	614.99	0.00E+00	7.49E-02	1.50E-01		
Pu-241	3.3415E-02	307.50	614.99	0.00E+00	1.03E+01	2.06E+01		
Pu-242	3.6329E-07	307.50	614.99	0.00E+00	1.12E-04	2.23E-04		
Ra-226	2.2854E-10	307.50	614.99	0.00E+00	7.03E-08	1.41E-07		
Ra-228	1.2426E-14	307.50	614.99	0.00E+00	3.82E-12	7.64E-12		
Ru-106	6.3589E-06	307.50	614.99	0.00E+00	1.96E-03	3.91E-03		
Se-79	1.2933E-05	307.50	614.99	0.00E+00	3.98E-03	7.95E-03		
Sn-126	1.1574E-05	307.50	614.99	0.00E+00	3.56E-03	7.12E-03		
Sr-90	1.9248E+00	307.50	614.99	0.00E+00	5.82E+02	1.16E+03		
Tc-99	4.2239E-04	307.50	614.99	0.00E+00	1.30E-01	2.60E-01		
Th-229	5.0953E-12	307.50	614.99	0.00E+00	1.57E-09	3.13E-09		
Th-230	4.1885E-08	307.50	614.99	0.00E+00	1.29E-05	2.58E-05		
Th-232	1.8270E-14	307.50	614.99	0.00E+00	5.93E-12	1.19E-11		
Ti-208	4.6024E-08	307.50	614.99	0.00E+00	1.42E-05	2.83E-05		
U-232	1.2582E-07	307.50	614.99	0.00E+00	3.87E-05	7.74E-05		
U-233	2.5825E-09	307.50	614.99	0.00E+00	7.94E-07	1.59E-06		
U-234	1.8450E-04	307.50	614.99	0.00E+00	5.67E-02	1.13E-01		
U-235	2.7235E-06	307.50	0.00	3.86E-03	3.02E-03	3.86E-03		
U-236	1.5493E-05	307.50	614.99	0.00E+00	4.76E-03	9.53E-03		
U-238	4.2851E-09	307.50	0.00	2.40E-03	2.40E-03	2.40E-03		
Y-90	1.9254E+00	307.50	614.99	0.00E+00	5.92E+02	1.18E+03		
Other Radionuclides					5.95E+02	1.19E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000028	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		307.50	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		614.99	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.11		1.00
Bounding:	0.22		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3S2 LEU) NETHERLANDS
 SNF ID #: 509
 Fuel Units & Descr: 7 - ASSEMBLY
 Heavy Metal Mass: BOL=5.53kg; EOL=4.86kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.29

II. Estimates

Radionuclide	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	6.6313E-10	628.44	1,256.88	0.00E+00	4.17E-07	8.33E-07	0.0150 1.327E+14
Am-241	2.0060E-03	628.44	1,256.88	0.00E+00	1.26E+00	2.52E+00	0.0250 2.759E+13
Am-242m	4.2429E-07	628.44	1,256.88	0.00E+00	2.67E-04	5.33E-04	0.0375 2.406E+13
Am-243	1.4899E-06	628.44	1,256.88	0.00E+00	9.36E-04	1.87E-03	0.0675 2.577E+13
C-14	5.7135E-09	628.44	1,256.88	0.00E+00	3.59E-08	7.18E-08	0.0850 1.557E+13
Cl-36	1.3124E-32	628.44	1,256.88	0.00E+00	8.25E-30	1.65E-29	0.1250 1.054E+13
Cm-243	1.6443E-07	628.44	1,256.88	0.00E+00	1.03E-04	2.07E-04	0.2250 1.344E+13
Cm-244	2.9330E-05	628.44	1,256.88	0.00E+00	1.84E-02	3.69E-02	0.3750 5.850E+12
Co-60	5.3186E-06	628.44	1,256.88	0.00E+00	3.34E-03	6.68E-03	0.5750 9.543E+13
Cs-134	3.1563E-03	628.44	1,256.88	0.00E+00	1.98E+00	3.97E+00	0.8500 1.613E+12
Cs-135	3.4477E-06	628.44	1,256.88	0.00E+00	2.17E-03	4.33E-03	1.2500 9.212E+11
Cs-137	2.0313E+00	628.44	1,256.88	0.00E+00	1.28E+03	2.55E+03	1.7500 4.228E+10
Eu-154	2.4513E-02	628.44	1,256.88	0.00E+00	1.54E+01	3.08E+01	2.2500 3.709E+06
Eu-155	4.8175E-03	628.44	1,256.88	0.00E+00	3.03E+00	6.06E+00	2.7500 2.097E+06
Fe-55	1.2397E-04	628.44	1,256.88	0.00E+00	7.79E-02	1.56E-01	3.5000 9.640E+03
H-3	4.5697E-03	628.44	1,256.88	0.00E+00	2.87E+00	5.74E+00	5.0000 5.479E+02
I-129	7.5300E-07	628.44	1,256.88	0.00E+00	4.73E-04	9.46E-04	7.0000 6.050E+01
Kr-85	1.0850E-01	628.44	1,256.88	0.00E+00	6.82E+01	1.36E+02	11.0000 6.781E+00
Np-237	9.5561E-06	628.44	1,256.88	0.00E+00	6.01E-03	1.20E-02	
Pa-231	2.0359E-09	628.44	1,256.88	0.00E+00	1.28E-06	2.56E-06	
Pb-210	4.9728E-11	628.44	1,256.88	0.00E+00	3.13E-08	6.25E-08	
Pm-147	4.8502E-02	628.44	1,256.88	0.00E+00	3.05E+01	6.10E+01	
Pu-238	1.8254E-02	628.44	1,256.88	0.00E+00	1.15E+01	2.29E+01	
Pu-239	4.2810E-04	628.44	1,256.88	0.00E+00	2.69E-01	5.38E-01	
Pu-240	2.4368E-04	628.44	1,256.88	0.00E+00	1.53E-01	3.06E-01	
Pu-241	3.3415E-02	628.44	1,256.88	0.00E+00	2.10E+01	4.20E+01	
Pu-242	3.6329E-07	628.44	1,256.88	0.00E+00	2.28E-04	4.57E-04	
Ra-226	2.2854E-10	628.44	1,256.88	0.00E+00	1.44E-07	2.87E-07	
Ra-228	1.2426E-14	628.44	1,256.88	0.00E+00	7.81E-12	1.56E-11	
Ru-106	6.3589E-06	628.44	1,256.88	0.00E+00	4.00E-03	7.99E-03	
Se-79	1.2933E-05	628.44	1,256.88	0.00E+00	8.13E-03	1.63E-02	
Sn-126	1.1574E-05	628.44	1,256.88	0.00E+00	7.27E-03	1.45E-02	
Sr-90	1.9248E+00	628.44	1,256.88	0.00E+00	1.21E+03	2.42E+03	
Tc-99	4.2239E-04	628.44	1,256.88	0.00E+00	2.65E-01	5.31E-01	
Th-229	5.0953E-12	628.44	1,256.88	0.00E+00	3.20E-09	6.40E-09	
Th-230	4.1885E-06	628.44	1,256.88	0.00E+00	2.63E-05	5.26E-05	
Th-232	1.9270E-14	628.44	1,256.88	0.00E+00	1.21E-11	2.42E-11	
Th-208	4.6024E-06	628.44	1,256.88	0.00E+00	2.89E-05	5.78E-05	
U-232	1.2682E-07	628.44	1,256.88	0.00E+00	7.91E-05	1.58E-04	
U-233	2.5825E-09	628.44	1,256.88	0.00E+00	1.62E-06	3.25E-06	
U-234	1.8450E-04	628.44	1,256.88	0.00E+00	1.16E-01	2.32E-01	
U-235	-2.7235E-06	628.44	0.00	2.39E-03	6.78E-04	2.39E-03	
U-236	1.5493E-05	628.44	1,256.88	0.00E+00	9.74E-03	1.95E-02	
U-238	-4.2851E-09	628.44	0.00	1.49E-03	1.48E-03	1.49E-03	
Y-90	1.9254E+00	628.44	1,256.88	0.00E+00	1.21E+03	2.42E+03	
Other Radionuclides					1.22E+03	2.43E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Claddings:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000038	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:		628.44
Bounding:		1,256.88

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM
 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX LEU) SWEDEN

SNF ID #: 523

Fuel Units & Descr: 480 - ASSEMBLY

Heavy Metal Mass: BOL=960kg; EOL=789.888kg

ROD Storage Site: SRS

Fuel decay start date: 2010

Estimates as of: 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: 20 years

Estimated

Canister usage:

18"x10"

20.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	161,099.36	322,198.73	0.00E+00	1.07E-04	2.14E-04	Avg. MeV	
Am-241	2.0060E-03	161,099.36	322,198.73	0.00E+00	3.23E+02	6.46E+02	0.0150	3.401E+16
Am-242m	4.2429E-07	161,099.36	322,198.73	0.00E+00	6.84E-02	1.37E-01	0.0250	7.072E+15
Am-243	1.4899E-06	161,099.36	322,198.73	0.00E+00	2.40E-01	4.80E-01	0.0375	6.169E+15
C-14	5.7135E-09	161,099.36	322,198.73	0.00E+00	9.20E-04	1.84E-03	0.0575	6.607E+15
Cl-36	1.3124E-32	161,099.36	322,198.73	0.00E+00	2.11E-27	4.23E-27	0.0850	3.993E+15
Cm-243	1.6443E-07	161,099.36	322,198.73	0.00E+00	2.65E-02	5.30E-02	0.1250	2.702E+15
Cm-244	2.9330E-05	161,099.36	322,198.73	0.00E+00	4.73E+00	9.45E+00	0.2250	3.445E+15
Co-60	5.3186E-06	161,099.36	322,198.73	0.00E+00	8.57E-01	1.71E+00	0.3750	1.500E+15
Cs-134	3.1563E-03	161,099.36	322,198.73	0.00E+00	5.08E+02	1.02E+03	0.5750	2.446E+16
Cs-135	3.4477E-06	161,099.36	322,198.73	0.00E+00	5.55E-01	1.11E+00	0.8500	4.136E+14
Cs-137	2.0313E+00	161,099.36	322,198.73	0.00E+00	3.27E+05	6.54E+05	1.2500	2.361E+14
Eu-154	2.4513E-02	161,099.36	322,198.73	0.00E+00	3.95E+03	7.90E+03	1.7500	1.084E+13
Eu-155	4.8175E-03	161,099.36	322,198.73	0.00E+00	7.76E+02	1.55E+03	2.2500	9.508E+08
Fe-55	1.2397E-04	161,099.36	322,198.73	0.00E+00	2.00E+01	3.99E+01	2.7500	5.375E+08
H-3	4.5697E-03	161,099.36	322,198.73	0.00E+00	7.36E+02	1.47E+03	3.5000	2.471E+06
I-129	7.5300E-07	161,099.36	322,198.73	0.00E+00	1.21E-01	2.43E-01	5.0000	1.402E+05
Kr-85	1.0850E-01	161,099.36	322,198.73	0.00E+00	1.75E+04	3.50E+04	7.0000	1.548E+04
Np-237	9.5561E-06	161,099.36	322,198.73	0.00E+00	1.54E+00	3.08E+00	11.0000	1.735E+03
Pa-231	2.0359E-09	161,099.36	322,198.73	0.00E+00	3.28E-04	6.56E-04		
Pb-210	4.9728E-11	161,099.36	322,198.73	0.00E+00	8.01E-06	1.60E-05		
Pm-147	4.8502E-02	161,099.36	322,198.73	0.00E+00	7.81E+03	1.56E+04		
Pu-238	1.8254E-02	161,099.36	322,198.73	0.00E+00	2.94E+03	5.88E+03		
Pu-239	4.2810E-04	161,099.36	322,198.73	0.00E+00	6.90E+01	1.38E+02		
Pu-240	2.4368E-04	161,099.36	322,198.73	0.00E+00	3.93E+01	7.85E+01		
Pu-241	3.3415E-02	161,099.36	322,198.73	0.00E+00	5.38E+03	1.08E+04		
Pu-242	3.6329E-07	161,099.36	322,198.73	0.00E+00	5.85E-02	1.17E-01		
Ra-226	2.2854E-10	161,099.36	322,198.73	0.00E+00	3.68E-05	7.36E-05		
Ra-228	1.2426E-14	161,099.36	322,198.73	0.00E+00	2.00E-09	4.00E-09		
Ru-106	6.3589E-06	161,099.36	322,198.73	0.00E+00	1.02E+00	2.05E+00		
Se-79	1.2933E-05	161,099.36	322,198.73	0.00E+00	2.08E+00	4.17E+00		
Sn-126	1.1574E-05	161,099.36	322,198.73	0.00E+00	1.86E+00	3.73E+00		
Sr-90	1.9248E+00	161,099.36	322,198.73	0.00E+00	3.10E+05	6.20E+05		
Tc-99	4.2239E-04	161,099.36	322,198.73	0.00E+00	6.80E+01	1.36E+02		
Th-229	5.0953E-12	161,099.36	322,198.73	0.00E+00	8.21E-07	1.64E-06		
Th-230	4.1885E-08	161,099.36	322,198.73	0.00E+00	6.75E-03	1.35E-02		
Th-232	1.9270E-14	161,099.36	322,198.73	0.00E+00	3.10E-09	6.21E-09		
Ti-208	4.6024E-08	161,099.36	322,198.73	0.00E+00	7.41E-03	1.48E-02		
U-232	1.2582E-07	161,099.36	322,198.73	0.00E+00	2.03E-02	4.05E-02	Thermal Power	
U-233	2.5825E-09	161,099.36	322,198.73	0.00E+00	4.18E-04	8.32E-04	Nominal Heat	Bounding
U-234	1.8450E-04	161,099.36	322,198.73	0.00E+00	2.97E+01	5.94E+01	Output	Heat Output
U-235	-2.7235E-06	161,099.36	0.00	4.15E-01	0.00E+00	4.15E-01	(Watts)	(Watts)
U-236	1.5493E-05	161,099.36	322,198.73	0.00E+00	2.50E+00	4.99E+00	3.84E+03	7.85E+03
U-238	-4.2851E-09	161,099.36	0.00	2.58E-01	2.57E-01	2.58E-01	Total	Total
Y-90	1.9254E+00	161,099.36	322,198.73	0.00E+00	3.10E+05	6.20E+05		
Other Radionuclides					3.12E+05	6.23E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		161,099.36
Bounding:		322,198.73

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:	0.53	
Bounding:	1.07	

Estimated EOL HM/Given EOL HM

1.03

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

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

Fuel Radionuclide Inventory Worksheet

1. Fuel and Template Information
 Fuel Name: FRR MTR-C (UALXHEU) ARGENTINA
 SNF ID #: 635
 Fuel Units & Decay: 14 - MTR TYPE
 Heavy Metal Mass: BOL-2.395kg; EOL=1.749kg
 ROD Storage She: SRS

Fuel decay start date: 2010
 Estimate as of: 2030
 Template: ATR (Lgth Warr. Ann. 60 to 100%, U)
 Template Burnup(MWD): 3672
 Template BOL Heavy Metal Mass (MTR): 0.0016698
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 0.58

IL Estimate	m	%	%	b	%	%	Gamma Sources
Radionuclide	CLAW/F From Template	Nominal Fuel Burnup (MWD) ^a	Bounding Fuel Burnup (MWD) ^a	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	6.6313E-10	612.53	1.225.06	0.00E+00	4.00E-07	8.12E-07	Avg. Max
Am-241	2.0080E-03	612.53	1.225.06	0.00E+00	1.23E+00	2.46E+00	0.0150
Am-242m	4.2429E-07	612.53	1.225.06	0.00E+00	2.60E-04	5.20E-04	0.0250
Am-243	1.4899E-08	612.53	1.225.06	0.00E+00	9.13E-04	1.83E-03	0.0375
C-14	5.7135E-09	612.53	1.225.06	0.00E+00	3.50E-06	7.00E-06	0.0575
Ci-36	1.3124E-32	612.53	1.225.06	0.00E+00	8.04E-30	1.61E-29	0.0850
Co-243	1.6443E-07	612.53	1.225.06	0.00E+00	1.07E-04	2.07E-04	0.1250
Co-244	2.8330E-05	612.53	1.225.06	0.00E+00	1.80E-02	3.59E-02	0.2250
Co-60	5.3186E-06	612.53	1.225.06	0.00E+00	3.29E-03	6.59E-03	0.5750
Co-134	3.1563E-03	612.53	1.225.06	0.00E+00	1.83E+00	3.67E+00	0.5750
Co-135	3.4477E-06	612.53	1.225.06	0.00E+00	2.11E-03	4.22E-03	0.8500
Co-137	2.0313E+00	612.53	1.225.06	0.00E+00	1.24E+03	2.49E+03	1.2500
Eu-154	2.4513E-02	612.53	1.225.06	0.00E+00	1.50E+01	3.00E+01	1.7500
Eu-155	4.8173E-03	612.53	1.225.06	0.00E+00	2.86E+00	5.70E+00	2.2500
Fe-55	1.2397E-04	612.53	1.225.06	0.00E+00	7.59E-02	1.52E-01	2.7500
H-3	4.5687E-03	612.53	1.225.06	0.00E+00	2.80E+00	5.60E+00	3.5000
K-40	7.5300E-07	612.53	1.225.06	0.00E+00	4.61E-04	9.22E-04	5.0000
K-85	1.0850E-01	612.53	1.225.06	0.00E+00	6.65E+01	1.33E+02	7.0000
Np-237	9.5561E-06	612.53	1.225.06	0.00E+00	5.85E-03	1.17E-02	11.0000
Pa-231	2.0539E-09	612.53	1.225.06	0.00E+00	1.25E-06	2.49E-06	
Pb-210	4.9723E-11	612.53	1.225.06	0.00E+00	3.05E-08	6.09E-08	
Pm-147	4.8502E-02	612.53	1.225.06	0.00E+00	2.97E+01	5.94E+01	
Pu-238	1.8254E-02	612.53	1.225.06	0.00E+00	1.12E+01	2.24E+01	
Pu-239	4.2810E-04	612.53	1.225.06	0.00E+00	2.62E-01	5.24E-01	
Pu-240	2.4389E-06	612.53	1.225.06	0.00E+00	1.49E-01	2.99E-01	
Pu-241	3.3415E-02	612.53	1.225.06	0.00E+00	2.05E+01	4.09E+01	
Pu-242	3.6329E-07	612.53	1.225.06	0.00E+00	2.23E-04	4.45E-04	
Pu-242	2.2854E-10	612.53	1.225.06	0.00E+00	1.40E-07	2.80E-07	
Pu-246	1.2429E-14	612.53	1.225.06	0.00E+00	7.61E-12	1.52E-11	
Pu-248	6.3589E-06	612.53	1.225.06	0.00E+00	3.90E-03	7.79E-03	
Pu-106	1.2833E-05	612.53	1.225.06	0.00E+00	7.92E-03	1.58E-02	
Se-79	1.2833E-05	612.53	1.225.06	0.00E+00	7.92E-03	1.58E-02	
Sm-126	1.1574E-05	612.53	1.225.06	0.00E+00	7.09E-03	1.42E-02	
Sn-90	1.9248E+00	612.53	1.225.06	0.00E+00	1.19E+03	2.39E+03	
Tc-99	4.2239E-04	612.53	1.225.06	0.00E+00	2.59E-01	5.17E-01	
Ti-228	5.0953E-12	612.53	1.225.06	0.00E+00	3.12E-09	6.24E-09	
Ti-230	4.1885E-08	612.53	1.225.06	0.00E+00	2.57E-05	5.13E-05	
Ti-232	1.9270E-14	612.53	1.225.06	0.00E+00	1.19E-11	2.38E-11	
Ti-206	4.6024E-08	612.53	1.225.06	0.00E+00	2.82E-05	5.64E-05	
U-232	1.2582E-07	612.53	1.225.06	0.00E+00	7.71E-05	1.54E-04	
U-233	2.5825E-09	612.53	1.225.06	0.00E+00	1.58E-06	3.16E-06	
U-234	1.8450E-04	612.53	1.225.06	0.00E+00	1.13E-01	2.26E-01	
U-235	2.7235E-06	612.53	1.225.06	0.00E+00	4.68E-03	9.36E-03	
U-236	1.5489E-05	612.53	1.225.06	0.00E+00	8.49E-03	1.69E-02	
U-238	4.2851E-09	612.53	1.225.06	0.00E+00	7.79E-05	1.55E-04	
Y-90	1.9254E+00	612.53	1.225.06	0.00E+00	1.19E+03	2.37E+03	

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.46E+07	2.82E+07
Total	Total

TiL Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	
From SFD	Used
Reactor Moderator: LIGHT WATER	Reactor Moderator: LIGHT WATER
Fuel Cladding: U	Fuel Cladding: U
BOL H/M Constituents: U	BOL H/M Constituents: U
BOL Enrichment %: 80.00000174	BOL Enrichment %: 60 to 100

Basis for Parameter Differences:

Burnup Summary (MWD) ^a	
Nominal: From SFD	Estimated: 612.53
Bounding: 1.225.06	Bounding burnup assumed to be twice nominal burnup.

Basis for burnup used in estimate:

Checks	
Nominal: Burnup Multiplier: 0.81	Estimated Burnup/ Given Burnup: 1.02
Bounding: 1.63	Estimated EOL H/M/Given EOL H/M: 1.02

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

Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWD/MHT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: FRR MTR-C (UAK+EO) CANADA
 SNF ID #: 612
 Fuel Units & Descr: 23 - MTR TYPE
 Heavy Metal Mass: BOL-2.721kg; EOL-1.78kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Alum. 60 to 100%, U)
 Template Burnup (MWd): 567.2
 Template Heavy Metal Mass (MT): 0.0016689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18 x10
 0.96

IL Estimates	m	x _m	x ₀	B	Y ₀	Y ₅	Gamma Sources
Radionuclide	CLMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	6.6313E-10	910.46	1,820.93	0.00E+00	6.04E-07	1.21E-06	Avg. 0.0150
Am-241	2.0060E-03	910.46	1,820.93	0.00E+00	1.83E+00	3.65E+00	0.0150
Am-242m	4.2429E-07	910.46	1,820.93	0.00E+00	3.85E-04	7.73E-04	0.0250
Am-243	1.4899E-06	910.46	1,820.93	0.00E+00	1.35E-03	2.71E-03	0.0375
C-14	5.7135E-09	910.46	1,820.93	0.00E+00	5.20E-06	1.04E-05	0.0575
C-36	1.3124E-32	910.46	1,820.93	0.00E+00	1.19E-29	2.39E-29	0.0650
Co-243	1.6443E-07	910.46	1,820.93	0.00E+00	1.50E-04	2.99E-04	0.1250
Co-244	2.8330E-05	910.46	1,820.93	0.00E+00	2.67E-02	5.34E-02	0.2250
Co-60	5.3186E-06	910.46	1,820.93	0.00E+00	4.64E-03	9.68E-03	0.3750
Co-134	3.1693E-03	910.46	1,820.93	0.00E+00	2.67E+00	5.75E+00	0.5750
Co-135	3.4477E-06	910.46	1,820.93	0.00E+00	3.14E-03	6.28E-03	0.6500
Co-137	2.0313E+00	910.46	1,820.93	0.00E+00	3.14E+03	3.70E+03	1.2500
Eu-154	2.4513E-02	910.46	1,820.93	0.00E+00	2.23E+01	4.46E+01	1.7500
Eu-155	4.8175E-03	910.46	1,820.93	0.00E+00	4.39E+00	8.77E+00	2.2500
Fe-55	1.2397E-04	910.46	1,820.93	0.00E+00	1.13E-01	2.26E-01	2.7500
H-3	4.5697E-03	910.46	1,820.93	0.00E+00	4.18E+00	8.32E+00	3.5000
I-129	7.5300E-07	910.46	1,820.93	0.00E+00	6.86E-04	1.37E-03	5.0000
K-85	1.0650E-01	910.46	1,820.93	0.00E+00	9.88E+01	1.98E+02	7.0000
Np-237	9.5561E-06	910.46	1,820.93	0.00E+00	8.70E-03	1.74E-02	11.0000
Pa-231	2.0359E-09	910.46	1,820.93	0.00E+00	1.85E-06	3.71E-06	
Pb-210	4.9722E-11	910.46	1,820.93	0.00E+00	4.53E-08	9.06E-08	
Pb-212	4.8502E-02	910.46	1,820.93	0.00E+00	4.42E+01	8.83E+01	
Pb-238	1.8254E-02	910.46	1,820.93	0.00E+00	1.66E+01	3.32E+01	
Pu-240	2.4358E-04	910.46	1,820.93	0.00E+00	2.22E-01	4.44E-01	
Pu-241	3.3415E-02	910.46	1,820.93	0.00E+00	3.04E+01	6.08E+01	
Pu-242	3.6329E-07	910.46	1,820.93	0.00E+00	3.31E-04	6.62E-04	
Pu-242	2.2854E-10	910.46	1,820.93	0.00E+00	2.08E-07	4.16E-07	
Pu-238	1.2436E-14	910.46	1,820.93	0.00E+00	1.13E-11	2.26E-11	
Pu-106	6.3589E-06	910.46	1,820.93	0.00E+00	5.79E-03	1.16E-02	
Sm-147	1.2835E-05	910.46	1,820.93	0.00E+00	1.18E-02	2.36E-02	
Sm-126	1.1574E-05	910.46	1,820.93	0.00E+00	1.05E-02	2.11E-02	
Sm-90	1.9248E+00	910.46	1,820.93	0.00E+00	1.75E+03	3.50E+03	
Tb-229	5.0835E-12	910.46	1,820.93	0.00E+00	3.85E-01	7.69E-01	
Tb-230	4.1885E-08	910.46	1,820.93	0.00E+00	4.64E-09	9.28E-09	
Tb-232	1.8270E-14	910.46	1,820.93	0.00E+00	1.75E-11	3.51E-11	
Tb-232	4.6024E-08	910.46	1,820.93	0.00E+00	4.19E-06	8.38E-06	
U-232	1.2532E-07	910.46	1,820.93	0.00E+00	1.15E-04	2.29E-04	
U-234	2.5825E-09	910.46	1,820.93	0.00E+00	2.35E-06	4.70E-06	
U-234	1.8450E-04	910.46	1,820.93	0.00E+00	1.68E-01	3.36E-01	
U-235	2.7235E-06	910.46	0.00	5.47E-03	2.89E-02	5.47E-02	
U-235	1.5403E-05	910.46	1,820.93	0.00E+00	1.41E-02	2.82E-02	
U-238	4.2851E-09	910.46	0.00	6.40E-05	6.01E-05	6.40E-05	
Y-90	1.9254E+00	910.46	1,820.93	0.00E+00	1.75E+03	3.51E+03	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
	2.17E+01	4.35E+01
Total		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFR	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: U	ALUM
BOL HMI Constituents: U	U
BOL Enrichment %: 82.9997833	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

From SFR	Estimated
Nominal: 910.46	910.46
Bounding: 1,820.93	Nominal burnup calculated from the heavy metal mass destroyed.
	1,820.93 Bounding Burnup assumed to be twice nominal burnup.

Basis for Burnup used in estimate:

Nominal: 910.46	Estimated
Bounding: 1,820.93	Nominal burnup calculated from the heavy metal mass destroyed.
	1,820.93 Bounding Burnup assumed to be twice nominal burnup.

Checks

Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding: 2.13	1.05	

Estimated EOL NUCLINCHEN EOL HMI	1.05
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Reactor shutdown, core removal, storage, shipping or other data 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/HM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRB MTR-C (U/LX+EU) GERMANY
 SIF ID #: 579
 Fuel Units & Decay: 30 - MTR TYPE
 Heavy Metal Mass: BOL=3.356kg EOL=2.002kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimate as of: 2030
 Template: ATR (U/LX+EU, Alim. 60 to 100%, U)
 *Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.0016658
 Template Decay Time: 20 years

Estimated
 Canister Usage:
 187.719
 1.38

II. Radionuclides

Radionuclide	CI/MWD From Template	Normal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Normal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources
Ac-227	6.6313E-10	1.206.31	2.412.63	0.00E+00	8.00E-07	1.60E-08	Photon Energy Group
Am-241	2.0060E-03	1.206.31	2.412.63	0.00E+00	2.40E+00	4.84E+00	2.547E+14
Am-242m	4.2429E-07	1.206.31	2.412.63	0.00E+00	5.12E-04	1.02E-03	0.0250
Am-243	1.4899E-08	1.206.31	2.412.63	0.00E+00	1.80E-03	3.59E-03	0.0075
C-14	5.7135E-09	1.206.31	2.412.63	0.00E+00	6.88E-06	1.38E-05	0.0575
C-36	1.3124E-02	1.206.31	2.412.63	0.00E+00	1.58E-29	3.17E-29	0.0850
Co-57	1.6443E-07	1.206.31	2.412.63	0.00E+00	1.98E-04	3.97E-04	0.1250
Co-58	2.9330E-05	1.206.31	2.412.63	0.00E+00	3.54E-02	7.08E-02	0.2250
Co-60	5.3186E-06	1.206.31	2.412.63	0.00E+00	6.42E-03	1.29E-02	0.3750
Co-134	3.1563E-03	1.206.31	2.412.63	0.00E+00	3.81E+00	7.62E+00	0.5750
Co-137	3.4477E-06	1.206.31	2.412.63	0.00E+00	4.19E-03	8.32E-03	0.8500
Eu-154	2.0313E+00	1.206.31	2.412.63	0.00E+00	2.45E+03	4.90E+03	1.2500
Eu-155	4.8175E-03	1.206.31	2.412.63	0.00E+00	2.98E+01	5.91E+01	1.7500
Fe-55	1.2397E-04	1.206.31	2.412.63	0.00E+00	5.81E+00	1.16E+01	2.2500
H-3	4.5687E-03	1.206.31	2.412.63	0.00E+00	5.51E+00	1.10E+01	2.7500
I-129	7.5300E-07	1.206.31	2.412.63	0.00E+00	9.08E-04	1.82E-03	3.5000
K-86	1.0950E-01	1.206.31	2.412.63	0.00E+00	1.31E+02	2.62E+02	5.0000
Np-237	9.5581E-08	1.206.31	2.412.63	0.00E+00	1.15E-02	2.31E-02	7.0000
Pu-231	2.0269E-09	1.206.31	2.412.63	0.00E+00	2.46E-08	4.91E-08	11.0000
Pu-238	4.9728E-11	1.206.31	2.412.63	0.00E+00	6.00E-08	1.20E-07	
Pu-239	4.8502E-02	1.206.31	2.412.63	0.00E+00	5.85E+01	1.17E+02	
Pu-240	1.8254E-02	1.206.31	2.412.63	0.00E+00	2.20E+01	4.40E+01	
Pu-242	4.2810E-04	1.206.31	2.412.63	0.00E+00	5.16E-01	1.03E+00	
Pu-244	2.4368E-04	1.206.31	2.412.63	0.00E+00	2.94E-01	5.88E-01	
Pu-246	3.3415E-02	1.206.31	2.412.63	0.00E+00	4.03E+01	8.06E+01	
Ra-226	2.2854E-10	1.206.31	2.412.63	0.00E+00	2.78E-07	5.51E-07	
Ra-228	1.2426E-14	1.206.31	2.412.63	0.00E+00	1.50E-11	3.00E-11	
Ru-106	6.3589E-08	1.206.31	2.412.63	0.00E+00	7.67E-03	1.53E-02	
Sr-78	1.2933E-05	1.206.31	2.412.63	0.00E+00	1.56E-02	3.12E-02	
Sr-90	1.1574E-05	1.206.31	2.412.63	0.00E+00	1.40E-02	2.79E-02	
Tc-99	4.2239E-02	1.206.31	2.412.63	0.00E+00	2.32E+03	4.64E+03	
Th-229	5.0953E-12	1.206.31	2.412.63	0.00E+00	5.10E-01	1.02E+00	
Th-230	4.1885E-08	1.206.31	2.412.63	0.00E+00	6.05E-05	1.21E-04	
Th-232	1.9270E-14	1.206.31	2.412.63	0.00E+00	2.32E-11	4.65E-11	
Th-238	4.6024E-08	1.206.31	2.412.63	0.00E+00	5.55E-05	1.11E-04	
U-232	1.2582E-07	1.206.31	2.412.63	0.00E+00	1.52E-04	3.04E-04	
U-233	2.5825E-09	1.206.31	2.412.63	0.00E+00	3.12E-06	6.22E-06	
U-234	1.8450E-04	1.206.31	2.412.63	0.00E+00	2.23E-01	4.46E-01	
U-235	2.7235E-06	1.206.31	0.00	6.71E-03	3.42E-03	6.71E-03	
U-238	1.5463E-06	1.206.31	2.412.63	0.00E+00	1.87E-02	3.74E-02	
U-238	4.2811E-09	1.206.31	0.00	7.85E-05	7.33E-05	7.85E-05	
Y-90	1.9254E+00	1.206.31	2.412.63	0.00E+00	2.32E+03	4.64E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used
Reactor Moderator: LIGHT WATER	LIGHT WATER
Fuel Cladding: ALUM	ALUM
BOL HIM Constituents: U	U
BOL Enrichment %: 92.9597131	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

From SFD	Estimated
Normal:	1.206.31
Bounding:	2.412.63

*Normal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be the normal burnup.

Checks

From SFD	Estimated Burnup/ Given Burnup
Normal:	1.15
Bounding:	2.30

Estimated EOL HIM/Given EOL HIM
 1.04

Reactor shutdown, core removal, storage, shipping or other data 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/GM).

Thermal Power

Normal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+01	5.73E+01
Total	Total

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) JAPAN
 SNF ID #: 800
 Fuel Units & Descr: 54 - MTR TYPE
 Heavy Metal Mass: BOL=5.227kg; EOL=4.158kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 2.25

II. Estimates	m	λ_a	λ_b	b	γ_a	γ_b	Gamma Sources	
Radionuclide	GMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.8313E-10	1,012.55	2,025.11	0.00E+00	6.71E-07	1.34E-06	Avg. MeV	
Am-241	2.0060E-03	1,012.55	2,025.11	0.00E+00	2.03E+00	4.06E+00	0.0150	2.139E+14
Am-242m	4.2429E-07	1,012.55	2,025.11	0.00E+00	4.30E-04	8.59E-04	0.0250	4.445E+13
Am-243	1.4899E-06	1,012.55	2,025.11	0.00E+00	1.51E-03	3.02E-03	0.0375	3.877E+13
C-14	5.7135E-09	1,012.55	2,025.11	0.00E+00	5.79E-06	1.16E-05	0.0575	4.153E+13
Ci-36	1.3124E-32	1,012.55	2,025.11	0.00E+00	1.33E-29	2.66E-29	0.0850	2.509E+13
Cm-243	1.6443E-07	1,012.55	2,025.11	0.00E+00	1.66E-04	3.33E-04	0.1250	1.696E+13
Cm-244	2.9330E-05	1,012.55	2,025.11	0.00E+00	2.97E-02	5.94E-02	0.2250	2.165E+13
Co-60	5.3186E-06	1,012.55	2,025.11	0.00E+00	5.39E-03	1.08E-02	0.3750	9.426E+12
Cs-134	3.1563E-03	1,012.55	2,025.11	0.00E+00	3.20E+00	6.39E+00	0.5750	1.536E+14
Cs-135	3.4477E-06	1,012.55	2,025.11	0.00E+00	3.49E-03	6.98E-03	0.8500	2.599E+12
Cs-137	2.0313E+00	1,012.55	2,025.11	0.00E+00	2.06E+03	4.11E+03	1.2500	1.484E+12
Eu-154	2.4513E-02	1,012.55	2,025.11	0.00E+00	2.48E+01	4.96E+01	1.7500	6.812E+10
Eu-155	4.8175E-03	1,012.55	2,025.11	0.00E+00	4.88E+00	9.76E+00	2.2500	5.976E+06
Fe-55	1.2397E-04	1,012.55	2,025.11	0.00E+00	1.26E-01	2.51E-01	2.7500	3.378E+06
H-3	4.5697E-03	1,012.55	2,025.11	0.00E+00	4.63E+00	9.25E+00	3.5000	1.552E+04
I-129	7.5300E-07	1,012.55	2,025.11	0.00E+00	7.62E-04	1.52E-03	5.0000	6.776E+02
Kr-85	1.0850E-01	1,012.55	2,025.11	0.00E+00	1.10E+02	2.20E+02	7.0000	9.888E+01
Np-237	9.5561E-06	1,012.55	2,025.11	0.00E+00	9.68E-03	1.94E-02	11.0000	1.086E+01
Pa-231	2.0359E-09	1,012.55	2,025.11	0.00E+00	2.06E-06	4.12E-06		
Pb-210	4.9728E-11	1,012.55	2,025.11	0.00E+00	5.04E-08	1.01E-07		
Pm-147	4.8502E-02	1,012.55	2,025.11	0.00E+00	4.91E+01	9.82E+01		
Pu-238	1.8254E-02	1,012.55	2,025.11	0.00E+00	1.85E+01	3.70E+01		
Pu-239	4.2810E-04	1,012.55	2,025.11	0.00E+00	4.33E-01	8.67E-01		
Pu-240	2.4368E-04	1,012.55	2,025.11	0.00E+00	2.47E-01	4.93E-01		
Pu-241	3.3415E-02	1,012.55	2,025.11	0.00E+00	3.38E+01	6.77E+01		
Pu-242	3.6329E-07	1,012.55	2,025.11	0.00E+00	3.68E-04	7.36E-04		
Ra-226	2.2854E-10	1,012.55	2,025.11	0.00E+00	2.31E-07	4.63E-07		
Ra-228	1.2426E-14	1,012.55	2,025.11	0.00E+00	1.26E-11	2.52E-11		
Ru-106	6.3589E-06	1,012.55	2,025.11	0.00E+00	6.44E-03	1.29E-02		
Se-79	1.2933E-05	1,012.55	2,025.11	0.00E+00	1.31E-02	2.62E-02		
Sn-126	1.1574E-05	1,012.55	2,025.11	0.00E+00	1.17E-02	2.34E-02		
Sr-90	1.9248E+00	1,012.55	2,025.11	0.00E+00	1.95E+03	3.90E+03		
Tc-99	4.2239E-04	1,012.55	2,025.11	0.00E+00	4.28E-01	8.55E-01		
Th-229	5.0953E-12	1,012.55	2,025.11	0.00E+00	5.16E-09	1.03E-08		
Th-230	4.1885E-08	1,012.55	2,025.11	0.00E+00	4.24E-05	8.48E-05		
Th-232	1.9270E-14	1,012.55	2,025.11	0.00E+00	1.95E-11	3.90E-11		
Ti-208	4.6024E-08	1,012.55	2,025.11	0.00E+00	4.66E-05	9.32E-05		
U-232	1.2582E-07	1,012.55	2,025.11	0.00E+00	1.27E-04	2.55E-04		
U-233	2.5825E-09	1,012.55	2,025.11	0.00E+00	2.61E-06	5.23E-06		
U-234	1.8450E-04	1,012.55	2,025.11	0.00E+00	1.87E-01	3.74E-01		
U-235	-2.7235E-06	1,012.55	0.00	1.05E-02	7.75E-03	1.05E-02		
U-236	1.5493E-05	1,012.55	2,025.11	0.00E+00	1.57E-02	3.14E-02		
U-238	-4.2851E-09	1,012.55	0.00	1.23E-04	1.19E-04	1.23E-04		
Y-90	1.9254E+00	1,012.55	2,025.11	0.00E+00	1.95E+03	3.90E+03		
Other Radionuclides					1.96E+03	3.92E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999931	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		1,012.55
Bounding:		2,025.11

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:	0.62	
Bounding:	1.23	

Estimated EOL HM/Given EOL HM

1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) PORTUGAL

SNF ID #: 631

Fuel Units & Descr: 0 - MTR TYPE

Heavy Metal Mass: BOL=1.423kg; EOL=0.894kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x10"

0.38

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	501.16	1,002.33	0.00E+00	3.32E-07	6.65E-07	Avg. MeV	
Am-241	2.0060E-03	501.16	1,002.33	0.00E+00	1.01E+00	2.01E+00	0.0150	1.058E+14
Am-242m	4.2429E-07	501.16	1,002.33	0.00E+00	2.13E-04	4.25E-04	0.0250	2.200E+13
Am-243	1.4899E-06	501.16	1,002.33	0.00E+00	7.47E-04	1.49E-03	0.0375	1.919E+13
C-14	5.7135E-09	501.16	1,002.33	0.00E+00	2.86E-06	5.73E-06	0.0575	2.056E+13
Cl-36	1.3124E-32	501.16	1,002.33	0.00E+00	6.58E-30	1.32E-29	0.0850	1.242E+13
Cm-243	1.6443E-07	501.16	1,002.33	0.00E+00	8.24E-05	1.65E-04	0.1250	8.405E+12
Cm-244	2.9330E-05	501.16	1,002.33	0.00E+00	1.47E-02	2.94E-02	0.2250	1.072E+13
Co-60	5.3186E-06	501.16	1,002.33	0.00E+00	2.67E-03	5.33E-03	0.3750	4.865E+12
Cs-134	3.1563E-03	501.16	1,002.33	0.00E+00	1.58E+00	3.16E+00	0.5750	7.610E+13
Cs-136	3.4477E-06	501.16	1,002.33	0.00E+00	1.73E-03	3.46E-03	0.8500	1.287E+12
Cs-137	2.0313E+00	501.16	1,002.33	0.00E+00	1.02E+03	2.04E+03	1.2500	7.346E+11
Eu-154	2.4513E-02	501.16	1,002.33	0.00E+00	1.23E+01	2.46E+01	1.7500	3.372E+10
Eu-155	4.8175E-03	501.16	1,002.33	0.00E+00	2.41E+00	4.83E+00	2.2500	2.958E+06
Fe-55	1.2397E-04	501.16	1,002.33	0.00E+00	6.21E-02	1.24E-01	2.7500	1.672E+06
H-3	4.5697E-03	501.16	1,002.33	0.00E+00	2.29E+00	4.58E+00	3.5000	7.681E+03
I-129	7.5300E-07	501.16	1,002.33	0.00E+00	3.77E-04	7.55E-04	5.0000	4.343E+02
Kr-85	1.0850E-01	501.16	1,002.33	0.00E+00	5.44E+01	1.09E+02	7.0000	4.794E+01
Np-237	9.5561E-06	501.16	1,002.33	0.00E+00	4.79E-03	9.59E-03	11.0000	5.373E+00
Pa-231	2.0359E-09	501.16	1,002.33	0.00E+00	1.02E-06	2.04E-06		
Pb-210	4.9728E-11	501.16	1,002.33	0.00E+00	2.49E-08	4.98E-08		
Pm-147	4.8502E-02	501.16	1,002.33	0.00E+00	2.43E+01	4.86E+01		
Pu-238	1.8254E-02	501.16	1,002.33	0.00E+00	9.15E+00	1.83E+01		
Pu-239	4.2810E-04	501.16	1,002.33	0.00E+00	2.15E-01	4.29E-01		
Pu-240	2.4368E-04	501.16	1,002.33	0.00E+00	1.22E-01	2.44E-01		
Pu-241	3.3415E-02	501.16	1,002.33	0.00E+00	1.67E+01	3.35E+01		
Pu-242	3.6329E-07	501.16	1,002.33	0.00E+00	1.82E-04	3.64E-04		
Ra-226	2.2854E-10	501.16	1,002.33	0.00E+00	1.15E-07	2.29E-07		
Ra-228	1.2426E-14	501.16	1,002.33	0.00E+00	6.23E-12	1.25E-11		
Ru-106	6.3589E-06	501.16	1,002.33	0.00E+00	3.19E-03	6.37E-03		
Se-79	1.2933E-05	501.16	1,002.33	0.00E+00	6.48E-03	1.30E-02		
Sn-126	1.1574E-06	501.16	1,002.33	0.00E+00	5.80E-03	1.16E-02		
Sr-90	1.9248E+00	501.16	1,002.33	0.00E+00	9.65E+02	1.93E+03		
Tc-99	4.2239E-04	501.16	1,002.33	0.00E+00	2.12E-01	4.23E-01		
Th-229	5.0953E-12	501.16	1,002.33	0.00E+00	2.55E-09	5.11E-09		
Th-230	4.1885E-08	501.16	1,002.33	0.00E+00	2.10E-05	4.20E-05		
Th-232	1.9270E-14	501.16	1,002.33	0.00E+00	9.68E-12	1.93E-11		
Th-238	4.6024E-08	501.16	1,002.33	0.00E+00	2.31E-05	4.61E-05		
U-232	1.2582E-07	501.16	1,002.33	0.00E+00	6.31E-05	1.26E-04		
U-233	2.5825E-09	501.16	1,002.33	0.00E+00	1.29E-06	2.59E-06	Thermal Power	
U-234	1.8450E-04	501.16	1,002.33	0.00E+00	9.25E-02	1.85E-01	Nominal Heat	Bounding
U-235	-2.7235E-06	501.16	0.00	2.86E-03	1.49E-03	2.86E-03	Output (Watts)	Heat Output (Watts)
U-236	1.5493E-05	501.16	1,002.33	0.00E+00	7.76E-03	1.55E-02	1.19E+01	2.39E+01
U-238	-4.2851E-09	501.16	0.00	3.35E-05	3.13E-05	3.35E-05	Total	Total
Y-90	1.9254E+00	501.16	1,002.33	0.00E+00	9.65E+02	1.93E+03		

Other Radionuclides

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 Claddings:		ALUM	
BOL HM Constituents:		U	
BOL Enrichment %:	93.00000971	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		501.16	
Bounding:		1,002.33	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	1.12		
Bounding:	2.24		1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: FRR MTR-C (UAX+EU) TURKEY
 SFR ID #: 643
 Fuel Unit & Design: S - MTR TYPE
 Heavy Metal Mass: BOL-1.781kg; EOL-0.953kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (light water, Alum., 60 to 100%, U)
 Template Burnup (MWd/kg): 367.2
 Template BOL Heavy Metal Mass (kg): 0.0016689
 Template Decay Time: 20 years

Estimated
 Canister Usage:
 18 x 10'
 0.33

II. Estimates	m	x _m	x _p	b	y _a	y _p	Gamma Sources
Radionuclide	CA/MWD From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory (Ci)	Bounding Fuel Inventory (Ci)	Photon Energy Group
Ac-227	6.631E-10	784.13	1,568.26	0.00E+00	5.20E-07	1.04E-06	Avg. Mev
Am-241	2.0080E-03	784.13	1,568.26	0.00E+00	1.57E+00	3.15E+00	0.0150
Am-243m	4.2429E-07	784.13	1,568.26	0.00E+00	3.33E-04	6.65E-04	0.0050
Am-243	1.4889E-06	784.13	1,568.26	0.00E+00	1.17E-03	2.34E-03	0.0075
C-14	5.7135E-09	784.13	1,568.26	0.00E+00	4.48E-06	8.96E-06	0.0675
C-36	1.3124E-32	784.13	1,568.26	0.00E+00	1.03E-29	2.06E-29	0.0650
Cm-243	1.6443E-07	784.13	1,568.26	0.00E+00	1.29E-04	2.58E-04	0.1250
Cm-244	2.8330E-05	784.13	1,568.26	0.00E+00	2.30E-02	4.60E-02	0.2250
Co-60	5.3185E-06	784.13	1,568.26	0.00E+00	4.17E-03	8.34E-03	0.5750
Co-134	3.1563E-03	784.13	1,568.26	0.00E+00	2.47E+00	4.95E+00	0.5750
Co-136	3.4477E-06	784.13	1,568.26	0.00E+00	2.70E-03	5.41E-03	0.8500
Eu-154	2.4513E-02	784.13	1,568.26	0.00E+00	1.59E+03	3.18E+03	1.2500
Eu-155	4.8175E-03	784.13	1,568.26	0.00E+00	1.92E+01	3.84E+01	1.7500
H-3	4.5697E-03	784.13	1,568.26	0.00E+00	3.58E+00	7.16E+00	0.5750
Fe-55	1.2397E-04	784.13	1,568.26	0.00E+00	8.72E-02	1.74E-01	2.7500
K-40	1.0850E-01	784.13	1,568.26	0.00E+00	8.51E+01	1.70E+02	3.5000
Nb-237	9.5561E-06	784.13	1,568.26	0.00E+00	7.48E-03	1.50E-02	6.0000
Nd-231	2.0359E-09	784.13	1,568.26	0.00E+00	1.60E-06	3.19E-06	11.0000
Pb-210	4.9728E-11	784.13	1,568.26	0.00E+00	3.80E-08	7.60E-08	
Pm-147	4.8502E-02	784.13	1,568.26	0.00E+00	3.80E+01	7.60E+01	
Pu-238	1.8254E-02	784.13	1,568.26	0.00E+00	1.43E+01	2.86E+01	
Pu-239	4.2810E-04	784.13	1,568.26	0.00E+00	3.36E-01	6.71E-01	
Pu-240	2.4368E-04	784.13	1,568.26	0.00E+00	1.91E-01	3.82E-01	
Pu-241	3.3415E-02	784.13	1,568.26	0.00E+00	2.62E+01	5.24E+01	
Pu-242	3.6299E-07	784.13	1,568.26	0.00E+00	2.65E-04	5.30E-04	
Ra-226	2.2854E-10	784.13	1,568.26	0.00E+00	1.79E-07	3.58E-07	
Ru-106	1.2426E-14	784.13	1,568.26	0.00E+00	9.74E-12	1.95E-11	
Se-79	1.2933E-06	784.13	1,568.26	0.00E+00	4.99E-03	9.97E-03	
Si-126	1.1574E-05	784.13	1,568.26	0.00E+00	1.01E-02	2.02E-02	
Sn-126	1.8248E-00	784.13	1,568.26	0.00E+00	9.08E-03	1.82E-02	
Tb-89	4.2239E-04	784.13	1,568.26	0.00E+00	1.51E+03	3.02E+03	
Tb-229	6.0935E-12	784.13	1,568.26	0.00E+00	3.31E-01	6.62E-01	
Tb-230	4.1855E-08	784.13	1,568.26	0.00E+00	4.00E-09	7.99E-09	
Tb-232	1.8270E-14	784.13	1,568.26	0.00E+00	1.51E-11	3.02E-11	
Tl-208	4.6024E-03	784.13	1,568.26	0.00E+00	3.28E-05	6.57E-05	
U-232	1.2582E-07	784.13	1,568.26	0.00E+00	9.67E-05	1.93E-04	
U-233	2.8525E-04	784.13	1,568.26	0.00E+00	2.03E-06	4.05E-06	
U-234	1.8450E-04	784.13	1,568.26	0.00E+00	1.45E-01	2.89E-01	
U-235	-2.7235E-06	784.13	0.00	3.59E-03	1.44E-03	3.58E-03	
U-236	1.5493E-05	784.13	1,568.26	0.00E+00	1.21E-02	2.42E-02	
U-238	-4.2851E-09	784.13	0.00	4.19E-05	3.85E-05	4.19E-05	
Y-90	1.9254E-00	784.13	1,568.26	0.00E+00	1.51E+03	3.02E+03	

Thermal Power
 Nominal Heat Output (Watts)
 Bounding Heat Output (Watts)
 Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUMI	ALUMI
BOL HMI Constituents:	U	
BOL Enrichment %:	93.00002122	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd/g)	From SFD	Estimated
Nominal:		784.13
Bounding:		1,568.26

Nominal burnup calculated from the heavy metal mass destroyed.

Bounding burnup assumed to be twice nominal burnup.

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated BOL (UAX+EU) EOL HMI

1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (JALX-LEU) JAPAN
 SNF ID #: 552
 Fuel Units & Descr: 99 - ASSEMBLY
 Heavy Metal Mass: BOL=94.05kg; EOL=84.645kg
 ROD Storage Sht: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 4.13

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.533E-10	8,939.12	17,878.25	0.00E+00	7.83E-08	1.53E-05	Avg. MeV	
Am-241	2.2753E-02	8,939.12	17,878.25	0.00E+00	2.03E+02	4.07E+02	0.0150	1.812E+15
Am-242m	8.9133E-08	8,939.12	17,878.25	0.00E+00	7.97E-02	1.59E-01	0.0250	3.763E+14
Am-243	6.4007E-08	8,939.12	17,878.25	0.00E+00	5.72E-02	1.14E-01	0.0375	3.306E+14
C-14	2.9620E-08	8,939.12	17,878.25	0.00E+00	2.65E-04	5.30E-04	0.0575	3.561E+14
Cl-36	5.9513E-35	8,939.12	17,878.25	0.00E+00	5.32E-31	1.06E-30	0.0850	2.120E+14
Cm-243	2.2087E-06	8,939.12	17,878.25	0.00E+00	1.97E-02	3.95E-02	0.1250	1.427E+14
Cm-244	1.1007E-04	8,939.12	17,878.25	0.00E+00	9.84E-01	1.97E+00	0.2250	1.827E+14
Co-60	1.6340E-05	8,939.12	17,878.25	0.00E+00	1.46E-01	2.92E-01	0.3750	7.952E+13
Cs-134	2.1353E-03	8,939.12	17,878.25	0.00E+00	1.91E+01	3.82E+01	0.5750	1.349E+15
Cs-135	4.9607E-06	8,939.12	17,878.25	0.00E+00	4.35E-02	8.69E-02	0.8500	2.062E+13
Cs-137	2.0227E+00	8,939.12	17,878.25	0.00E+00	1.81E+04	3.62E+04	1.2500	1.162E+13
Eu-154	2.0887E-02	8,939.12	17,878.25	0.00E+00	1.87E+02	3.73E+02	1.7500	5.482E+11
Eu-155	4.0867E-03	8,939.12	17,878.25	0.00E+00	3.65E+01	7.31E+01	2.2500	5.141E+07
Fe-55	1.4167E-03	8,939.12	17,878.25	0.00E+00	1.27E+01	2.53E+01	2.7500	6.084E+06
H-3	4.6653E-03	8,939.12	17,878.25	0.00E+00	4.17E+01	8.34E+01	3.5000	2.465E+06
I-129	7.1600E-07	8,939.12	17,878.25	0.00E+00	6.40E-03	1.28E-02	5.0000	3.744E+04
Kr-85	1.0240E-01	8,939.12	17,878.25	0.00E+00	9.15E+02	1.83E+03	7.0000	4.237E+03
Np-237	3.7227E-06	8,939.12	17,878.25	0.00E+00	3.33E-02	6.66E-02	11.0000	4.821E+02
Pa-231	2.6727E-09	8,939.12	17,878.25	0.00E+00	2.39E-05	4.78E-05		
Pb-210	4.3313E-14	8,939.12	17,878.25	0.00E+00	3.87E-10	7.74E-10		
Pm-147	4.6307E-02	8,939.12	17,878.25	0.00E+00	4.14E+02	8.28E+02		
Pu-238	5.5273E-03	8,939.12	17,878.25	0.00E+00	4.94E+01	9.88E+01		
Pu-239	1.0313E-02	8,939.12	17,878.25	0.00E+00	9.22E+01	1.84E+02		
Pu-240	5.4180E-03	8,939.12	17,878.25	0.00E+00	4.84E+01	9.69E+01		
Pu-241	3.7573E-01	8,939.12	17,878.25	0.00E+00	3.36E+03	6.72E+03		
Pu-242	3.0713E-06	8,939.12	17,878.25	0.00E+00	2.75E-02	5.49E-02		
Ra-226	2.3807E-13	8,939.12	17,878.25	0.00E+00	2.13E-09	4.26E-09		
Ra-228	1.0807E-14	8,939.12	17,878.25	0.00E+00	9.48E-11	1.90E-10		
Ru-106	8.4800E-06	8,939.12	17,878.25	0.00E+00	7.58E-02	1.52E-01		
Se-79	1.2533E-05	8,939.12	17,878.25	0.00E+00	1.12E-01	2.24E-01		
Sn-126	1.1393E-05	8,939.12	17,878.25	0.00E+00	1.02E-01	2.04E-01		
Sr-90	1.8400E+00	8,939.12	17,878.25	0.00E+00	1.64E+04	3.29E+04		
Tc-99	4.3533E-04	8,939.12	17,878.25	0.00E+00	3.89E+00	7.78E+00		
Th-229	5.8947E-13	8,939.12	17,878.25	0.00E+00	5.27E-09	1.05E-08		
Th-230	5.9500E-11	8,939.12	17,878.25	0.00E+00	5.32E-07	1.06E-06		
Th-232	1.6360E-14	8,939.12	17,878.25	0.00E+00	1.46E-10	2.92E-10		
Ti-208	7.6000E-09	8,939.12	17,878.25	0.00E+00	6.79E-05	1.36E-04		
U-232	2.0747E-08	8,939.12	17,878.25	0.00E+00	1.85E-04	3.71E-04		
U-233	4.4013E-10	8,939.12	17,878.25	0.00E+00	3.93E-08	7.87E-08		
U-234	4.6500E-07	8,939.12	17,878.25	0.00E+00	4.16E-03	8.31E-03		
U-235	2.5335E-06	8,939.12	0.00	4.06E-02	1.80E-02	4.06E-02		
U-236	1.3000E-05	8,939.12	17,878.25	0.00E+00	1.16E-01	2.32E-01		
U-238	-1.4207E-08	8,939.12	0.00	2.53E-02	2.52E-02	2.53E-02		
Y-90	1.8400E+00	8,939.12	17,878.25	0.00E+00	1.64E+04	3.29E+04		
Other Radionuclides					1.72E+04	3.44E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		8,939.12	
		17,878.25	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	2.17	4.34	
			1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (JALX-LEU) PORTUGAL

SNF ID #: 540

Fuel Units & Descr: 9 - ASSEMBLY

Heavy Metal Mass: BOL=4.05kg; EOL=3.912kg

ROD Storage Site: SRS

Fuel decay start date: 2010

Estimates as of: 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: 20 years

Estimated

Canister usage:

18"x10"

0.38

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV
Ac-227	6.6313E-10	130.40	260.81	0.00E+00	8.65E-08	1.73E-07	0.0150
Am-241	2.0060E-03	130.40	260.81	0.00E+00	2.62E-01	5.23E-01	0.0250
Am-242m	4.2429E-07	130.40	260.81	0.00E+00	5.53E-05	1.11E-04	0.0375
Am-243	1.4899E-06	130.40	260.81	0.00E+00	1.94E-04	3.89E-04	0.0675
C-14	5.7135E-09	130.40	260.81	0.00E+00	7.45E-07	1.49E-06	0.0850
Cf-252	1.3124E-32	130.40	260.81	0.00E+00	1.71E-30	3.42E-30	0.1250
Cm-243	1.6443E-07	130.40	260.81	0.00E+00	2.14E-05	4.29E-05	0.2250
Cm-244	2.9330E-05	130.40	260.81	0.00E+00	3.62E-03	7.65E-03	0.3750
Co-60	5.3186E-06	130.40	260.81	0.00E+00	6.94E-04	1.39E-03	0.5750
Cs-134	3.1563E-03	130.40	260.81	0.00E+00	4.12E-01	8.23E-01	0.8500
Cs-135	3.4477E-06	130.40	260.81	0.00E+00	4.50E-04	8.99E-04	1.2500
Cs-137	2.0313E+00	130.40	260.81	0.00E+00	2.65E+02	5.30E+02	1.7500
Eu-154	2.4513E-02	130.40	260.81	0.00E+00	3.20E+00	6.39E+00	2.2500
Eu-155	4.8175E-03	130.40	260.81	0.00E+00	6.28E-01	1.26E+00	2.7500
Fe-55	1.2397E-04	130.40	260.81	0.00E+00	1.62E-02	3.23E-02	3.5000
H-3	4.5697E-03	130.40	260.81	0.00E+00	5.96E-01	1.19E+00	5.0000
I-129	7.5300E-07	130.40	260.81	0.00E+00	9.82E-05	1.96E-04	7.0000
Kr-85	1.0850E-01	130.40	260.81	0.00E+00	1.41E+01	2.83E+01	11.0000
Np-237	9.5561E-06	130.40	260.81	0.00E+00	1.25E-03	2.49E-03	
Pa-231	2.0359E-09	130.40	260.81	0.00E+00	2.65E-07	5.31E-07	
Pb-210	4.9728E-11	130.40	260.81	0.00E+00	6.48E-09	1.30E-08	
Pm-147	4.8502E-02	130.40	260.81	0.00E+00	6.32E+00	1.26E+01	
Pu-238	1.8254E-02	130.40	260.81	0.00E+00	2.38E+00	4.76E+00	
Pu-239	4.2610E-04	130.40	260.81	0.00E+00	5.58E-02	1.12E-01	
Pu-240	2.4368E-04	130.40	260.81	0.00E+00	3.18E-02	6.36E-02	
Pu-241	3.3415E-02	130.40	260.81	0.00E+00	4.36E+00	8.71E+00	
Pu-242	3.6329E-07	130.40	260.81	0.00E+00	4.74E-05	9.47E-05	
Ra-226	2.2854E-10	130.40	260.81	0.00E+00	2.98E-08	5.96E-08	
Ra-228	1.2426E-14	130.40	260.81	0.00E+00	1.62E-12	3.24E-12	
Ru-106	6.3589E-06	130.40	260.81	0.00E+00	8.29E-04	1.66E-03	
Se-79	1.2933E-05	130.40	260.81	0.00E+00	1.69E-03	3.37E-03	
Sn-126	1.1574E-05	130.40	260.81	0.00E+00	1.51E-03	3.02E-03	
Sr-90	1.9248E+00	130.40	260.81	0.00E+00	2.51E+02	5.02E+02	
Tc-99	4.2239E-04	130.40	260.81	0.00E+00	5.51E-02	1.10E-01	
Th-229	5.0953E-12	130.40	260.81	0.00E+00	6.84E-10	1.33E-09	
Th-230	4.1885E-08	130.40	260.81	0.00E+00	5.46E-06	1.09E-05	
Th-232	1.9270E-14	130.40	260.81	0.00E+00	2.51E-12	5.03E-12	
Ti-208	4.6024E-08	130.40	260.81	0.00E+00	6.00E-06	1.20E-05	
U-232	1.2582E-07	130.40	260.81	0.00E+00	1.64E-05	3.28E-05	
U-233	2.5825E-09	130.40	260.81	0.00E+00	3.37E-07	6.74E-07	
U-234	1.8450E-04	130.40	260.81	0.00E+00	2.41E-02	4.81E-02	
U-235	-2.7235E-06	130.40	0.00	1.75E-03	1.40E-03	1.75E-03	
U-236	1.5493E-05	130.40	260.81	0.00E+00	2.02E-03	4.04E-03	
U-238	-4.2851E-09	130.40	0.00	1.09E-03	1.09E-03	1.09E-03	
Y-90	1.9254E+00	130.40	260.81	0.00E+00	2.51E+02	5.02E+02	
Other Radionuclides					2.52E+02	5.04E+02	

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.11E+00	6.22E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000132	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) ^a		
	From SFD	Estimated
Nominal:	130.40	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	260.81	Bounding burnup assumed to be twice nominal burnup.

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C1 (UALX-HEU) SWITZERLAND
SNF ID #: 658
Fuel Units & Descr: 7 - MTR TYPE
Heavy Metal Mass: BOL=1.28kg; EOL=0.518kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.29

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	721.25	1,211.81	0.00E+00	4.78E-07	8.04E-07	Avg. MeV	
Am-241	2.0060E-03	721.25	1,211.81	0.00E+00	1.45E+00	2.43E+00	0.0150	1.279E+14
Am-242m	4.2429E-07	721.25	1,211.81	0.00E+00	3.06E-04	5.14E-04	0.0250	2.680E+13
Am-243	1.4899E-06	721.25	1,211.81	0.00E+00	1.07E-03	1.81E-03	0.0375	2.320E+13
C-14	5.7135E-09	721.25	1,211.81	0.00E+00	4.12E-06	6.92E-06	0.0575	2.485E+13
Cl-36	1.3124E-32	721.25	1,211.81	0.00E+00	9.47E-30	1.59E-29	0.0850	1.502E+13
Cm-243	1.6443E-07	721.25	1,211.81	0.00E+00	1.19E-04	1.99E-04	0.1250	1.016E+13
Cm-244	2.9330E-05	721.25	1,211.81	0.00E+00	2.12E-02	3.55E-02	0.2250	1.296E+13
Co-60	5.3186E-06	721.25	1,211.81	0.00E+00	3.84E-03	6.45E-03	0.3750	5.640E+12
Cs-134	3.1563E-03	721.25	1,211.81	0.00E+00	2.28E+00	3.82E+00	0.5750	9.200E+13
Cs-136	3.4477E-06	721.25	1,211.81	0.00E+00	2.49E-03	4.18E-03	0.8500	1.555E+12
Cs-137	2.0313E+00	721.25	1,211.81	0.00E+00	1.47E+03	2.48E+03	1.2500	8.882E+11
Eu-154	2.4513E-02	721.25	1,211.81	0.00E+00	1.77E+01	2.97E+01	1.7500	4.076E+10
Eu-155	4.8175E-03	721.25	1,211.81	0.00E+00	3.47E+00	5.84E+00	2.2500	3.576E+08
Fe-55	1.2397E-04	721.25	1,211.81	0.00E+00	8.94E-02	1.50E-01	2.7500	2.022E+06
H-3	4.5697E-03	721.25	1,211.81	0.00E+00	3.30E+00	5.54E+00	3.5000	9.287E+03
I-129	7.5300E-07	721.25	1,211.81	0.00E+00	5.43E-04	9.12E-04	5.0000	5.250E+02
Kr-85	1.0850E-01	721.25	1,211.81	0.00E+00	7.83E+01	1.31E+02	7.0000	5.796E+01
Np-237	9.5561E-06	721.25	1,211.81	0.00E+00	6.89E-03	1.16E-02	11.0000	6.498E+00
Pa-231	2.0359E-09	721.25	1,211.81	0.00E+00	1.47E-06	2.47E-06		
Pb-210	4.9728E-11	721.25	1,211.81	0.00E+00	3.59E-08	6.03E-08		
Pm-147	4.8502E-02	721.25	1,211.81	0.00E+00	3.50E+01	5.88E+01		
Pu-238	1.8254E-02	721.25	1,211.81	0.00E+00	1.32E+01	2.21E+01		
Pu-239	4.2810E-04	721.25	1,211.81	0.00E+00	3.09E-01	5.19E-01		
Pu-240	2.4368E-04	721.25	1,211.81	0.00E+00	1.78E-01	2.95E-01		
Pu-241	3.3415E-02	721.25	1,211.81	0.00E+00	2.41E+01	4.05E+01		
Pu-242	3.6329E-07	721.25	1,211.81	0.00E+00	2.62E-04	4.40E-04		
Ra-226	2.2854E-10	721.25	1,211.81	0.00E+00	1.65E-07	2.77E-07		
Ra-228	1.2426E-14	721.25	1,211.81	0.00E+00	8.96E-12	1.51E-11		
Ru-106	6.3589E-06	721.25	1,211.81	0.00E+00	4.59E-03	7.71E-03		
Se-79	1.2933E-05	721.25	1,211.81	0.00E+00	9.33E-03	1.57E-02		
Sn-126	1.1574E-05	721.25	1,211.81	0.00E+00	8.35E-03	1.40E-02		
Sr-90	1.9248E+00	721.25	1,211.81	0.00E+00	1.39E+03	2.33E+03		
Tc-99	4.2239E-04	721.25	1,211.81	0.00E+00	3.05E-01	5.12E-01		
Th-229	5.0953E-12	721.25	1,211.81	0.00E+00	3.67E-09	6.17E-09		
Th-230	4.1885E-08	721.25	1,211.81	0.00E+00	3.02E-05	5.08E-05		
Th-232	1.9270E-14	721.25	1,211.81	0.00E+00	1.39E-11	2.34E-11		
Ti-208	4.6024E-08	721.25	1,211.81	0.00E+00	3.32E-05	5.58E-05		
U-232	1.2582E-07	721.25	1,211.81	0.00E+00	9.07E-05	1.52E-04		
U-233	2.5825E-09	721.25	1,211.81	0.00E+00	1.86E-06	3.13E-06		
U-234	1.8450E-04	721.25	1,211.81	0.00E+00	1.33E-01	2.24E-01		
U-235	-2.7235E-06	721.25	0.00	2.57E-03	6.07E-04	2.57E-03		
U-236	1.5493E-05	721.25	1,211.81	0.00E+00	1.12E-02	1.88E-02		
U-238	-4.2851E-09	721.25	0.00	3.01E-05	2.70E-05	3.01E-05		
Y-90	1.9254E+00	721.25	1,211.81	0.00E+00	1.39E+03	2.33E+03		
Other Radionuclides					1.39E+03	2.34E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	92.9999987	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		721.25	
		1,211.81	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	1.79	1.09	
	3.01		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C2 (U3Si2 LEU) TURKEY
 SNF ID #: 527
 Fuel Units & Descr: 9 - ASSEMBLY
 Heavy Metal Mass: BOL=13.95kg; EOL=12.276kg
 ROD Storage Site: SRS

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

Estimated
 Canister usage:
 18"x10"
 0.38

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	1,585.31	3,170.62	0.00E+00	1.05E-06	2.10E-06	Avg. MeV	
Am-241	2.0060E-03	1,585.31	3,170.62	0.00E+00	3.18E+00	6.36E+00	0.0150	3.347E+14
Am-242m	4.2429E-07	1,585.31	3,170.62	0.00E+00	6.73E-04	1.35E-03	0.0250	6.960E+13
Am-243	1.4899E-06	1,585.31	3,170.62	0.00E+00	2.36E-03	4.72E-03	0.0375	6.070E+13
C-14	5.7136E-09	1,585.31	3,170.62	0.00E+00	9.06E-06	1.81E-05	0.0575	6.502E+13
Cl-36	1.3124E-32	1,585.31	3,170.62	0.00E+00	2.08E-29	4.16E-29	0.0850	3.929E+13
Cm-243	1.6443E-07	1,585.31	3,170.62	0.00E+00	2.61E-04	5.21E-04	0.1250	2.659E+13
Cm-244	2.9330E-05	1,585.31	3,170.62	0.00E+00	4.65E-02	9.30E-02	0.2250	3.390E+13
Co-60	5.3186E-06	1,585.31	3,170.62	0.00E+00	8.43E-03	1.69E-02	0.3750	1.476E+13
Cs-134	3.1563E-03	1,585.31	3,170.62	0.00E+00	5.00E+00	1.00E+01	0.5750	2.407E+14
Cs-135	3.4477E-06	1,585.31	3,170.62	0.00E+00	5.47E-03	1.09E-02	0.8500	4.070E+12
Cs-137	2.0313E+00	1,585.31	3,170.62	0.00E+00	3.22E+03	6.44E+03	1.2500	2.324E+12
Eu-154	2.4513E-02	1,585.31	3,170.62	0.00E+00	3.89E+01	7.77E+01	1.7500	1.067E+11
Eu-155	4.8175E-03	1,585.31	3,170.62	0.00E+00	7.64E+00	1.53E+01	2.2500	9.356E+06
Fe-55	1.2397E-04	1,585.31	3,170.62	0.00E+00	1.97E-01	3.93E-01	2.7500	5.289E+06
H-3	4.5697E-03	1,585.31	3,170.62	0.00E+00	7.24E+00	1.45E+01	3.5000	2.432E+04
I-129	7.5300E-07	1,585.31	3,170.62	0.00E+00	1.19E-03	2.39E-03	5.0000	1.382E+03
Kr-85	1.0850E-01	1,585.31	3,170.62	0.00E+00	1.72E+02	3.44E+02	7.0000	1.528E+02
Np-237	9.5561E-06	1,585.31	3,170.62	0.00E+00	1.51E-02	3.03E-02	11.0000	1.711E+01
Pa-231	2.0359E-09	1,585.31	3,170.62	0.00E+00	3.23E-06	6.46E-06		
Pb-210	4.9726E-11	1,585.31	3,170.62	0.00E+00	7.88E-08	1.58E-07		
Pm-147	4.8502E-02	1,585.31	3,170.62	0.00E+00	7.69E+01	1.54E+02		
Pu-238	1.8254E-02	1,585.31	3,170.62	0.00E+00	2.89E+01	5.79E+01		
Pu-239	4.2810E-04	1,585.31	3,170.62	0.00E+00	6.79E-01	1.36E+00		
Pu-240	2.4368E-04	1,585.31	3,170.62	0.00E+00	3.86E-01	7.73E-01		
Pu-241	3.3415E-02	1,585.31	3,170.62	0.00E+00	5.30E+01	1.06E+02		
Pu-242	3.6329E-07	1,585.31	3,170.62	0.00E+00	5.76E-04	1.15E-03		
Ra-226	2.2854E-10	1,585.31	3,170.62	0.00E+00	3.82E-07	7.25E-07		
Ra-228	1.2426E-14	1,585.31	3,170.62	0.00E+00	1.97E-11	3.94E-11		
Ru-106	6.3589E-06	1,585.31	3,170.62	0.00E+00	1.01E-02	2.02E-02		
Se-79	1.2933E-05	1,585.31	3,170.62	0.00E+00	2.05E-02	4.10E-02		
Sn-126	1.1574E-05	1,585.31	3,170.62	0.00E+00	1.83E-02	3.67E-02		
Sr-90	1.9248E+00	1,585.31	3,170.62	0.00E+00	3.05E+03	6.10E+03		
Tc-99	4.2239E-04	1,585.31	3,170.62	0.00E+00	6.70E-01	1.34E+00		
Th-229	5.0853E-12	1,585.31	3,170.62	0.00E+00	8.08E-09	1.62E-08		
Th-230	4.1885E-08	1,585.31	3,170.62	0.00E+00	6.84E-05	1.33E-04		
Th-232	1.9270E-14	1,585.31	3,170.62	0.00E+00	3.05E-11	6.11E-11		
Ti-208	4.6024E-08	1,585.31	3,170.62	0.00E+00	7.30E-05	1.46E-04		
U-232	1.2582E-07	1,585.31	3,170.62	0.00E+00	1.99E-04	3.99E-04	Thermal Power	
U-233	2.5825E-09	1,585.31	3,170.62	0.00E+00	4.09E-06	8.19E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8450E-04	1,585.31	3,170.62	0.00E+00	2.92E-01	5.85E-01	3.78E+01	7.86E+01
U-235	-2.7235E-06	1,585.31	0.00	6.03E-03	1.71E-03	6.03E-03	Total	Total
U-236	1.5493E-05	1,585.31	3,170.62	0.00E+00	2.46E-02	4.91E-02		
U-238	-4.2851E-09	1,585.31	0.00	3.75E-03	3.74E-03	3.75E-03		
Y-90	1.9254E+00	1,585.31	3,170.62	0.00E+00	3.05E+03	6.10E+03		
Other Radionuclides					3.07E+03	6.13E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000077	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:		1,585.31
Bounding:		3,170.62

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

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: FBR MTR-C2 (UADU+HEU) SWITZERLAND
 SW ID #: 657
 Fuel Units & Descr: 11 - MTR TYPE
 Heavy Metal Mass: BOL-2-461kg EOL-0-989kg
 ROD Storage Sst: SRS

Final decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Atom. 60 to 100%, U)
 Template Burnup(MWd): 367.2
 Heavy Metal Mass (MT): 0.0016689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18" x 10"
 0.46

IL Estimates	m	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Gamma Sources
Radionuclides	CU/MWD From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Photons/sec (bounding)
Ac-227	6.6313E-10	1.387 57	2.330 33	0.00E+00	9.20E-07	1.55E-06	Avg. MW	2.460E+14
Am-241	2.0080E-03	1.387 57	2.330 33	0.00E+00	2.78E+00	4.67E+00	0.0150	5.115E+13
Am-242m	4.2429E-07	1.387 57	2.330 33	0.00E+00	5.89E-04	9.69E-04	0.0250	4.462E+13
Am-243	1.4899E-06	1.387 57	2.330 33	0.00E+00	2.07E-03	3.47E-03	0.0075	4.779E+13
C-14	5.7135E-09	1.387 57	2.330 33	0.00E+00	7.93E-08	1.53E-06	0.0675	1.954E+13
C-36	1.3124E-32	1.387 57	2.330 33	0.00E+00	1.82E-29	3.06E-29	0.0850	2.888E+13
Co-243	1.6443E-07	1.387 57	2.330 33	0.00E+00	2.28E-04	3.63E-04	0.1250	1.954E+13
Co-244	2.8330E-05	1.387 57	2.330 33	0.00E+00	4.07E-02	6.63E-02	0.2250	2.482E+13
Co-60	5.3188E-06	1.387 57	2.330 33	0.00E+00	7.38E-03	1.24E-02	0.5750	1.085E+13
Co-134	3.1683E-06	1.387 57	2.330 33	0.00E+00	4.39E+00	7.39E+00	0.8500	1.709E+12
Co-135	3.4477E-06	1.387 57	2.330 33	0.00E+00	4.78E-03	8.03E-03	0.8500	2.991E+12
Cr-137	2.0313E+00	1.387 57	2.330 33	0.00E+00	2.82E+03	4.73E+03	1.2500	7.693E+10
Eu-154	2.4513E-02	1.387 57	2.330 33	0.00E+00	3.40E+01	5.71E+01	1.7500	2.898E+08
Eu-155	4.8175E-03	1.387 57	2.330 33	0.00E+00	6.68E+00	1.12E+01	2.2500	6.877E+08
Fe-55	1.2397E-04	1.387 57	2.330 33	0.00E+00	1.72E-07	2.92E-07	2.7500	3.888E+08
H-3	4.5697E-03	1.387 57	2.330 33	0.00E+00	6.34E+00	1.06E+01	3.5000	1.789E+04
H-129	7.5300E-07	1.387 57	2.330 33	0.00E+00	1.04E-03	1.75E-03	5.0000	1.010E+03
K-40	1.0850E-01	1.387 57	2.330 33	0.00E+00	1.51E+02	2.53E+02	7.0000	1.152E+02
Np-237	9.5591E-06	1.387 57	2.330 33	0.00E+00	1.33E-02	2.23E-02	11.0000	1.249E+01
Pa-231	2.0359E-02	1.387 57	2.330 33	0.00E+00	2.83E-08	4.74E-08		
Pb-210	4.9728E-11	1.387 57	2.330 33	0.00E+00	6.90E-08	1.16E-07		
Pm-147	4.8502E-02	1.387 57	2.330 33	0.00E+00	6.73E-01	1.15E+02		
Pu-238	1.8254E-02	1.387 57	2.330 33	0.00E+00	2.53E+01	4.25E+01		
Pu-239	4.2810E-04	1.387 57	2.330 33	0.00E+00	5.94E-01	9.98E-01		
Pu-240	2.4368E-04	1.387 57	2.330 33	0.00E+00	3.38E-01	5.69E-01		
Pu-241	3.3415E-02	1.387 57	2.330 33	0.00E+00	4.64E+01	7.79E+01		
Pu-242	3.6329E-07	1.387 57	2.330 33	0.00E+00	5.04E-04	8.47E-04		
Pa-226	2.2854E-10	1.387 57	2.330 33	0.00E+00	3.17E-07	5.33E-07		
Ra-226	1.387 57	1.387 57	2.330 33	0.00E+00	1.72E-11	2.90E-11		
Ra-106	6.3689E-06	1.387 57	2.330 33	0.00E+00	8.82E-03	1.48E-02		
Sr-70	1.387 57	1.387 57	2.330 33	0.00E+00	1.79E-02	3.01E-02		
Sr-126	1.1574E-05	1.387 57	2.330 33	0.00E+00	1.61E-02	2.70E-02		
Sr-90	1.9248E+00	1.387 57	2.330 33	0.00E+00	2.67E+03	4.49E+03		
Tc-99	4.2239E-04	1.387 57	2.330 33	0.00E+00	5.88E-01	9.84E-01		
Th-229	5.0953E-12	1.387 57	2.330 33	0.00E+00	7.07E-09	1.19E-08		
Th-230	4.1885E-08	1.387 57	2.330 33	0.00E+00	5.81E-05	8.78E-05		
Th-232	1.9270E-14	1.387 57	2.330 33	0.00E+00	2.67E-11	4.49E-11		
U-232	1.2582E-07	1.387 57	2.330 33	0.00E+00	1.75E-04	2.83E-04		
U-233	2.5826E-08	1.387 57	2.330 33	0.00E+00	3.58E-06	6.02E-06		
U-234	1.8450E-04	1.387 57	2.330 33	0.00E+00	2.56E-01	4.30E-01		
U-235	2.7235E-06	1.387 57	2.330 33	4.95E-03	1.17E-03	4.95E-03		
U-236	1.5483E-05	1.387 57	2.330 33	0.00E+00	2.15E-02	3.61E-02		
U-238	4.2851E-09	1.387 57	2.330 33	5.79E-05	6.19E-05	5.79E-05		
Y-90	1.9254E+00	1.387 57	2.330 33	0.00E+00	2.67E+03	4.49E+03		

Thermal Heat	Bounding Output (Watts)	Bounding Heat Output (Watts)
Total	3.31E+01	8.58E+01

III. Template Selection Summary, Burnup Summary, and Checks:

Template Selection Summary

Reactor Moderator:	From SFD	Used
Fuel Cladding:	LIGHT WATER	LIGHT WATER
BOL HIM Constituents:	U	U
BOL Enrichment %:	93.00001008	60 to 100

Base for Parameter Differences:

Burnup Summary (MWd/g)

Nonleak	From SFD	Estimated
Bounding:		2.330 33

Base for burnup used in estimates:

Nonleak	1.387 57	Bounding burnup calculated from the heavy metal mass developed.
Bounding:	2.330 33	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

Nonleak	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	1.79	3.01

Estimated EOL HIM/Given EOL HIM

1.09

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (JALX-HEU) TURKEY

SNF ID #: 642

Fuel Units & Descr: 2 - MTR TYPE

Heavy Metal Mass: BOL=0.366kg; EOL=0.196kg

ROD Storage Site: SRS

*Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x10"

0.06

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	6.6313E-10	160.99	321.99	0.00E+00	1.07E-07	2.14E-07	Avg. MeV	
Am-241	2.0060E-03	160.99	321.99	0.00E+00	3.23E-01	6.46E-01	0.0150	3.399E+13
Am-242m	4.2429E-07	160.99	321.99	0.00E+00	6.83E-05	1.37E-04	0.0250	7.068E+12
Am-243	1.4899E-06	160.99	321.99	0.00E+00	2.40E-04	4.80E-04	0.0375	6.165E+12
C-14	5.7135E-09	160.99	321.99	0.00E+00	9.20E-07	1.84E-06	0.0575	6.603E+12
Cl-36	1.3124E-32	160.99	321.99	0.00E+00	2.11E-30	4.23E-30	0.0850	3.990E+12
Cm-243	1.6443E-07	160.99	321.99	0.00E+00	2.65E-05	5.29E-05	0.1250	2.700E+12
Cm-244	2.9330E-05	160.99	321.99	0.00E+00	4.72E-03	9.44E-03	0.2250	3.443E+12
Co-60	5.3186E-06	160.99	321.99	0.00E+00	8.56E-04	1.71E-03	0.3750	1.499E+12
Cs-134	3.1563E-03	160.99	321.99	0.00E+00	5.08E-01	1.02E+00	0.5750	2.445E+13
Cs-135	3.4477E-06	160.99	321.99	0.00E+00	5.55E-04	1.11E-03	0.8500	4.133E+11
Cs-137	2.0313E+00	160.99	321.99	0.00E+00	3.27E+02	6.54E+02	1.2500	2.360E+11
Eu-154	2.4513E-02	160.99	321.99	0.00E+00	3.95E+00	7.89E+00	1.7500	1.063E+10
Eu-155	4.8175E-03	160.99	321.99	0.00E+00	7.76E-01	1.55E+00	2.2500	9.501E+05
Fe-55	1.2397E-04	160.99	321.99	0.00E+00	2.00E-02	3.99E-02	2.7500	5.372E+05
H-3	4.5607E-03	160.99	321.99	0.00E+00	7.36E-01	1.47E+00	3.5000	2.468E+03
I-129	7.5300E-07	160.99	321.99	0.00E+00	1.21E-04	2.42E-04	5.0000	1.395E+02
Kr-85	1.0850E-01	160.99	321.99	0.00E+00	1.75E+01	3.49E+01	7.0000	1.540E+01
Np-237	9.5561E-06	160.99	321.99	0.00E+00	1.54E-03	3.08E-03	11.0000	1.726E+00
Pa-231	2.0359E-09	160.99	321.99	0.00E+00	3.28E-07	6.56E-07		
Pb-210	4.9728E-11	160.99	321.99	0.00E+00	8.01E-09	1.60E-08		
Pm-147	4.8502E-02	160.99	321.99	0.00E+00	7.81E+00	1.56E+01		
Pu-238	1.8254E-02	160.99	321.99	0.00E+00	2.94E+00	5.88E+00		
Pu-239	4.2810E-04	160.99	321.99	0.00E+00	6.89E-02	1.38E-01		
Pu-240	2.4368E-04	160.99	321.99	0.00E+00	3.82E-02	7.65E-02		
Pu-241	3.3415E-02	160.99	321.99	0.00E+00	5.38E+00	1.08E+01		
Pu-242	3.6329E-07	160.99	321.99	0.00E+00	5.85E-05	1.17E-04		
Ra-226	2.2854E-10	160.99	321.99	0.00E+00	3.68E-08	7.36E-08		
Ra-228	1.2426E-14	160.99	321.99	0.00E+00	2.00E-12	4.00E-12		
Ru-106	6.3589E-06	160.99	321.99	0.00E+00	1.02E-03	2.05E-03		
Se-79	1.2933E-05	160.99	321.99	0.00E+00	2.06E-03	4.16E-03		
Sn-126	1.1574E-05	160.99	321.99	0.00E+00	1.86E-03	3.73E-03		
Sr-90	1.9248E+00	160.99	321.99	0.00E+00	3.10E+02	6.20E+02		
Tc-99	4.2239E-04	160.99	321.99	0.00E+00	6.80E-02	1.36E-01		
Th-229	5.0953E-12	160.99	321.99	0.00E+00	8.20E-10	1.64E-09		
Th-230	4.1885E-08	160.99	321.99	0.00E+00	6.74E-06	1.35E-05		
Th-232	1.9270E-14	160.99	321.99	0.00E+00	3.10E-12	6.20E-12		
Ti-208	4.6024E-08	160.99	321.99	0.00E+00	7.41E-06	1.48E-05		
U-232	1.2582E-07	160.99	321.99	0.00E+00	2.03E-05	4.05E-05		
U-233	2.5825E-09	160.99	321.99	0.00E+00	4.16E-07	8.32E-07		
U-234	1.8450E-04	160.99	321.99	0.00E+00	2.97E-02	5.94E-02		
U-235	-2.7235E-06	160.99	0.00	7.35E-04	2.66E-04	7.35E-04		
U-236	1.5493E-05	160.99	321.99	0.00E+00	2.49E-03	4.99E-03		
U-238	-4.2851E-09	160.99	0.00	8.60E-06	7.91E-06	8.60E-06		
Y-90	1.9254E+00	160.99	321.99	0.00E+00	3.10E+02	6.20E+02		
Other Radionuclides					3.11E+02	6.23E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		160.99
Bounding:		321.99

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM

1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (UALX-LEU) PORTUGAL

SNF ID #: 541

Fuel Units & Descr: 3 - ASSEMBLY

Heavy Metal Mass: BOL=1.35kg, EOL=1.35kg

ROD Storage Site: SRS

¹Fuel decay start date: 2010

Estimates as of: 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: 20 years

Estimated
Canister usage:

18"x10"

0.13

II. Estimates	m	x ₀	x ₀	b	y ₀	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	6.6313E-10	25.57	51.14	0.00E+00	1.70E-08	3.39E-08	Avg. MeV	
Am-241	2.0060E-03	25.57	51.14	0.00E+00	5.13E-02	1.03E-01	0.0150	5.398E+12
Am-242m	4.2429E-07	25.57	51.14	0.00E+00	1.08E-05	2.17E-05	0.0250	1.123E+12
Am-243	1.4890E-08	25.57	51.14	0.00E+00	3.81E-05	7.62E-05	0.0375	9.791E+11
C-14	5.7135E-09	25.57	51.14	0.00E+00	1.46E-07	2.92E-07	0.0575	1.049E+12
Cl-36	1.3124E-32	25.57	51.14	0.00E+00	3.36E-31	6.71E-31	0.0850	6.337E+11
Cm-243	1.6443E-07	25.57	51.14	0.00E+00	4.20E-06	8.41E-06	0.1250	4.288E+11
Cm-244	2.9330E-05	25.57	51.14	0.00E+00	7.50E-04	1.50E-03	0.2250	5.468E+11
Co-60	5.3186E-08	25.57	51.14	0.00E+00	1.36E-04	2.72E-04	0.3750	2.380E+11
Cs-134	3.1583E-03	25.57	51.14	0.00E+00	8.07E-02	1.61E-01	0.5750	3.883E+12
Cs-135	3.4477E-06	25.57	51.14	0.00E+00	8.82E-05	1.76E-04	0.8500	6.564E+10
Cs-137	2.0313E+00	25.57	51.14	0.00E+00	5.19E+01	1.04E+02	1.2500	3.748E+10
Eu-154	2.4513E-02	25.57	51.14	0.00E+00	6.27E-01	1.25E+00	1.7500	1.720E+08
Eu-155	4.8175E-03	25.57	51.14	0.00E+00	1.23E-01	2.46E-01	2.2500	1.508E+06
Fe-55	1.2397E-04	25.57	51.14	0.00E+00	3.17E-03	6.34E-03	2.7500	8.532E+04
H-3	4.5697E-03	25.57	51.14	0.00E+00	1.17E-01	2.34E-01	3.5000	3.938E+02
I-129	7.5300E-07	25.57	51.14	0.00E+00	1.93E-05	3.85E-05	5.0000	2.299E+01
Kr-85	1.0850E-01	25.57	51.14	0.00E+00	2.77E+00	5.55E+00	7.0000	2.542E+00
Np-237	9.5581E-06	25.57	51.14	0.00E+00	2.44E-04	4.89E-04	11.0000	2.852E-01
Pa-231	2.0359E-09	25.57	51.14	0.00E+00	5.21E-08	1.04E-07		
Pb-210	4.9728E-11	25.57	51.14	0.00E+00	1.27E-09	2.54E-09		
Pm-147	4.8502E-02	25.57	51.14	0.00E+00	1.24E+00	2.48E+00		
Pu-238	1.8254E-02	25.57	51.14	0.00E+00	4.67E-01	9.34E-01		
Pu-239	4.2810E-04	25.57	51.14	0.00E+00	1.09E-02	2.19E-02		
Pu-240	2.4388E-04	25.57	51.14	0.00E+00	6.23E-03	1.25E-02		
Pu-241	3.3415E-02	25.57	51.14	0.00E+00	8.54E-01	1.71E+00		
Pu-242	3.6329E-07	25.57	51.14	0.00E+00	9.29E-06	1.86E-05		
Ra-226	2.2854E-10	25.57	51.14	0.00E+00	5.84E-09	1.17E-08		
Ra-228	1.2426E-14	25.57	51.14	0.00E+00	3.18E-13	6.35E-13		
Ru-106	6.3589E-06	25.57	51.14	0.00E+00	1.63E-04	3.25E-04		
Se-79	1.2933E-05	25.57	51.14	0.00E+00	3.31E-04	6.61E-04		
Sn-126	1.1574E-05	25.57	51.14	0.00E+00	2.96E-04	5.92E-04		
Sr-90	1.9248E+00	25.57	51.14	0.00E+00	4.92E+01	9.84E+01		
Tc-99	4.2239E-04	25.57	51.14	0.00E+00	1.08E-02	2.16E-02		
Th-229	5.0953E-12	25.57	51.14	0.00E+00	1.30E-10	2.61E-10		
Th-230	4.1885E-08	25.57	51.14	0.00E+00	1.07E-06	2.14E-06		
Th-232	1.9270E-14	25.57	51.14	0.00E+00	4.93E-13	9.85E-13		
Ti-206	4.6024E-08	25.57	51.14	0.00E+00	1.18E-06	2.35E-06		
U-232	1.2582E-07	25.57	51.14	0.00E+00	3.22E-06	6.43E-06		
U-233	2.5825E-09	25.57	51.14	0.00E+00	6.60E-08	1.32E-07		
U-234	1.8450E-04	25.57	51.14	0.00E+00	4.72E-03	9.44E-03		
U-235	-2.7235E-06	25.57	0.00	5.83E-04	5.14E-04	5.83E-04		
U-236	1.5493E-05	25.57	51.14	0.00E+00	3.96E-04	7.92E-04		
U-238	-4.2851E-09	25.57	0.00	3.63E-04	3.63E-04	3.63E-04		
Y-90	1.9254E+00	25.57	51.14	0.00E+00	4.92E+01	9.85E+01		
Other Radionuclides					4.95E+01	9.89E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000132	60 to 100

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

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		25.57
Bounding:		51.14

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM

0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U308-LEU) INDONESIA

SNF ID #: 502

Fuel Units & Descr: 142 - ASSEMBLY

Heavy Metal Mass: BOL=177.5kg; EOL=159.75kg

ROD Storage Site: SRS

Fuel decay start date: 2010

Estimates as of: 2030

Template: ATR (Light Water, Alum., 80 to 100%, U)

Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

5.92

II. Estimates

Radionuclide	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
	C/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	6.8313E-10	16,809.59	33,619.19	0.00E+00	1.11E-05	2.23E-05	Avg. MeV	
Am-241	2.0060E-03	16,809.59	33,619.19	0.00E+00	3.37E+01	6.74E+01	0.0150	3.549E+15
Am-242m	4.2429E-07	16,809.59	33,619.19	0.00E+00	7.13E-03	1.43E-02	0.0250	7.380E+14
Am-243	1.4899E-06	16,809.59	33,619.19	0.00E+00	2.50E-02	5.01E-02	0.0375	6.437E+14
C-14	5.7135E-09	16,809.59	33,619.19	0.00E+00	9.60E-05	1.92E-04	0.0575	6.894E+14
Cl-36	1.3124E-32	16,809.59	33,619.19	0.00E+00	2.21E-28	4.41E-28	0.0650	4.166E+14
Cm-243	1.6443E-07	16,809.59	33,619.19	0.00E+00	2.76E-03	5.53E-03	0.1250	2.819E+14
Cm-244	2.8330E-05	16,809.59	33,619.19	0.00E+00	4.93E-01	9.86E-01	0.2250	3.595E+14
Co-60	5.3186E-06	16,809.59	33,619.19	0.00E+00	8.94E-02	1.79E-01	0.3750	1.565E+14
Cs-134	3.1563E-03	16,809.59	33,619.19	0.00E+00	5.31E+01	1.06E+02	0.5750	2.552E+15
Cs-135	3.4477E-06	16,809.59	33,619.19	0.00E+00	5.80E-02	1.16E-01	0.8500	4.315E+13
Cs-137	2.0313E+00	16,809.59	33,619.19	0.00E+00	3.41E+04	6.83E+04	1.2500	2.464E+13
Eu-154	2.4513E-02	16,809.59	33,619.19	0.00E+00	4.12E+02	8.24E+02	1.7500	1.131E+12
Eu-155	4.8175E-03	16,809.59	33,619.19	0.00E+00	8.10E+01	1.62E+02	2.2500	9.921E+07
Fe-55	1.2397E-04	16,809.59	33,619.19	0.00E+00	2.08E+00	4.17E+00	2.7500	5.609E+07
H-3	4.5697E-03	16,809.59	33,619.19	0.00E+00	7.68E+01	1.54E+02	3.5000	2.579E+05
I-129	7.5300E-07	16,809.59	33,619.19	0.00E+00	1.27E-02	2.53E-02	5.0000	1.464E+04
Kr-85	1.0850E-01	16,809.59	33,619.19	0.00E+00	1.82E+03	3.65E+03	7.0000	1.820E+03
Np-237	9.5561E-06	16,809.59	33,619.19	0.00E+00	1.61E-01	3.21E-01	11.0000	1.816E+02
Pa-231	2.0359E-09	16,809.59	33,619.19	0.00E+00	3.42E-05	6.84E-05		
Pb-210	4.9728E-11	16,809.59	33,619.19	0.00E+00	8.36E-07	1.67E-06		
Pm-147	4.8502E-02	16,809.59	33,619.19	0.00E+00	8.15E+02	1.63E+03		
Pu-238	1.8254E-02	16,809.59	33,619.19	0.00E+00	3.07E+02	6.14E+02		
Pu-239	4.2810E-04	16,809.59	33,619.19	0.00E+00	7.20E+00	1.44E+01		
Pu-240	2.4368E-04	16,809.59	33,619.19	0.00E+00	4.10E+00	8.19E+00		
Pu-241	3.3415E-02	16,809.59	33,619.19	0.00E+00	5.62E+02	1.12E+03		
Pu-242	3.6329E-07	16,809.59	33,619.19	0.00E+00	6.11E-03	1.22E-02		
Ra-226	2.2854E-10	16,809.59	33,619.19	0.00E+00	3.84E-06	7.68E-06		
Ra-228	1.2426E-14	16,809.59	33,619.19	0.00E+00	2.09E-10	4.18E-10		
Ru-106	6.3589E-06	16,809.59	33,619.19	0.00E+00	1.07E-01	2.14E-01		
Se-79	1.2933E-05	16,809.59	33,619.19	0.00E+00	2.17E-01	4.35E-01		
Sn-126	1.1574E-05	16,809.59	33,619.19	0.00E+00	1.95E-01	3.89E-01		
Sr-90	1.8248E+00	16,809.59	33,619.19	0.00E+00	3.24E+04	6.47E+04		
Tc-99	4.2239E-04	16,809.59	33,619.19	0.00E+00	7.10E+00	1.42E+01		
Th-229	5.0953E-12	16,809.59	33,619.19	0.00E+00	8.57E-08	1.71E-07		
Th-230	4.1885E-08	16,809.59	33,619.19	0.00E+00	7.04E-04	1.41E-03		
Th-232	1.8270E-14	16,809.59	33,619.19	0.00E+00	3.24E-10	6.48E-10		
Th-208	4.6024E-08	16,809.59	33,619.19	0.00E+00	7.74E-04	1.55E-03		
U-232	1.2582E-07	16,809.59	33,619.19	0.00E+00	2.11E-03	4.23E-03		
U-233	2.5825E-09	16,809.59	33,619.19	0.00E+00	4.34E-05	8.68E-05		
U-234	1.8450E-04	16,809.59	33,619.19	0.00E+00	3.10E+00	6.20E+00		
U-235	-2.7235E-06	16,809.59	0.00	7.67E-02	3.09E-02	7.67E-02		
U-236	1.5493E-05	16,809.59	33,619.19	0.00E+00	2.60E-01	5.21E-01		
U-238	-4.2851E-09	16,809.59	0.00	4.77E-02	4.77E-02	4.77E-02		
Y-90	1.8254E+00	16,809.59	33,619.19	0.00E+00	3.24E+04	6.47E+04		
Other Radionuclides					3.25E+04	6.50E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	80 to 100	

Burnup Summary (MWd)³

	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:		16,809.59	
Bounding:		33,619.19	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.30		
Bounding:	0.60		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U308-LEU) PERU
SNF ID #: 504
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass: BOL=32.2kg; EOL=28.98kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116688
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.96

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	6.6313E-10	3,049.40	6,098.80	0.00E+00	2.02E-06	4.04E-06	Avg. MeV	
Am-241	2.0060E-03	3,049.40	6,098.80	0.00E+00	6.12E+00	1.22E+01	0.0150	8.438E+14
Am-242m	4.2429E-07	3,049.40	6,098.80	0.00E+00	1.29E-03	2.59E-03	0.0250	1.330E+14
Am-243	1.4899E-06	3,049.40	6,098.80	0.00E+00	4.54E-03	9.09E-03	0.0375	1.168E+14
C-14	5.7135E-09	3,049.40	6,098.80	0.00E+00	1.74E-05	3.48E-05	0.0675	1.251E+14
Cl-36	1.3124E-32	3,049.40	6,098.80	0.00E+00	4.00E-29	8.00E-29	0.0850	7.557E+13
Cm-243	1.6443E-07	3,049.40	6,098.80	0.00E+00	5.01E-04	1.00E-03	0.1250	5.114E+13
Cm-244	2.9330E-05	3,049.40	6,098.80	0.00E+00	8.94E-02	1.79E-01	0.2250	6.521E+13
Co-60	5.3186E-06	3,049.40	6,098.80	0.00E+00	1.62E-02	3.24E-02	0.3750	2.839E+13
Cs-134	3.1563E-03	3,049.40	6,098.80	0.00E+00	9.62E+00	1.92E+01	0.5750	4.830E+14
Cs-135	3.4477E-06	3,049.40	6,098.80	0.00E+00	1.05E-02	2.10E-02	0.8500	7.828E+12
Cs-137	2.0313E+00	3,049.40	6,098.80	0.00E+00	6.19E+03	1.24E+04	1.2500	4.470E+12
Eu-154	2.4513E-02	3,049.40	6,098.80	0.00E+00	7.47E+01	1.49E+02	1.7500	2.052E+11
Eu-155	4.8175E-03	3,049.40	6,098.80	0.00E+00	1.47E+01	2.94E+01	2.2500	1.800E+07
Fe-55	1.2397E-04	3,049.40	6,098.80	0.00E+00	3.78E-01	7.56E-01	2.7500	1.017E+07
H-3	4.5697E-03	3,049.40	6,098.80	0.00E+00	1.39E+01	2.79E+01	3.5000	4.679E+04
I-129	7.5300E-07	3,049.40	6,098.80	0.00E+00	2.30E-03	4.59E-03	5.0000	2.663E+03
Kr-85	1.0850E-01	3,049.40	6,098.80	0.00E+00	3.31E+02	6.62E+02	7.0000	2.940E+02
Np-237	9.5561E-06	3,049.40	6,098.80	0.00E+00	2.91E-02	5.83E-02	11.0000	3.296E+01
Pa-231	2.0359E-09	3,049.40	6,098.80	0.00E+00	6.21E-06	1.24E-05		
Pb-210	4.9728E-11	3,049.40	6,098.80	0.00E+00	1.52E-07	3.03E-07		
Pm-147	4.8502E-02	3,049.40	6,098.80	0.00E+00	1.48E+02	2.96E+02		
Pu-238	1.8254E-02	3,049.40	6,098.80	0.00E+00	5.57E+01	1.11E+02		
Pu-239	4.2810E-04	3,049.40	6,098.80	0.00E+00	1.31E+00	2.61E+00		
Pu-240	2.4368E-04	3,049.40	6,098.80	0.00E+00	7.43E-01	1.49E+00		
Pu-241	3.3415E-02	3,049.40	6,098.80	0.00E+00	1.02E+02	2.04E+02		
Pu-242	3.6329E-07	3,049.40	6,098.80	0.00E+00	1.11E-03	2.22E-03		
Ra-226	2.2854E-10	3,049.40	6,098.80	0.00E+00	6.97E-07	1.39E-06		
Ra-228	1.2426E-14	3,049.40	6,098.80	0.00E+00	3.79E-11	7.58E-11		
Ru-106	6.3589E-06	3,049.40	6,098.80	0.00E+00	1.94E-02	3.88E-02		
Se-79	1.2933E-05	3,049.40	6,098.80	0.00E+00	3.94E-02	7.89E-02		
Sn-126	1.1574E-05	3,049.40	6,098.80	0.00E+00	3.53E-02	7.06E-02		
Sr-90	1.9248E+00	3,049.40	6,098.80	0.00E+00	5.87E+03	1.17E+04		
Tc-99	4.2239E-04	3,049.40	6,098.80	0.00E+00	1.29E+00	2.58E+00		
Th-229	5.0953E-12	3,049.40	6,098.80	0.00E+00	1.55E-08	3.11E-08		
Th-230	4.1885E-06	3,049.40	6,098.80	0.00E+00	1.28E-04	2.55E-04		
Th-232	1.9270E-14	3,049.40	6,098.80	0.00E+00	5.88E-11	1.18E-10		
Th-208	4.6024E-06	3,049.40	6,098.80	0.00E+00	1.40E-04	2.81E-04		
U-232	1.2582E-07	3,049.40	6,098.80	0.00E+00	3.84E-04	7.67E-04		
U-233	2.5825E-09	3,049.40	6,098.80	0.00E+00	7.88E-06	1.58E-05	Thermal Power	
U-234	1.8450E-04	3,049.40	6,098.80	0.00E+00	5.63E-01	1.13E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	3,049.40	0.00	1.14E-02	3.13E-03	1.14E-02	7.27E+01	1.45E+02
U-238	1.5493E-05	3,049.40	6,098.80	0.00E+00	4.72E-02	9.45E-02	Total	Total
U-238	-4.2851E-09	3,049.40	0.00	9.04E-03	9.03E-03	9.04E-03		
Y-90	1.9254E+00	3,049.40	6,098.80	0.00E+00	5.87E+03	1.17E+04		
Other Radionuclides					5.90E+03	1.18E+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	This Template was used for the following reason:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	16.42857201	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 3,049.40	Estimated 3,049.40	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	6,098.80	6,098.80	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 0.30	Estimated Burnup/ Given Burnup	1.01
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: FRR MTR-S (U3S2 LEU) CANADA
BNF ID #: 513
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=50.75kg; EOL=45.675kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
1.46

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	6.6313E-10	4,806.12	9,612.25	0.00E+00	3.19E-06	6.37E-06	Avg. MeV	
Am-241	2.0060E-03	4,806.12	9,612.25	0.00E+00	9.64E+00	1.93E+01	0.0150	1.015E+15
Am-242m	4.2429E-07	4,806.12	9,612.25	0.00E+00	2.04E-03	4.08E-03	0.0250	2.110E+14
Am-243	1.4899E-06	4,806.12	9,612.25	0.00E+00	7.16E-03	1.43E-02	0.0375	1.840E+14
C-14	5.7135E-09	4,806.12	9,612.25	0.00E+00	2.75E-05	5.49E-05	0.0575	1.971E+14
Cl-36	1.3124E-32	4,806.12	9,612.25	0.00E+00	8.31E-29	1.26E-28	0.0850	1.191E+14
Cm-243	1.6443E-07	4,806.12	9,612.25	0.00E+00	7.90E-04	1.58E-03	0.1250	8.060E+13
Cm-244	2.9330E-05	4,806.12	9,612.25	0.00E+00	1.41E-01	2.82E-01	0.2250	1.028E+14
Co-60	5.3186E-06	4,806.12	9,612.25	0.00E+00	2.56E-02	5.11E-02	0.3750	4.474E+13
Cs-134	3.1563E-03	4,806.12	9,612.25	0.00E+00	1.52E+01	3.03E+01	0.5750	7.298E+14
Cs-135	3.4477E-06	4,806.12	9,612.25	0.00E+00	1.66E-02	3.31E-02	0.8500	1.234E+13
Cs-137	2.0313E+00	4,806.12	9,612.25	0.00E+00	9.76E+03	1.95E+04	1.2500	7.045E+12
Eu-154	2.4513E-02	4,806.12	9,612.25	0.00E+00	1.18E+02	2.36E+02	1.7500	3.234E+11
Eu-155	4.8175E-03	4,806.12	9,612.25	0.00E+00	2.32E+01	4.63E+01	2.2500	2.836E+07
Fe-55	1.2397E-04	4,806.12	9,612.25	0.00E+00	5.96E-01	1.19E+00	2.7500	1.604E+07
H-3	4.5697E-03	4,806.12	9,612.25	0.00E+00	2.20E+01	4.39E+01	3.5000	7.374E+04
I-129	7.5300E-07	4,806.12	9,612.25	0.00E+00	3.62E-03	7.24E-03	5.0000	4.195E+03
Kr-85	1.0850E-01	4,806.12	9,612.25	0.00E+00	5.21E+02	1.04E+03	7.0000	4.633E+02
Np-237	9.5561E-06	4,806.12	9,612.25	0.00E+00	4.59E-02	9.19E-02	11.0000	5.193E+01
Pa-231	2.0359E-09	4,806.12	9,612.25	0.00E+00	9.79E-06	1.96E-05		
Pb-210	4.9728E-11	4,806.12	9,612.25	0.00E+00	2.39E-07	4.78E-07		
Pm-147	4.8502E-02	4,806.12	9,612.25	0.00E+00	2.33E+02	4.66E+02		
Pu-238	1.8254E-02	4,806.12	9,612.25	0.00E+00	8.77E+01	1.75E+02		
Pu-239	4.2810E-04	4,806.12	9,612.25	0.00E+00	2.06E+00	4.12E+00		
Pu-240	2.4368E-04	4,806.12	9,612.25	0.00E+00	1.17E+00	2.34E+00		
Pu-241	3.3415E-02	4,806.12	9,612.25	0.00E+00	1.61E+02	3.21E+02		
Pu-242	3.6329E-07	4,806.12	9,612.25	0.00E+00	1.75E-03	3.49E-03		
Ra-226	2.2854E-10	4,806.12	9,612.25	0.00E+00	1.10E-06	2.20E-06		
Ra-228	1.2426E-14	4,806.12	9,612.25	0.00E+00	5.97E-11	1.19E-10		
Ru-106	6.3589E-06	4,806.12	9,612.25	0.00E+00	3.06E-02	6.11E-02		
Se-79	1.2933E-05	4,806.12	9,612.25	0.00E+00	6.22E-02	1.24E-01		
Sn-126	1.1574E-05	4,806.12	9,612.25	0.00E+00	5.56E-02	1.11E-01		
Sr-90	1.9248E+00	4,806.12	9,612.25	0.00E+00	9.25E+03	1.85E+04		
Tc-99	4.2239E-04	4,806.12	9,612.25	0.00E+00	2.03E+00	4.06E+00		
Th-229	5.0953E-12	4,806.12	9,612.25	0.00E+00	2.45E-08	4.90E-08		
Th-230	4.1885E-08	4,806.12	9,612.25	0.00E+00	2.01E-04	4.03E-04		
Th-232	1.9270E-14	4,806.12	9,612.25	0.00E+00	9.26E-11	1.85E-10		
Ti-208	4.6024E-08	4,806.12	9,612.25	0.00E+00	2.21E-04	4.42E-04		
U-232	1.2582E-07	4,806.12	9,612.25	0.00E+00	6.05E-04	1.21E-03		
U-233	2.5825E-09	4,806.12	9,612.25	0.00E+00	1.24E-05	2.48E-05		
U-234	1.8450E-04	4,806.12	9,612.25	0.00E+00	8.87E-01	1.77E+00		
U-235	-2.7235E-06	4,806.12	0.00	2.19E-02	8.84E-03	2.19E-02		
U-236	1.5493E-05	4,806.12	9,612.25	0.00E+00	7.45E-02	1.49E-01		
U-238	-4.2851E-09	4,806.12	0.00	1.36E-02	1.36E-02	1.36E-02		
Y-90	1.9254E+00	4,806.12	9,612.25	0.00E+00	9.25E+03	1.85E+04		
Other Radionuclides					9.30E+03	1.86E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4,806.12	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		9,612.25	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.30		1.01
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: FRR MTR-S (U3Si2 LEU) GERMANY
SNF ID #: 519
Fuel Units & Descr: 97 - ASSEMBLY
Heavy Metal Mass: BOL=155.2kg; EOL=131.804kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-AI (LW/AJ-Zrx, Alum., 10 to 20%, U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
4.04

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.455E-09	22,332.30	44,664.59	0.00E+00	5.48E-06	1.10E-04	Avg. MeV	
Am-241	3.8752E-03	22,332.30	44,664.59	0.00E+00	8.65E+01	1.73E+02	0.0150	4.584E+15
Am-242m	1.8617E-06	22,332.30	44,664.59	0.00E+00	4.16E-02	8.32E-02	0.0250	9.465E+14
Am-243	2.3293E-07	22,332.30	44,664.59	0.00E+00	5.20E-03	1.04E-02	0.0375	9.907E+14
C-14	4.3233E-06	22,332.30	44,664.59	0.00E+00	9.65E-01	1.93E+00	0.0575	9.157E+14
Cl-38	4.3023E-08	22,332.30	44,664.59	0.00E+00	9.61E-04	1.92E-03	0.0850	5.575E+14
Cr-243	1.9653E-07	22,332.30	44,664.59	0.00E+00	4.25E-03	8.51E-03	0.1250	6.258E+14
Cr-244	1.7744E-06	22,332.30	44,664.59	0.00E+00	3.96E-02	7.93E-02	0.2250	5.052E+14
Co-60	4.3188E-03	22,332.30	44,664.59	0.00E+00	9.64E+01	1.93E+02	0.3750	2.076E+14
Cs-134	6.7188E-04	22,332.30	44,664.59	0.00E+00	1.50E+01	3.00E+01	0.5750	3.307E+15
Cs-135	3.1549E-05	22,332.30	44,664.59	0.00E+00	7.05E-01	1.41E+00	0.8500	3.519E+14
Cs-137	1.9489E+00	22,332.30	44,664.59	0.00E+00	4.35E+04	8.70E+04	1.2500	3.791E+14
Eu-154	4.0301E-01	22,332.30	44,664.59	0.00E+00	9.00E+03	1.80E+04	1.7500	1.136E+13
Eu-155	5.4000E-02	22,332.30	44,664.59	0.00E+00	1.21E+03	2.41E+03	2.2500	1.800E+08
Fe-55	1.5955E-04	22,332.30	44,664.59	0.00E+00	3.56E+00	7.13E+00	2.7500	2.996E+07
H-3	4.6571E-03	22,332.30	44,664.59	0.00E+00	1.04E+02	2.08E+02	3.5000	2.051E+05
I-129	7.3805E-07	22,332.30	44,664.59	0.00E+00	1.65E-02	3.30E-02	5.0000	2.520E+04
Kr-85	9.5684E-02	22,332.30	44,664.59	0.00E+00	2.14E+03	4.27E+03	7.0000	2.845E+03
Np-237	1.4618E-06	22,332.30	44,664.59	0.00E+00	3.26E-02	6.53E-02	11.0000	3.235E+02
Pa-231	6.4782E-09	22,332.30	44,664.59	0.00E+00	1.45E-04	2.89E-04		
Pb-210	6.3158E-14	22,332.30	44,664.59	0.00E+00	1.41E-09	2.82E-09		
Pm-147	3.9564E-02	22,332.30	44,664.59	0.00E+00	8.84E+02	1.77E+03		
Pu-238	1.2008E-03	22,332.30	44,664.59	0.00E+00	2.68E+01	5.36E+01		
Pu-239	5.6917E-03	22,332.30	44,664.59	0.00E+00	1.27E+02	2.54E+02		
Pu-240	2.2617E-03	22,332.30	44,664.59	0.00E+00	5.05E+01	1.01E+02		
Pu-241	6.1113E-02	22,332.30	44,664.59	0.00E+00	1.36E+03	2.73E+03		
Pu-242	3.0602E-07	22,332.30	44,664.59	0.00E+00	6.83E-03	1.37E-02		
Ra-226	2.6707E-13	22,332.30	44,664.59	0.00E+00	5.96E-09	1.19E-08		
Ra-228	2.2556E-10	22,332.30	44,664.59	0.00E+00	5.04E-06	1.01E-05		
Ru-106	3.1293E-06	22,332.30	44,664.59	0.00E+00	6.99E-02	1.40E-01		
Se-79	1.2935E-05	22,332.30	44,664.59	0.00E+00	2.89E-01	5.78E-01		
Sn-126	1.2238E-05	22,332.30	44,664.59	0.00E+00	2.73E-01	5.47E-01		
Sr-90	1.8195E+00	22,332.30	44,664.59	0.00E+00	4.06E+04	8.13E+04		
Tc-99	4.4120E-04	22,332.30	44,664.59	0.00E+00	9.85E+00	1.97E+01		
Th-229	3.3308E-10	22,332.30	44,664.59	0.00E+00	7.44E-06	1.49E-05		
Th-230	4.6526E-11	22,332.30	44,664.59	0.00E+00	1.04E-06	2.08E-06		
Th-232	2.3744E-10	22,332.30	44,664.59	0.00E+00	5.30E-06	1.06E-05		
Ti-208	1.8195E-08	22,332.30	44,664.59	0.00E+00	4.06E-04	8.13E-04		
U-232	4.9098E-08	22,332.30	44,664.59	0.00E+00	1.10E-03	2.19E-03		
U-233	1.3140E-07	22,332.30	44,664.59	0.00E+00	2.93E-03	5.87E-03		
U-234	2.2571E-07	22,332.30	44,664.59	0.00E+00	5.04E-03	1.01E-02		
U-235	2.6159E-06	22,332.30	0.00	6.71E-02	8.66E-03	6.71E-02		
U-238	1.2719E-05	22,332.30	44,664.59	0.00E+00	2.84E-01	5.68E-01		
U-238	3.8857E-08	22,332.30	0.00	4.17E-02	4.09E-02	4.17E-02		
Y-90	1.8211E+00	22,332.30	44,664.59	0.00E+00	4.07E+04	8.13E+04		
Other Radionuclides					4.68E+04	9.35E+04		

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 %:	19.9999963	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD 22,332.30	Estimated 22,332.30	
Bounding:	44,664.59	44,664.59	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 3.59	Estimated Burnup/ Given Burnup	
Bounding:	7.79		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3S2 LEU) GERMANY
 SNF ID #: 1067
 Fuel Units & Descr: 7 - ASSEMBLY
 Heavy Metal Mass: BOL=14.7kg; EOL=12.936kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.29

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	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	6.6313E-10	1,670.54	3,341.08	0.00E+00	1.11E-06	2.22E-06	Avg. MeV	
Am-241	2.0060E-03	1,670.54	3,341.08	0.00E+00	3.35E+00	6.70E+00	0.0150	3.527E+14
Am-242m	4.2429E-07	1,670.54	3,341.08	0.00E+00	7.09E-04	1.42E-03	0.0250	7.334E+13
Am-243	1.4899E-06	1,670.54	3,341.08	0.00E+00	2.49E-03	4.98E-03	0.0375	6.367E+13
C-14	5.7135E-09	1,670.54	3,341.08	0.00E+00	9.54E-06	1.91E-05	0.0575	6.851E+13
Ci-36	1.3124E-32	1,670.54	3,341.08	0.00E+00	2.19E-29	4.38E-29	0.0850	4.140E+13
Cm-243	1.6443E-07	1,670.54	3,341.08	0.00E+00	2.75E-04	5.49E-04	0.1250	2.802E+13
Cm-244	2.9330E-05	1,670.54	3,341.08	0.00E+00	4.90E-02	9.80E-02	0.2250	3.572E+13
Co-60	5.3186E-06	1,670.54	3,341.08	0.00E+00	8.88E-03	1.78E-02	0.3750	1.555E+13
Cs-134	3.1563E-03	1,670.54	3,341.08	0.00E+00	5.27E+00	1.05E+01	0.5750	2.537E+14
Cs-135	3.4477E-06	1,670.54	3,341.08	0.00E+00	5.78E-03	1.15E-02	0.8500	4.289E+12
Cs-137	2.0313E+00	1,670.54	3,341.08	0.00E+00	3.39E+03	6.79E+03	1.2500	2.449E+12
Eu-154	2.4513E-02	1,670.54	3,341.08	0.00E+00	4.09E+01	8.19E+01	1.7500	1.124E+11
Eu-155	4.8175E-03	1,670.54	3,341.08	0.00E+00	8.05E+00	1.61E+01	2.2500	9.859E+06
Fe-55	1.2397E-04	1,670.54	3,341.08	0.00E+00	2.07E-01	4.14E-01	2.7500	5.574E+06
H-3	4.5697E-03	1,670.54	3,341.08	0.00E+00	7.63E+00	1.53E+01	3.5000	2.563E+04
I-129	7.5300E-07	1,670.54	3,341.08	0.00E+00	1.26E-03	2.52E-03	5.0000	1.456E+03
Kr-85	1.0850E-01	1,670.54	3,341.08	0.00E+00	1.81E+02	3.62E+02	7.0000	1.808E+02
Np-237	9.5561E-06	1,670.54	3,341.08	0.00E+00	1.60E-02	3.19E-02	11.0000	1.803E+01
Pa-231	2.0359E-09	1,670.54	3,341.08	0.00E+00	3.40E-06	6.80E-06		
Pb-210	4.9728E-11	1,670.54	3,341.08	0.00E+00	8.31E-08	1.66E-07		
Pm-147	4.8502E-02	1,670.54	3,341.08	0.00E+00	8.10E+01	1.62E+02		
Pu-238	1.8254E-02	1,670.54	3,341.08	0.00E+00	3.05E+01	6.10E+01		
Pu-239	4.2810E-04	1,670.54	3,341.08	0.00E+00	7.15E-01	1.43E+00		
Pu-240	2.4368E-04	1,670.54	3,341.08	0.00E+00	4.07E-01	8.14E-01		
Pu-241	3.3415E-02	1,670.54	3,341.08	0.00E+00	5.58E+01	1.12E+02		
Pu-242	3.6329E-07	1,670.54	3,341.08	0.00E+00	6.07E-04	1.21E-03		
Ra-226	2.2854E-10	1,670.54	3,341.08	0.00E+00	3.82E-07	7.64E-07		
Ra-228	1.2426E-14	1,670.54	3,341.08	0.00E+00	2.08E-11	4.15E-11		
Ru-106	6.3689E-06	1,670.54	3,341.08	0.00E+00	1.06E-02	2.12E-02		
Se-79	1.2933E-05	1,670.54	3,341.08	0.00E+00	2.16E-02	4.32E-02		
Sn-126	1.1574E-05	1,670.54	3,341.08	0.00E+00	1.93E-02	3.87E-02		
Sr-90	1.8248E+00	1,670.54	3,341.08	0.00E+00	3.22E+03	6.43E+03		
Tc-99	4.2239E-04	1,670.54	3,341.08	0.00E+00	7.06E-01	1.41E+00		
Th-229	5.0953E-12	1,670.54	3,341.08	0.00E+00	8.51E-09	1.70E-08		
Th-230	4.1885E-08	1,670.54	3,341.08	0.00E+00	7.00E-05	1.40E-04		
Th-232	1.9270E-14	1,670.54	3,341.08	0.00E+00	3.22E-11	6.44E-11		
Ti-208	4.6024E-08	1,670.54	3,341.08	0.00E+00	7.69E-05	1.54E-04		
U-232	1.2582E-07	1,670.54	3,341.08	0.00E+00	2.10E-04	4.20E-04		
U-233	2.5825E-09	1,670.54	3,341.08	0.00E+00	4.31E-06	8.63E-06		
U-234	1.8450E-04	1,670.54	3,341.08	0.00E+00	3.08E-01	6.16E-01		
U-235	-2.7235E-06	1,670.54	0.00	6.35E-03	1.80E-03	6.35E-03		
U-236	1.5493E-05	1,670.54	3,341.08	0.00E+00	2.59E-02	5.18E-02		
U-238	-4.2851E-09	1,670.54	0.00	3.95E-03	3.95E-03	3.95E-03		
Y-90	1.9254E+00	1,670.54	3,341.08	0.00E+00	3.22E+03	6.43E+03		
Other Radionuclides					3.23E+03	6.46E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.0000028	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,670.54	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,341.08	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.36		1.01
Bounding:	0.72		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) GREECE
SNF ID #: 532
Fuel Units & Descr: 67 - ASSEMBLY
Heavy Metal Mass: BOL=74.37kg; EOL=67.683kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
2.79

II. Estimates		m	x ₀	x ₀	b	y ₀	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)	Avg. MeV
Ac-227	6.6313E-10	6,332.34	12,664.68	0.00E+00	4.20E-06	8.40E-06	0.0150	1.337E+15	0.0150
Am-241	2.0060E-03	6,332.34	12,664.68	0.00E+00	1.27E+01	2.54E+01	0.0250	2.780E+14	0.0250
Am-242m	4.2429E-07	6,332.34	12,664.68	0.00E+00	2.69E-03	5.37E-03	0.0375	2.425E+14	0.0375
Am-243	1.4899E-06	6,332.34	12,664.68	0.00E+00	9.43E-03	1.89E-02	0.0675	2.597E+14	0.0675
C-14	5.7135E-09	6,332.34	12,664.68	0.00E+00	3.62E-05	7.24E-05	0.0850	1.569E+14	0.0850
Cf-252	1.3124E-32	6,332.34	12,664.68	0.00E+00	8.31E-29	1.66E-28	0.1250	1.062E+14	0.1250
Cm-243	1.6443E-07	6,332.34	12,664.68	0.00E+00	1.04E-03	2.08E-03	0.2250	1.354E+14	0.2250
Cm-244	2.9330E-05	6,332.34	12,664.68	0.00E+00	1.86E-01	3.71E-01	0.3750	5.895E+13	0.3750
Co-60	5.3186E-06	6,332.34	12,664.68	0.00E+00	3.37E-02	6.74E-02	0.5750	9.615E+14	0.5750
Ce-134	3.1563E-03	6,332.34	12,664.68	0.00E+00	2.00E+01	4.00E+01	0.8500	1.626E+13	0.8500
Ce-135	3.4477E-06	6,332.34	12,664.68	0.00E+00	2.18E-02	4.37E-02	1.2500	9.282E+12	1.2500
Cs-137	2.0313E+00	6,332.34	12,664.68	0.00E+00	1.29E+04	2.57E+04	1.7500	4.260E+11	1.7500
Eu-154	2.4513E-02	6,332.34	12,664.68	0.00E+00	1.55E+02	3.10E+02	2.2500	3.737E+07	2.2500
Eu-155	4.8175E-03	6,332.34	12,664.68	0.00E+00	3.05E+01	6.10E+01	2.7500	2.113E+07	2.7500
Fe-55	1.2397E-04	6,332.34	12,664.68	0.00E+00	7.85E-01	1.57E+00	3.5000	9.716E+04	3.5000
H-3	4.5697E-03	6,332.34	12,664.68	0.00E+00	2.89E+01	5.79E+01	5.0000	5.258E+09	5.0000
I-129	7.5300E-07	6,332.34	12,664.68	0.00E+00	4.77E-03	9.54E-03	7.0000	6.109E+02	7.0000
Kr-85	1.0850E-01	6,332.34	12,664.68	0.00E+00	6.87E+02	1.37E+03	11.0000	6.848E+01	11.0000
Np-237	9.5561E-08	6,332.34	12,664.68	0.00E+00	6.05E-02	1.21E-01			
Pa-231	2.0359E-08	6,332.34	12,664.68	0.00E+00	1.29E-05	2.58E-05			
Pb-210	4.9728E-11	6,332.34	12,664.68	0.00E+00	3.15E-07	6.30E-07			
Pm-147	4.8502E-02	6,332.34	12,664.68	0.00E+00	3.07E+02	6.14E+02			
Pu-238	1.8254E-02	6,332.34	12,664.68	0.00E+00	1.16E+02	2.31E+02			
Pu-239	4.2810E-04	6,332.34	12,664.68	0.00E+00	2.71E+00	5.42E+00			
Pu-240	2.4368E-04	6,332.34	12,664.68	0.00E+00	1.54E+00	3.09E+00			
Pu-241	3.3415E-02	6,332.34	12,664.68	0.00E+00	2.12E+02	4.23E+02			
Pu-242	3.6329E-07	6,332.34	12,664.68	0.00E+00	2.30E-03	4.60E-03			
Ra-226	2.2854E-10	6,332.34	12,664.68	0.00E+00	1.45E-06	2.89E-06			
Ra-228	1.2426E-14	6,332.34	12,664.68	0.00E+00	7.87E-11	1.57E-10			
Ru-106	6.3589E-06	6,332.34	12,664.68	0.00E+00	4.03E-02	8.05E-02			
Se-79	1.2933E-05	6,332.34	12,664.68	0.00E+00	8.19E-02	1.64E-01			
Sn-126	1.1574E-05	6,332.34	12,664.68	0.00E+00	7.33E-02	1.47E-01			
Sr-90	1.9248E+00	6,332.34	12,664.68	0.00E+00	1.22E+04	2.44E+04			
Tc-99	4.2239E-04	6,332.34	12,664.68	0.00E+00	2.67E+00	5.35E+00			
Th-229	5.0953E-12	6,332.34	12,664.68	0.00E+00	3.23E-08	6.45E-08			
Th-230	4.1885E-08	6,332.34	12,664.68	0.00E+00	2.65E-04	5.30E-04			
Th-232	1.9270E-14	6,332.34	12,664.68	0.00E+00	1.22E-10	2.44E-10			
Ti-208	4.6024E-08	6,332.34	12,664.68	0.00E+00	2.91E-04	5.83E-04			
U-232	1.2582E-07	6,332.34	12,664.68	0.00E+00	7.97E-04	1.59E-03			
U-233	2.5825E-09	6,332.34	12,664.68	0.00E+00	1.64E-05	3.27E-05			
U-234	1.8450E-04	6,332.34	12,664.68	0.00E+00	1.17E+00	2.34E+00			
U-235	-2.7235E-08	6,332.34	0.00	3.21E-02	1.49E-02	3.21E-02			
U-236	1.5493E-05	6,332.34	12,664.68	0.00E+00	9.81E-02	1.96E-01			
U-238	-4.2851E-09	6,332.34	0.00	2.00E-02	2.00E-02	2.00E-02			
Y-90	1.9254E+00	6,332.34	12,664.68	0.00E+00	1.22E+04	2.44E+04			
Other Radionuclides					1.22E+04	2.45E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal:		6,332.34	
Bounding:		12,664.68	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.27		
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: FRR MTR-S (USG12 LEU) JAPAN
 SNF ID #: 506
 Fuel Units & Descr: 70 - ASSEMBLY
 Heavy Metal Mass: BOL=73.5kg; EOL=70.413kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 80 to 100%, U)
 *Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 2.92

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	2,923.45	5,846.90	0.00E+00	1.94E-06	3.88E-06	Avg. MeV	
Am-241	2.0060E-03	2,923.45	5,846.90	0.00E+00	5.86E+00	1.17E+01	0.0150	6.172E+14
Am-242m	4.2429E-07	2,923.45	5,846.90	0.00E+00	1.24E-03	2.48E-03	0.0250	1.283E+14
Am-243	1.4899E-06	2,923.45	5,846.90	0.00E+00	4.36E-03	8.71E-03	0.0375	1.119E+14
C-14	5.7135E-09	2,923.45	5,846.90	0.00E+00	1.67E-05	3.34E-05	0.0575	1.199E+14
Cl-36	1.3124E-32	2,923.45	5,846.90	0.00E+00	3.84E-29	7.67E-29	0.0650	7.245E+13
Cm-243	1.8443E-07	2,923.45	5,846.90	0.00E+00	4.81E-04	9.61E-04	0.1250	4.903E+13
Cm-244	2.9330E-05	2,923.45	5,846.90	0.00E+00	8.57E-02	1.71E-01	0.2250	6.252E+13
Co-60	5.3186E-06	2,923.45	5,846.90	0.00E+00	1.55E-02	3.11E-02	0.3750	2.721E+13
Cs-134	3.1563E-03	2,923.45	5,846.90	0.00E+00	9.23E+00	1.85E+01	0.5750	4.439E+14
Cs-135	3.4477E-06	2,923.45	5,846.90	0.00E+00	1.01E-02	2.02E-02	0.8500	7.505E+12
Cs-137	2.0313E+00	2,923.45	5,846.90	0.00E+00	5.94E+03	1.19E+04	1.2500	4.285E+12
Eu-154	2.4513E-02	2,923.45	5,846.90	0.00E+00	7.17E+01	1.43E+02	1.7500	1.967E+11
Eu-155	4.8175E-03	2,923.45	5,846.90	0.00E+00	1.41E+01	2.82E+01	2.2500	1.725E+07
Fe-55	1.2397E-04	2,923.45	5,846.90	0.00E+00	3.62E-01	7.25E-01	2.7500	9.754E+06
H-3	4.5697E-03	2,923.45	5,846.90	0.00E+00	1.34E+01	2.67E+01	3.5000	4.491E+04
I-129	7.5300E-07	2,923.45	5,846.90	0.00E+00	2.20E-03	4.40E-03	5.0000	2.578E+03
Kr-85	1.0850E-01	2,923.45	5,846.90	0.00E+00	3.17E+02	6.34E+02	7.0000	2.848E+02
Np-237	9.5561E-06	2,923.45	5,846.90	0.00E+00	2.79E-02	5.59E-02	11.0000	3.194E+01
Pa-231	2.0359E-09	2,923.45	5,846.90	0.00E+00	5.95E-06	1.19E-05		
Pb-210	4.9728E-11	2,923.45	5,846.90	0.00E+00	1.45E-07	2.91E-07		
Pm-147	4.8502E-02	2,923.45	5,846.90	0.00E+00	1.42E+02	2.84E+02		
Pu-238	1.8254E-02	2,923.45	5,846.90	0.00E+00	5.34E+01	1.07E+02		
Pu-239	4.2810E-04	2,923.45	5,846.90	0.00E+00	1.25E+00	2.50E+00		
Pu-240	2.4368E-04	2,923.45	5,846.90	0.00E+00	7.12E-01	1.42E+00		
Pu-241	3.3415E-02	2,923.45	5,846.90	0.00E+00	9.77E+01	1.95E+02		
Pu-242	3.6329E-07	2,923.45	5,846.90	0.00E+00	1.06E-03	2.12E-03		
Ra-226	2.2854E-10	2,923.45	5,846.90	0.00E+00	6.68E-07	1.34E-06		
Ra-228	1.2426E-14	2,923.45	5,846.90	0.00E+00	3.63E-11	7.27E-11		
Ru-106	6.3589E-06	2,923.45	5,846.90	0.00E+00	1.86E-02	3.72E-02		
Se-79	1.2933E-05	2,923.45	5,846.90	0.00E+00	3.78E-02	7.56E-02		
Sn-126	1.1574E-05	2,923.45	5,846.90	0.00E+00	3.38E-02	6.77E-02		
Sr-90	1.9248E+00	2,923.45	5,846.90	0.00E+00	5.63E+03	1.13E+04		
Tc-99	4.2239E-04	2,923.45	5,846.90	0.00E+00	1.23E+00	2.47E+00		
Th-229	5.0953E-12	2,923.45	5,846.90	0.00E+00	1.49E-08	2.98E-08		
Th-230	4.1885E-08	2,923.45	5,846.90	0.00E+00	1.22E-04	2.45E-04		
Th-232	1.9270E-14	2,923.45	5,846.90	0.00E+00	5.63E-11	1.13E-10		
Ti-208	4.6024E-08	2,923.45	5,846.90	0.00E+00	1.35E-04	2.69E-04		
U-232	1.2582E-07	2,923.45	5,846.90	0.00E+00	3.68E-04	7.36E-04		
U-233	2.5825E-09	2,923.45	5,846.90	0.00E+00	7.55E-06	1.51E-05		
U-234	1.8450E-04	2,923.45	5,846.90	0.00E+00	5.39E-01	1.08E+00		
U-235	-2.7235E-06	2,923.45	0.00	3.18E-02	2.38E-02	3.18E-02		
U-236	1.5493E-05	2,923.45	5,846.90	0.00E+00	4.53E-02	9.06E-02		
U-238	-4.2851E-09	2,923.45	0.00	1.98E-02	1.98E-02	1.98E-02		
Y-90	1.9254E+00	2,923.45	5,846.90	0.00E+00	5.63E+03	1.13E+04		
Other Radionuclides					5.65E+03	1.13E+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: This fuel matches on all parameters except enrichment.
Fuel Cladding:	ALUM	ALUM	
BOL NM Constituents:	U	U	
BOL Enrichment %:	20.00000028	80 to 100	

Burnup Summary (MWd)

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,923.45	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		5,846.90	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL NM/Given EOL NM
Nominal:	0.13		1.00
Bounding:	0.25		

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

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

Fuel Radionuclide Inventory Worksheet

A. Fuel and Template Information

Fuel Name: FRR MTR-S (US22 LEU) JAPAN
 SNF ID #: 508
 Fuel Units & Design: 149 - ASSEMBLY
 Heavy Metal Mass: BOL=205.62g; EOL=193.283g
 ROD Storage Site: SRS

*Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Asm. 60 to 100% U)
 *Template Burnup(MWd/g): 367.2
 Template BOL Heavy Metal Mass (MT): 0.0016689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 6.21

II. Estimates

Radionuclide	C/MWd From Template	m	%	Bounding Fuel Burnup (MWd/g)	%	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Gamma Sources	Total Photons/sec (bounding)
Ac-227	6.6313E-10	11.683.57	23.367.15	0.00E+00	7.75E-06	1.55E-05	1.55E-05	1.55E-05	0.0150	2.467E+15	2.467E+15
Am-241	2.0060E-03	11.683.57	23.367.15	0.00E+00	2.34E+01	4.89E+01	4.89E+01	4.89E+01	0.0250	5.129E+14	5.129E+14
Am-242m	4.2429E-07	11.683.57	23.367.15	0.00E+00	1.74E-02	3.48E-02	3.48E-02	3.48E-02	0.0376	4.674E+14	4.674E+14
Am-243	1.4899E-06	11.683.57	23.367.15	0.00E+00	6.69E-05	1.34E-04	1.34E-04	1.34E-04	0.0576	4.702E+14	4.702E+14
C-14	5.7135E-09	11.683.57	23.367.15	0.00E+00	1.53E-26	3.07E-26	3.07E-26	3.07E-26	0.0850	2.889E+14	2.889E+14
Cm-243	1.3124E-32	11.683.57	23.367.15	0.00E+00	1.92E-03	3.84E-03	3.84E-03	3.84E-03	0.1250	1.959E+14	1.959E+14
Cm-244	1.8443E-07	11.683.57	23.367.15	0.00E+00	3.43E-01	6.85E-01	6.85E-01	6.85E-01	0.2250	2.689E+14	2.689E+14
Co-60	5.3186E-06	11.683.57	23.367.15	0.00E+00	6.21E-02	1.24E-01	1.24E-01	1.24E-01	0.3750	1.089E+14	1.089E+14
Ce-134	3.1583E-03	11.683.57	23.367.15	0.00E+00	3.69E-01	7.38E+01	7.38E+01	7.38E+01	0.5750	1.774E+16	1.774E+16
Cs-135	3.4477E-06	11.683.57	23.367.15	0.00E+00	4.03E-02	8.06E-02	8.06E-02	8.06E-02	0.8500	2.899E+13	2.899E+13
Cs-137	2.0313E+00	11.683.57	23.367.15	0.00E+00	2.37E+04	4.75E+04	4.75E+04	4.75E+04	1.2500	1.719E+13	1.719E+13
Eu-154	2.4513E-02	11.683.57	23.367.15	0.00E+00	2.86E-02	5.73E-02	5.73E-02	5.73E-02	1.7500	7.861E+11	7.861E+11
Eu-155	4.8175E-03	11.683.57	23.367.15	0.00E+00	5.63E-01	1.13E+02	1.13E+02	1.13E+02	2.2500	8.865E+07	8.865E+07
Fe-56	1.2397E-04	11.683.57	23.367.15	0.00E+00	1.45E+00	2.90E+00	2.90E+00	2.90E+00	2.7500	3.898E+07	3.898E+07
H-3	4.5697E-03	11.683.57	23.367.15	0.00E+00	5.34E+01	1.07E+02	1.07E+02	1.07E+02	3.5000	1.794E+05	1.794E+05
I-129	7.5300E-07	11.683.57	23.367.15	0.00E+00	8.80E-03	1.76E-02	1.76E-02	1.76E-02	5.0000	1.025E+04	1.025E+04
Kr-85	1.0850E-01	11.683.57	23.367.15	0.00E+00	1.27E+03	2.54E+03	2.54E+03	2.54E+03	7.0000	1.132E+03	1.132E+03
Np-237	9.5561E-08	11.683.57	23.367.15	0.00E+00	1.12E-01	2.23E-01	2.23E-01	2.23E-01	11.0000	1.268E+02	1.268E+02
Pa-231	2.0359E-08	11.683.57	23.367.15	0.00E+00	2.38E-05	4.76E-05	4.76E-05	4.76E-05			
Pb-210	4.9728E-11	11.683.57	23.367.15	0.00E+00	5.81E-07	1.16E-06	1.16E-06	1.16E-06			
Pm-147	4.8502E-02	11.683.57	23.367.15	0.00E+00	5.67E+02	1.13E+03	1.13E+03	1.13E+03			
Pu-238	1.8254E-02	11.683.57	23.367.15	0.00E+00	2.13E+02	4.27E+02	4.27E+02	4.27E+02			
Pu-239	4.2810E-04	11.683.57	23.367.15	0.00E+00	5.00E+00	1.00E+01	1.00E+01	1.00E+01			
Pu-240	2.4369E-04	11.683.57	23.367.15	0.00E+00	2.85E+00	5.69E+00	5.69E+00	5.69E+00			
Pu-241	3.3415E-02	11.683.57	23.367.15	0.00E+00	3.90E+02	7.81E+02	7.81E+02	7.81E+02			
Pu-242	6.6205E-07	11.683.57	23.367.15	0.00E+00	4.24E+03	8.49E+03	8.49E+03	8.49E+03			
Ra-226	2.2654E-10	11.683.57	23.367.15	0.00E+00	2.67E+06	5.34E+06	5.34E+06	5.34E+06			
Ru-106	1.2426E-14	11.683.57	23.367.15	0.00E+00	1.45E-10	2.90E-10	2.90E-10	2.90E-10			
Ru-108	6.3589E-06	11.683.57	23.367.15	0.00E+00	7.43E-02	1.49E-01	1.49E-01	1.49E-01			
Se-79	1.2933E-05	11.683.57	23.367.15	0.00E+00	1.51E-01	3.02E-01	3.02E-01	3.02E-01			
Sm-128	1.1574E-05	11.683.57	23.367.15	0.00E+00	1.35E-01	2.70E-01	2.70E-01	2.70E-01			
Sn-90	1.9248E+00	11.683.57	23.367.15	0.00E+00	2.25E+04	4.50E+04	4.50E+04	4.50E+04			
Tc-99	4.2239E-04	11.683.57	23.367.15	0.00E+00	4.83E+00	9.67E+00	9.67E+00	9.67E+00			
Th-229	5.0953E-12	11.683.57	23.367.15	0.00E+00	5.95E-06	1.19E-07	1.19E-07	1.19E-07			
Th-230	1.1895E-06	11.683.57	23.367.15	0.00E+00	4.89E-04	9.79E-04	9.79E-04	9.79E-04			
Th-232	1.9270E-14	11.683.57	23.367.15	0.00E+00	2.25E-10	4.50E-10	4.50E-10	4.50E-10			
Th-234	4.6024E-06	11.683.57	23.367.15	0.00E+00	5.38E-04	1.08E-03	1.08E-03	1.08E-03			
U-232	1.2592E-07	11.683.57	23.367.15	0.00E+00	1.47E-03	2.94E-03	2.94E-03	2.94E-03			
U-233	2.5825E-09	11.683.57	23.367.15	0.00E+00	3.02E-05	6.03E-05	6.03E-05	6.03E-05			
U-234	1.8450E-04	11.683.57	23.367.15	0.00E+00	2.16E+00	4.31E+00	4.31E+00	4.31E+00			
U-235	-2.7235E-06	11.683.57	0.00	8.89E-02	5.70E-02	8.89E-02	8.89E-02	8.89E-02			
U-236	1.5493E-05	11.683.57	23.367.15	0.00E+00	1.81E-01	3.62E-01	3.62E-01	3.62E-01			
U-238	-4.2861E-09	11.683.57	0.00	5.53E-02	5.52E-02	5.53E-02	5.53E-02	5.53E-02			
Y-90	1.9254E+00	11.683.57	23.367.15	0.00E+00	2.25E+04	4.50E+04	4.50E+04	4.50E+04			

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator:	From SFD	Used
Light Water	Light Water	
Fuel Cladding:	ALUM	ALUM
BOL HMI Constituents:	U	U
BOL Enrichment %:	19.9999957	60 to 100

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

Burnup Summary (MWd/g)

	From SFD	Estimated
Nominal	11.683.57	11.683.57
Bounding	23.367.15	23.367.15

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	0.18
Bounding	0.36

Estimated EOL HMI/Given EOL HMI
 1.00

*Reactor shutdown, core removal, storage, shipping or other data 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/GMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) NETHERLANDS
SNF ID #: 510
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=64.5kg; EOL=56.76kg
ROD Storage Site: SRS

*Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
1.79

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CM/Wd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	7,329.93	14,659.86	0.00E+00	4.86E-06	9.72E-06	Avg. MeV	
Am-241	2.0060E-03	7,329.93	14,659.86	0.00E+00	1.47E+01	2.94E+01	0.0150	1.547E+15
Am-242m	4.2429E-07	7,329.93	14,659.86	0.00E+00	3.11E-03	6.22E-03	0.0250	3.218E+14
Am-243	1.4899E-06	7,329.93	14,659.86	0.00E+00	1.09E-02	2.18E-02	0.0375	2.807E+14
C-14	5.7135E-09	7,329.93	14,659.86	0.00E+00	4.19E-05	8.38E-05	0.0575	3.006E+14
Ci-36	1.3124E-32	7,329.93	14,659.86	0.00E+00	9.62E-29	1.92E-28	0.0850	1.817E+14
Cm-243	1.6443E-07	7,329.93	14,659.86	0.00E+00	1.21E-03	2.41E-03	0.1250	1.229E+14
Cm-244	2.9330E-05	7,329.93	14,659.86	0.00E+00	2.15E-01	4.30E-01	0.2250	1.567E+14
Co-60	5.3186E-06	7,329.93	14,659.86	0.00E+00	3.90E-02	7.80E-02	0.3750	6.823E+13
Cs-134	3.1563E-03	7,329.93	14,659.86	0.00E+00	2.31E+01	4.63E+01	0.5750	1.113E+15
Cs-135	3.4477E-06	7,329.93	14,659.86	0.00E+00	2.53E-02	5.05E-02	0.8500	1.882E+13
Cs-137	2.0313E+00	7,329.93	14,659.86	0.00E+00	1.49E+04	2.98E+04	1.2500	1.074E+13
Eu-154	2.4513E-02	7,329.93	14,659.86	0.00E+00	1.80E+02	3.59E+02	1.7500	4.932E+11
Eu-155	4.8175E-03	7,329.93	14,659.86	0.00E+00	3.53E+01	7.06E+01	2.2500	4.326E+07
Fe-55	1.2397E-04	7,329.93	14,659.86	0.00E+00	9.09E-01	1.82E+00	2.7500	2.446E+07
H-3	4.5697E-03	7,329.93	14,659.86	0.00E+00	3.35E+01	6.70E+01	3.5000	1.124E+05
I-129	7.5300E-07	7,329.93	14,659.86	0.00E+00	6.52E-03	1.10E-02	5.0000	6.390E+03
Kr-85	1.0850E-01	7,329.93	14,659.86	0.00E+00	7.95E+02	1.59E+03	7.0000	7.056E+02
Np-237	9.5561E-06	7,329.93	14,659.86	0.00E+00	7.00E-02	1.40E-01	11.0000	7.910E+01
Pa-231	2.0359E-09	7,329.93	14,659.86	0.00E+00	1.49E-05	2.98E-05		
Pb-210	4.9728E-11	7,329.93	14,659.86	0.00E+00	3.85E-07	7.29E-07		
Pm-147	4.8502E-02	7,329.93	14,659.86	0.00E+00	3.56E+02	7.11E+02		
Pu-238	1.8254E-02	7,329.93	14,659.86	0.00E+00	1.34E+02	2.68E+02		
Pu-239	4.2810E-04	7,329.93	14,659.86	0.00E+00	3.14E+00	6.28E+00		
Pu-240	2.4368E-04	7,329.93	14,659.86	0.00E+00	1.79E+00	3.57E+00		
Pu-241	3.3415E-02	7,329.93	14,659.86	0.00E+00	2.45E+02	4.90E+02		
Pu-242	3.6329E-07	7,329.93	14,659.86	0.00E+00	2.66E-03	5.33E-03		
Ra-226	2.2854E-10	7,329.93	14,659.86	0.00E+00	1.68E-06	3.35E-06		
Ra-228	1.2426E-14	7,329.93	14,659.86	0.00E+00	9.11E-11	1.82E-10		
Ru-106	8.3589E-06	7,329.93	14,659.86	0.00E+00	4.66E-02	9.32E-02		
Se-79	1.2933E-05	7,329.93	14,659.86	0.00E+00	9.48E-02	1.80E-01		
Sn-126	1.1574E-05	7,329.93	14,659.86	0.00E+00	8.48E-02	1.70E-01		
Sr-90	1.9248E+00	7,329.93	14,659.86	0.00E+00	1.41E+04	2.82E+04		
Tc-99	4.2239E-04	7,329.93	14,659.86	0.00E+00	3.10E+00	6.19E+00		
Th-229	5.0953E-12	7,329.93	14,659.86	0.00E+00	3.73E-08	7.47E-08		
Th-230	4.1885E-08	7,329.93	14,659.86	0.00E+00	3.07E-04	6.14E-04		
Th-232	1.9270E-14	7,329.93	14,659.86	0.00E+00	1.41E-10	2.82E-10		
Ti-206	4.6024E-08	7,329.93	14,659.86	0.00E+00	3.37E-04	6.75E-04		
U-232	1.2582E-07	7,329.93	14,659.86	0.00E+00	9.22E-04	1.84E-03		
U-233	2.5825E-09	7,329.93	14,659.86	0.00E+00	1.89E-05	3.79E-05		
U-234	1.8450E-04	7,329.93	14,659.86	0.00E+00	1.35E+00	2.70E+00		
U-235	2.7235E-06	7,329.93	0.00	2.79E-02	7.91E-03	2.79E-02		
U-236	1.5493E-05	7,329.93	14,659.86	0.00E+00	1.14E-01	2.27E-01		
U-238	4.2851E-09	7,329.93	0.00	1.73E-02	1.73E-02	1.73E-02		
Y-90	1.8254E+00	7,329.93	14,659.86	0.00E+00	1.41E+04	2.82E+04		
Other Radionuclides					1.42E+04	2.84E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000079	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)^a

	From SFD	Estimated
Nominal:		7,329.93
Bounding:		14,659.86

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM
1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:

Fuel Name: FRR MTR-S (USSR LEU) TURKEY
 SWF ID #: 528
 Fuel Unit: 6 Descr: 32 - ASSEMBLY
 Heavy Metal Mass: BOL-67.2kg; EOL-69.139kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2000
 Template: ATR (Light Water, Atom. 60 to 100%, U)
 Template BOL Heavy Metal Mass (MT): 367.2
 Template Decay Time: 0.0016689
 20 years

Estimated
 Canister usage:
 187119
 1.33

IL Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources
Radionuclide	CLAIMED From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	6.6313E-10	7.638.76	15.273.53	0.00E+00	5.00E-06	1.01E-05	Avg. Max
Am-241	2.0060E-03	7.638.76	15.273.53	0.00E+00	1.53E-01	3.08E+01	0.0150
Am-242m	4.2429E-07	7.638.76	15.273.53	0.00E+00	3.24E-03	8.48E-03	0.0250
Am-243	1.4899E-06	7.638.76	15.273.53	0.00E+00	1.14E-02	2.28E-02	0.0075
C-14	5.7136E-09	7.638.76	15.273.53	0.00E+00	4.36E-06	8.73E-06	0.0075
C-36	1.3124E-32	7.638.76	15.273.53	0.00E+00	1.00E-28	2.00E-28	0.0850
Cm-243	1.6443E-07	7.638.76	15.273.53	0.00E+00	1.29E-03	2.51E-03	0.1250
Cm-244	2.9330E-06	7.638.76	15.273.53	0.00E+00	2.24E-01	4.48E-01	0.2250
Co-60	5.3186E-08	7.638.76	15.273.53	0.00E+00	4.00E-02	8.12E-02	0.3750
Co-134	3.1683E-03	7.638.76	15.273.53	0.00E+00	2.41E-01	4.82E-01	0.5750
Co-136	3.4477E-06	7.638.76	15.273.53	0.00E+00	2.63E-02	5.27E-02	1.860E+15
Cr-137	2.0313E-00	7.638.76	15.273.53	0.00E+00	1.55E-04	3.10E+04	1.2500
Eu-154	2.4513E-02	7.638.76	15.273.53	0.00E+00	1.87E-02	3.74E+02	1.7500
Eu-155	4.8175E-03	7.638.76	15.273.53	0.00E+00	3.68E-01	7.36E+01	2.2500
Fe-55	1.2397E-04	7.638.76	15.273.53	0.00E+00	9.47E-01	1.89E+00	2.7500
H-3	4.5697E-03	7.638.76	15.273.53	0.00E+00	3.49E+01	6.98E+01	5.0000
H-39	7.638.76	7.638.76	15.273.53	0.00E+00	5.75E-03	1.15E-02	5.0000
Kr-86	1.0850E-01	7.638.76	15.273.53	0.00E+00	8.29E-02	1.66E+03	7.0000
Np-237	9.5561E-08	7.638.76	15.273.53	0.00E+00	7.30E-02	1.46E-01	11.0000
Pa-231	2.0359E-09	7.638.76	15.273.53	0.00E+00	1.55E-05	3.11E-05	
Pb-210	4.9728E-11	7.638.76	15.273.53	0.00E+00	3.80E-07	7.60E-07	
Pb-214	4.8502E-02	7.638.76	15.273.53	0.00E+00	3.70E-02	7.41E+02	
Pu-238	1.8254E-02	7.638.76	15.273.53	0.00E+00	1.39E-02	2.73E+02	
Pu-239	4.2810E-04	7.638.76	15.273.53	0.00E+00	3.27E-00	6.54E+00	
Pu-240	2.4388E-04	7.638.76	15.273.53	0.00E+00	1.86E-00	3.72E+00	
Pu-241	3.3415E-02	7.638.76	15.273.53	0.00E+00	2.55E-02	5.10E+02	
Pu-242	3.6329E-07	7.638.76	15.273.53	0.00E+00	2.77E-03	5.55E-03	
Pu-246	2.2854E-10	7.638.76	15.273.53	0.00E+00	1.75E-08	3.49E-08	
Ra-226	1.2428E-14	7.638.76	15.273.53	0.00E+00	9.48E-11	1.90E-10	
Rn-106	6.3689E-06	7.638.76	15.273.53	0.00E+00	4.86E-02	9.71E-02	
Sa-79	1.2933E-05	7.638.76	15.273.53	0.00E+00	9.89E-02	1.98E-01	
Sm-126	1.1574E-05	7.638.76	15.273.53	0.00E+00	8.84E-02	1.77E-01	
Sm-147	1.9249E-00	7.638.76	15.273.53	0.00E+00	1.47E-04	2.94E+04	
Tc-99	4.2239E-12	7.638.76	15.273.53	0.00E+00	3.23E-03	6.45E+00	
Th-229	5.0953E-12	7.638.76	15.273.53	0.00E+00	3.89E-08	7.78E-08	
Th-230	4.1856E-08	7.638.76	15.273.53	0.00E+00	3.20E-04	6.40E-04	
Th-232	1.9270E-14	7.638.76	15.273.53	0.00E+00	1.47E-10	2.94E-10	
Th-234	4.6024E-08	7.638.76	15.273.53	0.00E+00	3.51E-04	7.02E-04	
U-232	1.2582E-07	7.638.76	15.273.53	0.00E+00	9.61E-04	1.92E-03	
U-233	2.5825E-09	7.638.76	15.273.53	0.00E+00	1.97E-05	3.94E-05	
U-234	1.9450E-04	7.638.76	15.273.53	0.00E+00	1.41E-00	2.82E+00	
U-235	2.7263E-08	7.638.76	0.00	2.90E-02	8.24E-03	2.90E-02	
U-236	1.5493E-05	7.638.76	15.273.53	0.00E+00	1.18E-01	2.37E-01	
U-238	4.2851E-08	7.638.76	0.00	1.81E-02	1.80E-02	1.81E-02	
Y-90	1.9254E+00	7.638.76	15.273.53	0.00E+00	1.47E+04	2.94E+04	
Other Radionuclides					1.48E+04	2.95E+04	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL H/M Constituents	U	U
BOL Enrichment %:	20.00000028	60 to 100

Basic for Parameter Differences:
 This Template was used for the following reason:
 The fuel matches on all parameters except enrichment.

Burnup Summary (MWd/g)	From SFD	Estimated
Nominal		7.638.76
Bounding		15.273.53

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

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.36	
Bounding	0.72	
		Estimated EOL H/M/Given EOL H/M
		1.01

*Reactor shutdown, core removal, storage, shipping or other data confirming that radiation 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/GMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (JALX-HEU) CANADA
SNF ID #: 720
Fuel Units & Descr: 21 - MTR TYPE
Heavy Metal Mass: BOL=4.427kg; EOL=2.862kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.88

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	6.6313E-10	1,481.61	2,963.22	0.00E+00	9.82E-07	1.96E-06	Avg. MeV	
Am-241	2.0060E-03	1,481.61	2,963.22	0.00E+00	2.97E+00	5.94E+00	0.0150	3.128E+14
Am-242m	4.2429E-07	1,481.61	2,963.22	0.00E+00	6.29E-04	1.26E-03	0.0250	6.504E+13
Am-243	1.4899E-06	1,481.61	2,963.22	0.00E+00	2.21E-03	4.41E-03	0.0375	5.673E+13
C-14	5.7135E-09	1,481.61	2,963.22	0.00E+00	8.47E-06	1.69E-05	0.0575	6.076E+13
Cl-36	1.3124E-32	1,481.61	2,963.22	0.00E+00	1.94E-29	3.89E-29	0.0850	3.872E+13
Cm-243	1.6443E-07	1,481.61	2,963.22	0.00E+00	2.44E-04	4.87E-04	0.1250	2.485E+13
Cm-244	2.9330E-05	1,481.61	2,963.22	0.00E+00	4.35E-02	8.69E-02	0.2250	3.165E+13
Co-60	5.3186E-06	1,481.61	2,963.22	0.00E+00	7.88E-03	1.58E-02	0.3750	1.379E+13
Cs-134	3.1563E-03	1,481.61	2,963.22	0.00E+00	4.68E+00	9.35E+00	0.5750	2.250E+14
Cs-135	3.4477E-06	1,481.61	2,963.22	0.00E+00	5.11E-03	1.02E-02	0.8500	3.803E+12
Cs-137	2.0313E+00	1,481.61	2,963.22	0.00E+00	3.01E+03	6.02E+03	1.2500	2.172E+12
Eu-154	2.4513E-02	1,481.61	2,963.22	0.00E+00	3.63E+01	7.26E+01	1.7500	9.968E+10
Eu-155	4.8175E-03	1,481.61	2,963.22	0.00E+00	7.14E+00	1.43E+01	2.2500	8.744E+06
Fe-55	1.2397E-04	1,481.61	2,963.22	0.00E+00	1.84E-01	3.67E-01	2.7500	4.943E+06
H-3	4.5697E-03	1,481.61	2,963.22	0.00E+00	6.77E+00	1.35E+01	3.5000	2.271E+04
I-129	7.5300E-07	1,481.61	2,963.22	0.00E+00	1.12E-03	2.23E-03	5.0000	1.284E+03
Kr-85	1.0850E-01	1,481.61	2,963.22	0.00E+00	1.61E+02	3.22E+02	7.0000	1.417E+02
Np-237	9.5561E-06	1,481.61	2,963.22	0.00E+00	1.42E-02	2.83E-02	11.0000	1.589E+01
Pa-231	2.0359E-09	1,481.61	2,963.22	0.00E+00	3.02E-06	6.03E-06		
Pb-210	4.9728E-11	1,481.61	2,963.22	0.00E+00	7.37E-08	1.47E-07		
Pm-147	4.8502E-02	1,481.61	2,963.22	0.00E+00	7.19E+01	1.44E+02		
Pu-238	1.8254E-02	1,481.61	2,963.22	0.00E+00	2.70E+01	5.41E+01		
Pu-239	4.2810E-04	1,481.61	2,963.22	0.00E+00	6.34E-01	1.27E+00		
Pu-240	2.4358E-04	1,481.61	2,963.22	0.00E+00	3.61E-01	7.22E-01		
Pu-241	3.3415E-02	1,481.61	2,963.22	0.00E+00	4.95E+01	9.90E+01		
Pu-242	3.6329E-07	1,481.61	2,963.22	0.00E+00	5.38E-04	1.08E-03		
Ra-226	2.2854E-10	1,481.61	2,963.22	0.00E+00	3.39E-07	6.77E-07		
Ra-228	1.2426E-14	1,481.61	2,963.22	0.00E+00	1.84E-11	3.68E-11		
Ru-106	6.3589E-06	1,481.61	2,963.22	0.00E+00	9.42E-03	1.88E-02		
Se-79	1.2933E-05	1,481.61	2,963.22	0.00E+00	1.82E-02	3.63E-02		
Sn-126	1.1574E-05	1,481.61	2,963.22	0.00E+00	1.71E-02	3.43E-02		
Sr-90	1.9248E+00	1,481.61	2,963.22	0.00E+00	2.85E+03	5.70E+03		
Tc-99	4.2239E-04	1,481.61	2,963.22	0.00E+00	6.26E-01	1.25E+00		
Th-229	5.0953E-12	1,481.61	2,963.22	0.00E+00	7.55E-09	1.51E-08		
Th-230	4.1885E-06	1,481.61	2,963.22	0.00E+00	6.21E-05	1.24E-04		
Th-232	1.9270E-14	1,481.61	2,963.22	0.00E+00	2.86E-11	5.71E-11		
Ti-208	4.6024E-08	1,481.61	2,963.22	0.00E+00	6.82E-05	1.36E-04		
U-232	1.2582E-07	1,481.61	2,963.22	0.00E+00	1.86E-04	3.73E-04		
U-233	2.5825E-09	1,481.61	2,963.22	0.00E+00	3.83E-06	7.65E-06		
U-234	1.8450E-04	1,481.61	2,963.22	0.00E+00	2.73E-01	5.47E-01		
U-235	2.7235E-06	1,481.61	0.00	8.90E-03	4.86E-03	8.90E-03		
U-236	1.5493E-05	1,481.61	2,963.22	0.00E+00	2.30E-02	4.59E-02		
U-238	4.2851E-09	1,481.61	0.00	1.04E-04	9.78E-05	1.04E-04		
Y-90	1.9254E+00	1,481.61	2,963.22	0.00E+00	2.85E+03	5.71E+03		
Other Radionuclides					2.87E+03	5.73E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999478	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		1,481.61
Bounding:		2,963.22

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:	1.06	
Bounding:	2.13	

Estimated EOL HM/Given EOL HM

1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
SNF ID #: 582
Fuel Units & Descr: 1 - MTR TYPE
Heavy Metal Mass: BOL=0.176kg; EOL=0.126kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	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	6.6313E-10	48.11	96.22	0.00E+00	3.19E-08	6.38E-08	Avg. MeV	
Am-241	2.0060E-03	48.11	96.22	0.00E+00	9.65E-02	1.93E-01	0.0150	1.016E+13
Am-242m	4.2429E-07	48.11	96.22	0.00E+00	2.04E-05	4.08E-05	0.0250	2.112E+12
Am-243	1.4899E-06	48.11	96.22	0.00E+00	7.17E-05	1.43E-04	0.0375	1.842E+12
C-14	5.7135E-09	48.11	96.22	0.00E+00	2.75E-07	5.50E-07	0.0575	1.973E+12
Cl-36	1.3124E-32	48.11	96.22	0.00E+00	6.31E-31	1.26E-30	0.0850	1.192E+12
Cm-243	1.6443E-07	48.11	96.22	0.00E+00	7.91E-06	1.58E-05	0.1250	8.068E+11
Cm-244	2.9330E-05	48.11	96.22	0.00E+00	1.41E-03	2.82E-03	0.2250	1.029E+12
Co-60	5.3186E-06	48.11	96.22	0.00E+00	2.56E-04	5.12E-04	0.3750	4.478E+11
Cs-134	3.1563E-03	48.11	96.22	0.00E+00	1.52E-01	3.04E-01	0.5750	7.305E+12
Cs-135	3.4477E-06	48.11	96.22	0.00E+00	1.66E-04	3.32E-04	0.8500	1.235E+11
Cs-137	2.0313E+00	48.11	96.22	0.00E+00	9.77E+01	1.95E+02	1.2500	7.052E+10
Eu-154	2.4513E-02	48.11	96.22	0.00E+00	1.18E+00	2.36E+00	1.7500	3.237E+09
Eu-155	4.8175E-03	48.11	96.22	0.00E+00	2.32E-01	4.64E-01	2.2500	2.839E+06
Fe-55	1.2397E-04	48.11	96.22	0.00E+00	5.96E-03	1.19E-02	2.7500	1.805E+05
H-3	4.5697E-03	48.11	96.22	0.00E+00	2.20E-01	4.40E-01	3.5000	7.374E+02
I-129	7.5300E-07	48.11	96.22	0.00E+00	3.62E-05	7.25E-05	5.0000	4.169E+01
Kr-85	1.0850E-01	48.11	96.22	0.00E+00	5.22E+00	1.04E+01	7.0000	4.602E+00
Np-237	9.5561E-06	48.11	96.22	0.00E+00	4.60E-04	9.19E-04	11.0000	5.158E-01
Pa-231	2.0359E-09	48.11	96.22	0.00E+00	9.79E-08	1.96E-07		
Pb-210	4.9728E-11	48.11	96.22	0.00E+00	2.39E-09	4.78E-09		
Pm-147	4.8502E-02	48.11	96.22	0.00E+00	2.33E+00	4.67E+00		
Pu-238	1.8254E-02	48.11	96.22	0.00E+00	8.78E-01	1.76E+00		
Pu-239	4.2810E-04	48.11	96.22	0.00E+00	2.06E-02	4.12E-02		
Pu-240	2.4368E-04	48.11	96.22	0.00E+00	1.17E-02	2.34E-02		
Pu-241	3.3415E-02	48.11	96.22	0.00E+00	1.61E+00	3.22E+00		
Pu-242	3.6329E-07	48.11	96.22	0.00E+00	1.75E-05	3.50E-05		
Ra-226	2.2854E-10	48.11	96.22	0.00E+00	1.10E-08	2.20E-08		
Ra-228	1.2426E-14	48.11	96.22	0.00E+00	5.98E-13	1.20E-12		
Ru-106	6.3589E-06	48.11	96.22	0.00E+00	3.06E-04	6.12E-04		
Se-79	1.2933E-05	48.11	96.22	0.00E+00	6.22E-04	1.24E-03		
Sn-126	1.1574E-05	48.11	96.22	0.00E+00	5.57E-04	1.11E-03		
Sr-90	1.9248E+00	48.11	96.22	0.00E+00	9.26E+01	1.85E+02		
Tc-99	4.2239E-04	48.11	96.22	0.00E+00	2.03E-02	4.06E-02		
Th-229	5.0953E-12	48.11	96.22	0.00E+00	2.45E-10	4.90E-10		
Th-230	4.1885E-08	48.11	96.22	0.00E+00	2.02E-06	4.03E-06		
Th-232	1.9270E-14	48.11	96.22	0.00E+00	9.27E-13	1.85E-12		
Th-208	4.6024E-08	48.11	96.22	0.00E+00	2.21E-06	4.43E-06		
U-232	1.2582E-07	48.11	96.22	0.00E+00	6.05E-06	1.21E-05		
U-233	2.5825E-09	48.11	96.22	0.00E+00	1.24E-07	2.48E-07		
U-234	1.8450E-04	48.11	96.22	0.00E+00	8.88E-03	1.78E-02		
U-235	-2.7235E-06	48.11	0.00	3.54E-04	2.23E-04	3.54E-04		
U-238	1.5493E-05	48.11	96.22	0.00E+00	7.45E-04	1.49E-03		
U-238	-4.2851E-09	48.11	0.00	4.15E-08	3.94E-08	4.15E-08		
Y-90	1.9254E+00	48.11	96.22	0.00E+00	9.26E+01	1.85E+02		
Other Radionuclides					9.30E+01	1.86E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.9999263	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		48.11	
Bounding:		96.22	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.87		
Bounding:	1.73		1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
 SNF ID #: 584
 Fuel Units & Descr: 44 - MTR TYPE
 Heavy Metal Mass: BOL=8.136kg; EOL=5.944kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 1.83

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	6.6313E-10	2,075.11	4,150.22	0.00E+00	1.38E-06	2.75E-06	Avg. MeV	
Am-241	2.0060E-03	2,075.11	4,150.22	0.00E+00	4.16E+00	8.33E+00	0.0150	4.381E+14
Am-242m	4.2429E-07	2,075.11	4,150.22	0.00E+00	8.80E-04	1.76E-03	0.0250	2.110E+13
Am-243	1.4899E-06	2,075.11	4,150.22	0.00E+00	3.09E-03	6.18E-03	0.0375	7.946E+13
C-14	5.7135E-09	2,075.11	4,150.22	0.00E+00	1.19E-06	2.37E-06	0.0575	8.510E+13
Cl-36	1.3124E-32	2,075.11	4,150.22	0.00E+00	2.72E-29	5.45E-29	0.0850	5.143E+13
Cm-243	1.6443E-07	2,075.11	4,150.22	0.00E+00	3.41E-04	6.82E-04	0.1250	3.480E+13
Cm-244	2.9330E-05	2,075.11	4,150.22	0.00E+00	6.09E-02	1.22E-01	0.2250	4.438E+13
Co-60	5.3186E-06	2,075.11	4,150.22	0.00E+00	1.10E-02	2.21E-02	0.3750	1.932E+13
Cs-134	3.1563E-03	2,075.11	4,150.22	0.00E+00	6.55E+00	1.31E+01	0.5750	3.151E+14
Cs-135	3.4477E-06	2,075.11	4,150.22	0.00E+00	7.15E-03	1.43E-02	0.8500	5.327E+12
Cs-137	2.0313E+00	2,075.11	4,150.22	0.00E+00	4.22E+03	8.43E+03	1.2500	3.042E+12
Eu-154	2.4513E-02	2,075.11	4,150.22	0.00E+00	5.09E+01	1.02E+02	1.7500	1.396E+11
Eu-155	4.8175E-03	2,075.11	4,150.22	0.00E+00	1.00E+01	2.00E+01	2.2500	1.225E+07
Fe-55	1.2397E-04	2,075.11	4,150.22	0.00E+00	2.57E-01	5.14E-01	2.7500	6.924E+06
H-3	4.5697E-03	2,075.11	4,150.22	0.00E+00	9.48E+00	1.90E+01	3.5000	3.181E+04
I-129	7.5300E-07	2,075.11	4,150.22	0.00E+00	1.56E-03	3.13E-03	5.0000	1.798E+03
Kr-85	1.0850E-01	2,075.11	4,150.22	0.00E+00	2.25E+02	4.50E+02	7.0000	1.965E+02
Np-237	9.5561E-06	2,075.11	4,150.22	0.00E+00	1.98E-02	3.97E-02	11.0000	2.225E+01
Pa-231	2.0395E-09	2,075.11	4,150.22	0.00E+00	4.22E-06	8.45E-06		
Pb-210	4.9728E-11	2,075.11	4,150.22	0.00E+00	1.03E-07	2.06E-07		
Pm-147	4.8502E-02	2,075.11	4,150.22	0.00E+00	1.01E+02	2.01E+02		
Pu-238	1.8254E-02	2,075.11	4,150.22	0.00E+00	3.79E+01	7.58E+01		
Pu-239	4.2610E-04	2,075.11	4,150.22	0.00E+00	8.88E-01	1.78E+00		
Pu-240	2.4368E-04	2,075.11	4,150.22	0.00E+00	5.06E-01	1.01E+00		
Pu-241	3.3415E-02	2,075.11	4,150.22	0.00E+00	6.93E+01	1.39E+02		
Pu-242	3.6329E-07	2,075.11	4,150.22	0.00E+00	7.54E-04	1.51E-03		
Ra-226	2.2854E-10	2,075.11	4,150.22	0.00E+00	4.74E-07	9.48E-07		
Ra-228	1.2426E-14	2,075.11	4,150.22	0.00E+00	2.58E-11	5.16E-11		
Ru-106	6.3589E-06	2,075.11	4,150.22	0.00E+00	1.32E-02	2.64E-02		
Se-79	1.2933E-05	2,075.11	4,150.22	0.00E+00	2.68E-02	5.37E-02		
Sn-126	1.1574E-06	2,075.11	4,150.22	0.00E+00	2.40E-02	4.80E-02		
Sr-90	1.9248E+00	2,075.11	4,150.22	0.00E+00	3.99E+03	7.99E+03		
Tc-99	4.2239E-04	2,075.11	4,150.22	0.00E+00	8.76E-01	1.75E+00		
Th-229	5.0953E-12	2,075.11	4,150.22	0.00E+00	1.06E-08	2.11E-08		
Th-230	4.1885E-08	2,075.11	4,150.22	0.00E+00	8.69E-05	1.74E-04		
Th-232	1.9270E-14	2,075.11	4,150.22	0.00E+00	4.00E-11	8.00E-11		
Ti-208	4.6024E-08	2,075.11	4,150.22	0.00E+00	9.55E-05	1.91E-04		
U-232	1.2582E-07	2,075.11	4,150.22	0.00E+00	2.81E-04	5.22E-04		
U-233	2.5825E-09	2,075.11	4,150.22	0.00E+00	5.36E-06	1.07E-05		
U-234	1.8450E-04	2,075.11	4,150.22	0.00E+00	3.83E-01	7.66E-01		
U-235	-2.7235E-06	2,075.11	0.00	1.64E-02	1.07E-02	1.64E-02		
U-236	1.5493E-05	2,075.11	4,150.22	0.00E+00	3.21E-02	6.43E-02		
U-238	-4.2851E-09	2,075.11	0.00	1.91E-04	1.83E-04	1.91E-04		
Y-90	1.9254E+00	2,075.11	4,150.22	0.00E+00	4.00E+03	7.99E+03		
Other Radionuclides					4.01E+03	8.03E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.00001838	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,075.11	
Bounding:		4,150.22	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.81		
Bounding:	1.62		1.02

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY

SNF ID #: 585

Fuel Units & Descr: 50 - MTR TYPE

Heavy Metal Mass: BOL=9.675kg; EOL=4.635kg

ROD Storage Site: SRS

*Fuel decay start date: 2010

Estimates as of: 2030

Template: TRIGA-AI (LW/U-Zrx, Alum., 10 to 20%, U)

*Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

2.08

II. Estimates

	m	x ₁	x ₂	b	y ₁	y ₂	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.4556E-09	4,810.77	9,234.97	0.00E+00	1.18E-05	2.27E-05	Avg. MeV	
Am-241	3.8752E-03	4,810.77	9,234.97	0.00E+00	1.86E+01	3.58E+01	0.0150	9.477E+14
Am-242m	1.8617E-06	4,810.77	9,234.97	0.00E+00	8.96E-03	1.72E-02	0.0250	1.967E+14
Am-243	2.3293E-07	4,810.77	9,234.97	0.00E+00	1.12E-03	2.15E-03	0.0375	2.048E+14
C-14	4.3233E-05	4,810.77	9,234.97	0.00E+00	2.08E-01	3.99E-01	0.0575	1.893E+14
Cl-36	4.3023E-08	4,810.77	9,234.97	0.00E+00	2.07E-04	3.97E-04	0.0850	1.153E+14
Cm-243	1.9053E-07	4,810.77	9,234.97	0.00E+00	9.17E-04	1.76E-03	0.1250	1.294E+14
Cm-244	1.7744E-08	4,810.77	9,234.97	0.00E+00	8.54E-03	1.64E-02	0.2250	1.045E+14
Co-60	4.3188E-03	4,810.77	9,234.97	0.00E+00	2.08E+01	3.99E+01	0.3750	4.292E+13
Cs-134	6.7188E-04	4,810.77	9,234.97	0.00E+00	3.23E+00	6.20E+00	0.5750	6.838E+14
Cs-135	3.1549E-05	4,810.77	9,234.97	0.00E+00	1.52E-01	2.91E-01	0.8500	7.276E+13
Cs-137	1.9489E+00	4,810.77	9,234.97	0.00E+00	9.38E+03	1.80E+04	1.2500	7.837E+13
Eu-154	4.0301E-01	4,810.77	9,234.97	0.00E+00	1.94E+03	3.72E+03	1.7500	2.348E+12
Eu-155	5.4000E-02	4,810.77	9,234.97	0.00E+00	2.60E+02	4.99E+02	2.2500	3.722E+07
Fe-55	1.5955E-04	4,810.77	9,234.97	0.00E+00	7.68E-01	1.47E+00	2.7500	6.194E+06
H-3	4.6571E-03	4,810.77	9,234.97	0.00E+00	2.24E+01	4.30E+01	3.5000	4.237E+04
I-129	7.3805E-07	4,810.77	9,234.97	0.00E+00	3.55E-03	6.82E-03	5.0000	5.191E+03
Kr-85	9.5684E-02	4,810.77	9,234.97	0.00E+00	4.60E+02	8.84E+02	7.0000	5.859E+02
Np-237	1.4618E-06	4,810.77	9,234.97	0.00E+00	7.03E-03	1.35E-02	11.0000	6.663E-01
Pa-231	6.4782E-09	4,810.77	9,234.97	0.00E+00	3.12E-05	5.98E-05		
Pb-210	6.3158E-14	4,810.77	9,234.97	0.00E+00	3.04E-10	5.83E-10		
Pm-147	3.9564E-02	4,810.77	9,234.97	0.00E+00	1.90E+02	3.65E+02		
Pu-238	1.2008E-03	4,810.77	9,234.97	0.00E+00	5.78E+00	1.11E+01		
Pu-239	5.6917E-03	4,810.77	9,234.97	0.00E+00	2.74E+01	5.26E+01		
Pu-240	2.2617E-03	4,810.77	9,234.97	0.00E+00	1.09E+01	2.09E+01		
Pu-241	6.1113E-02	4,810.77	9,234.97	0.00E+00	2.94E+02	5.64E+02		
Pu-242	3.0602E-07	4,810.77	9,234.97	0.00E+00	1.47E-03	2.83E-03		
Ra-226	2.6707E-13	4,810.77	9,234.97	0.00E+00	1.28E-09	2.47E-09		
Ra-228	2.2556E-10	4,810.77	9,234.97	0.00E+00	1.09E-06	2.08E-06		
Ru-106	3.1293E-06	4,810.77	9,234.97	0.00E+00	1.51E-02	2.89E-02		
Se-79	1.2935E-05	4,810.77	9,234.97	0.00E+00	6.22E-02	1.19E-01		
Sn-126	1.2238E-05	4,810.77	9,234.97	0.00E+00	5.89E-02	1.13E-01		
Sr-90	1.8195E+00	4,810.77	9,234.97	0.00E+00	8.75E+03	1.68E+04		
Tc-99	4.4120E-04	4,810.77	9,234.97	0.00E+00	2.12E+00	4.07E+00		
Th-229	3.3308E-10	4,810.77	9,234.97	0.00E+00	1.60E-06	3.08E-06		
Th-230	4.6526E-11	4,810.77	9,234.97	0.00E+00	2.24E-07	4.30E-07		
Th-232	2.3744E-10	4,810.77	9,234.97	0.00E+00	1.14E-06	2.19E-06		
Ti-208	1.8195E-08	4,810.77	9,234.97	0.00E+00	8.75E-05	1.68E-04		
U-232	4.9098E-08	4,810.77	9,234.97	0.00E+00	2.36E-04	4.53E-04		
U-233	1.3140E-07	4,810.77	9,234.97	0.00E+00	6.32E-04	1.21E-03		
U-234	2.2571E-07	4,810.77	9,234.97	0.00E+00	1.09E-03	2.08E-03		
U-235	-2.6159E-06	4,810.77	0.00	1.94E-02	6.88E-03	1.94E-02		
U-236	1.2719E-05	4,810.77	9,234.97	0.00E+00	6.12E-02	1.17E-01		
U-238	-3.8857E-08	4,810.77	0.00	2.28E-04	4.07E-05	2.28E-04		
Y-90	1.8211E+00	4,810.77	9,234.97	0.00E+00	8.76E+03	1.68E+04		
Other Radionuclides					1.01E+04	1.93E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator:	LW AND U ZIRC HYDRIDE	Used	LW AND U ZIRC HYDRIDE
Fuel Claddings:	ALUM	Used	ALUM
BOL HM Constituents:	U		
BOL Enrichment %:	92.9999938		10 to 20.1

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		4,810.77
Bounding:		9,234.97

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	13.46	
Bounding:	25.84	

Estimated EOL HM/Given EOL HM

1.02

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY

SNF ID #: 588

Fuel Units & Descr: 2 - MTR TYPE

Heavy Metal Mass: BOL=0.404kg; EOL=0.273kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated
Canister usage:
18"x10"
0.08

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	124.06	248.12	0.00E+00	8.23E-08	1.65E-07	Avg. MeV	
Am-241	2.0060E-03	124.06	248.12	0.00E+00	2.49E-01	4.98E-01	0.0150	2.619E+13
Am-242m	4.2429E-07	124.06	248.12	0.00E+00	5.26E-05	1.05E-04	0.0250	5.446E+12
Am-243	1.4899E-06	124.06	248.12	0.00E+00	1.85E-04	3.70E-04	0.0375	4.750E+12
C-14	5.7135E-09	124.06	248.12	0.00E+00	7.09E-07	1.42E-06	0.0575	5.068E+12
Ci-36	1.3124E-32	124.06	248.12	0.00E+00	1.63E-30	3.26E-30	0.0850	3.075E+12
Cm-243	1.6443E-07	124.06	248.12	0.00E+00	2.04E-05	4.08E-05	0.1250	2.081E+12
Cm-244	2.9330E-05	124.06	248.12	0.00E+00	3.64E-03	7.28E-03	0.2250	2.653E+12
Co-60	5.3186E-06	124.06	248.12	0.00E+00	6.60E-04	1.32E-03	0.3750	1.155E+12
Cs-134	3.1563E-03	124.06	248.12	0.00E+00	3.92E-01	7.83E-01	0.5750	1.884E+13
Cs-135	3.4477E-06	124.06	248.12	0.00E+00	4.28E-04	8.55E-04	0.8500	3.185E+11
Cs-137	2.0313E+00	124.06	248.12	0.00E+00	2.52E+02	5.04E+02	1.2500	1.819E+11
Eu-154	2.4513E-02	124.06	248.12	0.00E+00	3.04E+00	6.08E+00	1.7500	8.347E+09
Eu-155	4.8175E-03	124.06	248.12	0.00E+00	5.98E-01	1.20E+00	2.2500	7.322E+06
Fe-55	1.2397E-04	124.06	248.12	0.00E+00	1.54E-02	3.08E-02	2.7500	4.139E+05
H-3	4.5697E-03	124.06	248.12	0.00E+00	5.67E-01	1.13E+00	3.5000	1.902E+03
I-129	7.5300E-07	124.06	248.12	0.00E+00	9.34E-05	1.87E-04	5.0000	1.075E+02
Kr-85	1.0850E-01	124.06	248.12	0.00E+00	1.35E+01	2.69E+01	7.0000	1.187E+01
Np-237	9.5561E-06	124.06	248.12	0.00E+00	1.19E-03	2.37E-03	11.0000	1.330E+00
Pa-231	2.0359E-09	124.06	248.12	0.00E+00	2.53E-07	5.05E-07		
Pb-210	4.9728E-11	124.06	248.12	0.00E+00	6.17E-09	1.23E-08		
Pm-147	4.8502E-02	124.06	248.12	0.00E+00	6.02E+00	1.20E+01		
Pu-238	1.8254E-02	124.06	248.12	0.00E+00	2.26E+00	4.53E+00		
Pu-239	4.2810E-04	124.06	248.12	0.00E+00	5.31E-02	1.06E-01		
Pu-240	2.4368E-04	124.06	248.12	0.00E+00	3.02E-02	6.05E-02		
Pu-241	3.3415E-02	124.06	248.12	0.00E+00	4.15E+00	8.29E+00		
Pu-242	3.6329E-07	124.06	248.12	0.00E+00	4.51E-05	9.01E-05		
Ra-226	2.2854E-10	124.06	248.12	0.00E+00	2.84E-08	5.67E-08		
Ra-228	1.2426E-14	124.06	248.12	0.00E+00	1.54E-12	3.08E-12		
Ru-106	6.3589E-06	124.06	248.12	0.00E+00	7.89E-04	1.58E-03		
Se-79	1.2933E-05	124.06	248.12	0.00E+00	1.60E-03	3.21E-03		
Sn-126	1.1574E-05	124.06	248.12	0.00E+00	1.44E-03	2.87E-03		
Sr-90	1.9248E+00	124.06	248.12	0.00E+00	2.39E+02	4.78E+02		
Tc-99	4.2239E-04	124.06	248.12	0.00E+00	5.24E-02	1.05E-01		
Th-229	5.0953E-12	124.06	248.12	0.00E+00	6.32E-10	1.26E-09		
Th-230	4.1885E-08	124.06	248.12	0.00E+00	5.20E-06	1.04E-05		
Th-232	1.9270E-14	124.06	248.12	0.00E+00	2.39E-12	4.78E-12		
Ti-206	4.6024E-08	124.06	248.12	0.00E+00	5.71E-06	1.14E-05		
U-232	1.2582E-07	124.06	248.12	0.00E+00	1.56E-05	3.12E-05		
U-233	2.5825E-09	124.06	248.12	0.00E+00	3.20E-07	6.41E-07		
U-234	1.8450E-04	124.06	248.12	0.00E+00	2.29E-02	4.58E-02		
U-235	-2.7235E-06	124.06	0.00	7.87E-04	4.49E-04	7.87E-04		
U-236	1.5493E-05	124.06	248.12	0.00E+00	1.92E-03	3.84E-03		
U-238	-4.2851E-09	124.06	0.00	1.36E-05	1.31E-05	1.36E-05		
Y-90	1.9254E+00	124.06	248.12	0.00E+00	2.39E+02	4.78E+02		
Other Radionuclides					2.40E+02	4.80E+02		

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 %:	90.00000989	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		124.06	
Bounding:		248.12	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:	0.97		
Bounding:	1.95		1.03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (JALX-HEU) JAPAN
SNF ID #: 602
Fuel Units & Descr: 40 - MTR TYPE
Heavy Metal Mass: BOL=7.74kg; EOL=6.012kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimate 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: 20 years

Estimated
Canister usage:
18"x10"
1.67

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	6.6313E-10	1,636.45	3,272.90	0.00E+00	1.09E-06	2.17E-06	Avg. MeV	
Am-241	2.0060E-03	1,636.45	3,272.90	0.00E+00	3.28E+00	6.57E+00	0.0150	3.455E+14
Am-242m	4.2429E-07	1,636.45	3,272.90	0.00E+00	6.94E-04	1.39E-03	0.0250	7.184E+13
Am-243	1.4899E-06	1,636.45	3,272.90	0.00E+00	2.44E-03	4.88E-03	0.0375	6.266E+13
C-14	5.7135E-09	1,636.45	3,272.90	0.00E+00	9.35E-06	1.87E-05	0.0575	6.711E+13
Cl-36	1.3124E-32	1,636.45	3,272.90	0.00E+00	2.15E-29	4.30E-29	0.0850	4.056E+13
Cm-243	1.6443E-07	1,636.45	3,272.90	0.00E+00	2.69E-04	5.38E-04	0.1250	2.744E+13
Cm-244	2.9330E-05	1,636.45	3,272.90	0.00E+00	4.80E-02	9.60E-02	0.2250	3.499E+13
Co-60	5.3186E-06	1,636.45	3,272.90	0.00E+00	8.70E-03	1.74E-02	0.3750	1.523E+13
Cs-134	3.1563E-03	1,636.45	3,272.90	0.00E+00	5.17E+00	1.03E+01	0.5750	2.485E+14
Cs-135	3.4477E-06	1,636.45	3,272.90	0.00E+00	5.64E-03	1.13E-02	0.8500	4.201E+12
Cs-137	2.0313E+00	1,636.45	3,272.90	0.00E+00	3.32E+03	6.65E+03	1.2500	2.399E+12
Eu-154	2.4513E-02	1,636.45	3,272.90	0.00E+00	4.01E+01	8.02E+01	1.7500	1.101E+11
Eu-155	4.8175E-03	1,636.45	3,272.90	0.00E+00	7.88E+00	1.58E+01	2.2500	9.658E+06
Fe-55	1.2397E-04	1,636.45	3,272.90	0.00E+00	2.03E-01	4.06E-01	2.7500	5.460E+06
H-3	4.5697E-03	1,636.45	3,272.90	0.00E+00	7.48E+00	1.50E+01	3.5000	2.508E+04
I-129	7.5300E-07	1,636.45	3,272.90	0.00E+00	1.23E-03	2.46E-03	5.0000	1.418E+03
Kr-85	1.0850E-01	1,636.45	3,272.90	0.00E+00	1.78E+02	3.55E+02	7.0000	1.566E+02
Np-237	9.5561E-08	1,636.45	3,272.90	0.00E+00	1.56E-02	3.13E-02	11.0000	1.755E+01
Pa-231	2.0359E-09	1,636.45	3,272.90	0.00E+00	3.33E-06	6.66E-06		
Pb-210	4.9728E-11	1,636.45	3,272.90	0.00E+00	8.14E-08	1.63E-07		
Pm-147	4.8502E-02	1,636.45	3,272.90	0.00E+00	7.94E+01	1.59E+02		
Pu-238	1.8254E-02	1,636.45	3,272.90	0.00E+00	2.99E+01	5.97E+01		
Pu-239	4.2810E-04	1,636.45	3,272.90	0.00E+00	7.01E-01	1.40E+00		
Pu-240	2.4368E-04	1,636.45	3,272.90	0.00E+00	3.99E-01	7.98E-01		
Pu-241	3.3415E-02	1,636.45	3,272.90	0.00E+00	5.47E+01	1.09E+02		
Pu-242	3.6329E-07	1,636.45	3,272.90	0.00E+00	5.95E-04	1.19E-03		
Ra-226	2.2854E-10	1,636.45	3,272.90	0.00E+00	3.74E-07	7.48E-07		
Ra-228	1.2426E-14	1,636.45	3,272.90	0.00E+00	2.03E-11	4.07E-11		
Ru-106	6.3589E-06	1,636.45	3,272.90	0.00E+00	1.04E-02	2.08E-02		
Se-79	1.2933E-05	1,636.45	3,272.90	0.00E+00	2.12E-02	4.23E-02		
Sn-126	1.1574E-05	1,636.45	3,272.90	0.00E+00	1.89E-02	3.79E-02		
Sr-90	1.9248E+00	1,636.45	3,272.90	0.00E+00	3.15E+03	6.30E+03		
Tc-99	4.2239E-04	1,636.45	3,272.90	0.00E+00	6.91E-01	1.38E+00		
Th-229	5.0953E-12	1,636.45	3,272.90	0.00E+00	8.34E-09	1.67E-08		
Th-230	4.1885E-08	1,636.45	3,272.90	0.00E+00	6.85E-05	1.37E-04		
Th-232	1.9270E-14	1,636.45	3,272.90	0.00E+00	3.15E-11	6.31E-11		
Th-208	4.6024E-08	1,636.45	3,272.90	0.00E+00	7.53E-05	1.51E-04		
U-232	1.2582E-07	1,636.45	3,272.90	0.00E+00	2.06E-04	4.12E-04		
U-233	2.5825E-09	1,636.45	3,272.90	0.00E+00	4.23E-06	8.45E-06		
U-234	1.8450E-04	1,636.45	3,272.90	0.00E+00	3.02E-01	6.04E-01		
U-235	2.7235E-06	1,636.45	0.00	1.56E-02	1.11E-02	1.56E-02		
U-236	1.5493E-05	1,636.45	3,272.90	0.00E+00	2.54E-02	5.07E-02		
U-238	4.2851E-09	1,636.45	0.00	1.82E-04	1.75E-04	1.82E-04		
Y-90	1.9254E+00	1,636.45	3,272.90	0.00E+00	3.15E+03	6.30E+03		
Other Radionuclides					3.16E+03	6.33E+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:	ALLUM	ALLUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.99999931	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,636.45	
Bounding:		3,272.90	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.67		
Bounding:	1.34		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: FRM MTR-S (UAX-HEU) NETHERLANDS
SNF ID #: 607
Fuel Units & Descr: 19 - MTR TYPE
Heavy Metal Mass: BOL=2.042kg; EOL=1.093kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 80 to 100%, U)
*Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.79

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	6.6313E-10	899.67	1,799.34	0.00E+00	5.97E-07	1.19E-06	Avg. MeV	
Am-241	2.0060E-03	899.67	1,799.34	0.00E+00	1.80E+00	3.61E+00	0.0150	1.899E+14
Am-242m	4.2429E-07	899.67	1,799.34	0.00E+00	3.82E-04	7.63E-04	0.0250	3.950E+13
Am-243	1.4899E-06	899.67	1,799.34	0.00E+00	1.34E-03	2.68E-03	0.0375	3.445E+13
C-14	5.7135E-09	899.67	1,799.34	0.00E+00	5.14E-06	1.03E-05	0.0575	3.690E+13
Cl-36	1.3124E-32	899.67	1,799.34	0.00E+00	1.18E-29	2.36E-29	0.0850	2.230E+13
Cm-243	1.6443E-07	899.67	1,799.34	0.00E+00	1.48E-04	2.96E-04	0.1250	1.506E+13
Cm-244	2.9330E-05	899.67	1,799.34	0.00E+00	2.84E-02	5.28E-02	0.2250	1.924E+13
Co-60	5.3186E-06	899.67	1,799.34	0.00E+00	4.79E-03	9.57E-03	0.3750	8.375E+12
Cs-134	3.1563E-03	899.67	1,799.34	0.00E+00	2.84E+00	5.68E+00	0.5750	1.366E+14
Cs-135	3.4477E-06	899.67	1,799.34	0.00E+00	3.10E-03	6.20E-03	0.8500	2.310E+12
Cs-137	2.0313E+00	899.67	1,799.34	0.00E+00	1.83E+03	3.66E+03	1.2500	1.319E+12
Eu-154	2.4513E-02	899.67	1,799.34	0.00E+00	2.21E+01	4.41E+01	1.7500	6.053E+10
Eu-155	4.8175E-03	899.67	1,799.34	0.00E+00	4.33E+00	8.67E+00	2.2500	5.310E+06
Fe-55	1.2397E-04	899.67	1,799.34	0.00E+00	1.12E-01	2.23E-01	2.7500	3.002E+06
H-3	4.5697E-03	899.67	1,799.34	0.00E+00	4.11E+00	8.22E+00	3.5000	1.379E+04
I-129	7.5300E-07	899.67	1,799.34	0.00E+00	6.77E-04	1.35E-03	5.0000	7.796E+02
Kr-85	1.0650E-01	899.67	1,799.34	0.00E+00	9.76E+01	1.95E+02	7.0000	8.606E+01
Np-237	9.5561E-06	899.67	1,799.34	0.00E+00	8.60E-03	1.72E-02	11.0000	9.845E+00
Pa-231	2.0359E-08	899.67	1,799.34	0.00E+00	1.83E-06	3.66E-06		
Pb-210	4.9728E-11	899.67	1,799.34	0.00E+00	4.47E-08	8.95E-08		
Pm-147	4.8502E-02	899.67	1,799.34	0.00E+00	4.36E+01	8.73E+01		
Pu-238	1.8254E-02	899.67	1,799.34	0.00E+00	1.64E+01	3.28E+01		
Pu-239	4.2810E-04	899.67	1,799.34	0.00E+00	3.85E-01	7.70E-01		
Pu-240	2.4368E-04	899.67	1,799.34	0.00E+00	2.19E-01	4.38E-01		
Pu-241	3.3415E-02	899.67	1,799.34	0.00E+00	3.01E+01	6.01E+01		
Pu-242	3.6329E-07	899.67	1,799.34	0.00E+00	3.27E-04	6.54E-04		
Ra-226	2.2854E-10	899.67	1,799.34	0.00E+00	2.06E-07	4.11E-07		
Ra-228	1.2426E-14	899.67	1,799.34	0.00E+00	1.12E-11	2.24E-11		
Ru-106	6.3589E-06	899.67	1,799.34	0.00E+00	5.72E-03	1.14E-02		
Se-79	1.2933E-05	899.67	1,799.34	0.00E+00	1.16E-02	2.33E-02		
Sn-126	1.1574E-05	899.67	1,799.34	0.00E+00	1.04E-02	2.08E-02		
Sr-90	1.9248E+00	899.67	1,799.34	0.00E+00	1.73E+03	3.46E+03		
Tc-99	4.2239E-04	899.67	1,799.34	0.00E+00	3.80E-01	7.60E-01		
Th-229	5.0953E-12	899.67	1,799.34	0.00E+00	4.58E-09	9.17E-09		
Th-230	4.1885E-08	899.67	1,799.34	0.00E+00	3.77E-05	7.54E-05		
Th-232	1.9270E-14	899.67	1,799.34	0.00E+00	1.73E-11	3.47E-11		
Ti-208	4.6024E-08	899.67	1,799.34	0.00E+00	4.14E-05	8.28E-05		
U-232	1.2582E-07	899.67	1,799.34	0.00E+00	1.13E-04	2.26E-04		
U-233	2.5825E-09	899.67	1,799.34	0.00E+00	2.32E-06	4.65E-06		
U-234	1.8450E-04	899.67	1,799.34	0.00E+00	1.66E-01	3.32E-01		
U-235	2.7235E-06	899.67	0.00	4.10E-03	1.65E-03	4.10E-03		
U-236	1.5493E-05	899.67	1,799.34	0.00E+00	1.39E-02	2.78E-02		
U-238	4.2851E-09	899.67	0.00	4.81E-05	4.42E-05	4.81E-05		
Y-90	1.9254E+00	899.67	1,799.34	0.00E+00	1.73E+03	3.46E+03		
Other Radionuclides					1.74E+03	3.48E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99998697	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		899.67
Bounding:		1,799.34

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM
1.05

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) NETHERLANDS
SNF ID #: 608
Fuel Units & Descr: 61 - MTR TYPE
Heavy Metal Mass: BOL=12.462kg; EOL=6.667kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
2.54

II. Estimates	m	X ₀	X ₀	b	Y ₀	Y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	5,487.98	10,975.95	0.00E+00	3.64E-06	7.28E-06	Avg. MeV	
Am-241	2.0060E-03	5,487.98	10,975.95	0.00E+00	1.10E+01	2.20E+01	0.0150	1.159E+15
Am-242m	4.2429E-07	5,487.98	10,975.95	0.00E+00	2.33E-03	4.66E-03	0.0250	2.409E+14
Am-243	1.4899E-06	5,487.98	10,975.95	0.00E+00	8.18E-03	1.64E-02	0.0375	2.101E+14
C-14	5.7135E-09	5,487.98	10,975.95	0.00E+00	3.14E-05	6.27E-05	0.0575	2.251E+14
Cl-36	1.3124E-32	5,487.98	10,975.95	0.00E+00	7.20E-29	1.44E-28	0.0850	1.360E+14
Cm-243	1.6443E-07	5,487.98	10,975.95	0.00E+00	9.02E-04	1.80E-03	0.1250	9.204E+13
Cm-244	2.9330E-05	5,487.98	10,975.95	0.00E+00	1.61E-01	3.22E-01	0.2250	1.174E+14
Co-60	5.3186E-06	5,487.98	10,975.95	0.00E+00	2.92E-02	5.84E-02	0.3750	5.109E+13
Cs-134	3.1563E-03	5,487.98	10,975.95	0.00E+00	1.73E+01	3.46E+01	0.5750	8.333E+14
Cs-135	3.4477E-08	5,487.98	10,975.95	0.00E+00	1.89E-02	3.78E-02	0.8500	1.409E+13
Cs-137	2.0313E+00	5,487.98	10,975.95	0.00E+00	1.11E+04	2.23E+04	1.2500	8.044E+12
Eu-154	2.4513E-02	5,487.98	10,975.95	0.00E+00	1.35E+02	2.69E+02	1.7500	3.692E+11
Eu-155	4.8175E-03	5,487.98	10,975.95	0.00E+00	2.64E+01	5.29E+01	2.2500	3.239E+07
Fe-55	1.2397E-04	5,487.98	10,975.95	0.00E+00	6.80E-01	1.36E+00	2.7500	1.831E+07
H-3	4.5697E-03	5,487.98	10,975.95	0.00E+00	2.51E+01	5.02E+01	3.5000	8.411E+04
I-129	7.5300E-07	5,487.98	10,975.95	0.00E+00	4.13E-03	8.26E-03	5.0000	4.755E+03
Kr-85	1.0850E-01	5,487.98	10,975.95	0.00E+00	5.95E+02	1.19E+03	7.0000	5.250E+02
Np-237	9.5561E-06	5,487.98	10,975.95	0.00E+00	5.24E-02	1.05E-01	11.0000	5.884E+01
Pa-231	2.0359E-09	5,487.98	10,975.95	0.00E+00	1.12E-05	2.23E-05		
Pb-210	4.9728E-11	5,487.98	10,975.95	0.00E+00	2.73E-07	5.46E-07		
Pm-147	4.8502E-02	5,487.98	10,975.95	0.00E+00	2.66E+02	5.32E+02		
Pu-238	1.8254E-02	5,487.98	10,975.95	0.00E+00	1.00E+02	2.00E+02		
Pu-239	4.2810E-04	5,487.98	10,975.95	0.00E+00	2.35E+00	4.70E+00		
Pu-240	2.4368E-04	5,487.98	10,975.95	0.00E+00	1.34E+00	2.67E+00		
Pu-241	3.3415E-02	5,487.98	10,975.95	0.00E+00	1.83E+02	3.67E+02		
Pu-242	3.6329E-07	5,487.98	10,975.95	0.00E+00	1.99E-03	3.99E-03		
Ra-226	2.2854E-10	5,487.98	10,975.95	0.00E+00	1.25E-06	2.51E-06		
Ra-228	1.2426E-14	5,487.98	10,975.95	0.00E+00	6.82E-11	1.36E-10		
Ru-106	6.3589E-06	5,487.98	10,975.95	0.00E+00	3.49E-02	6.98E-02		
Se-79	1.2933E-05	5,487.98	10,975.95	0.00E+00	7.10E-02	1.42E-01		
Sn-126	1.1574E-05	5,487.98	10,975.95	0.00E+00	6.35E-02	1.27E-01		
Sr-90	1.9248E+00	5,487.98	10,975.95	0.00E+00	1.06E+04	2.11E+04		
Tc-99	4.2239E-04	5,487.98	10,975.95	0.00E+00	2.32E+00	4.64E+00		
Th-229	5.0953E-12	5,487.98	10,975.95	0.00E+00	2.80E-08	5.59E-08		
Th-230	4.1885E-08	5,487.98	10,975.95	0.00E+00	2.30E-04	4.60E-04		
Th-232	1.9270E-14	5,487.98	10,975.95	0.00E+00	1.06E-10	2.12E-10		
Th-208	4.6024E-08	5,487.98	10,975.95	0.00E+00	2.53E-04	5.05E-04		
U-232	1.2582E-07	5,487.98	10,975.95	0.00E+00	6.90E-04	1.38E-03		
U-233	2.5825E-09	5,487.98	10,975.95	0.00E+00	1.42E-05	2.83E-05		
U-234	1.8450E-04	5,487.98	10,975.95	0.00E+00	1.01E+00	2.03E+00		
U-235	-2.7235E-06	5,487.98	0.00	2.50E-02	1.01E-02	2.50E-02		
U-236	1.5493E-05	5,487.98	10,975.95	0.00E+00	8.50E-02	1.70E-01		
U-238	-4.2851E-09	5,487.98	0.00	2.93E-04	2.70E-04	2.93E-04		
Y-90	1.9254E+00	5,487.98	10,975.95	0.00E+00	1.06E+04	2.11E+04		
Other Radionuclides					1.06E+04	2.12E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99998578	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		5,487.98
Bounding:		10,975.95

Basis for burnup used in estimates:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM
1.05

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (JALX-HEU) PORTUGAL

SNF ID #: 632

Fuel Units & Descr: 22 - MTR TYPE

Heavy Metal Mass: BOL=6246kg; EOL=3.923kg

ROD Storage Site: SRS

¹Fuel decay start date: 2010

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: 20 years

Estimated
Canister usage:

18"x10"

0.92

II. Estimates	a _n	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	GMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	2,200.12	4,400.23	0.00E+00	1.46E-06	2.92E-06	Avg. MeV	
Am-241	2.0060E-03	2,200.12	4,400.23	0.00E+00	4.41E+00	8.83E+00	0.0150	4.645E+14
Am-242m	4.2429E-07	2,200.12	4,400.23	0.00E+00	9.33E-04	1.87E-03	0.0250	9.659E+13
Am-243	1.4899E-06	2,200.12	4,400.23	0.00E+00	3.28E-03	6.56E-03	0.0375	8.425E+13
C-14	5.7135E-09	2,200.12	4,400.23	0.00E+00	1.26E-05	2.51E-05	0.0575	9.023E+13
Cf-252	1.3124E-32	2,200.12	4,400.23	0.00E+00	2.89E-29	5.77E-29	0.0850	5.453E+13
Cm-243	1.6443E-07	2,200.12	4,400.23	0.00E+00	3.62E-04	7.24E-04	0.1250	3.690E+13
Cm-244	2.9330E-05	2,200.12	4,400.23	0.00E+00	6.45E-02	1.29E-01	0.2250	4.705E+13
Co-60	5.3186E-06	2,200.12	4,400.23	0.00E+00	1.17E-02	2.34E-02	0.3750	2.048E+13
Cs-134	3.1563E-03	2,200.12	4,400.23	0.00E+00	6.94E+00	1.39E+01	0.5750	3.341E+14
Cs-135	3.4477E-06	2,200.12	4,400.23	0.00E+00	7.59E-03	1.52E-02	0.8500	5.848E+12
Cs-137	2.0313E+00	2,200.12	4,400.23	0.00E+00	4.47E+03	8.94E+03	1.2500	3.225E+12
Eu-154	2.4513E-02	2,200.12	4,400.23	0.00E+00	5.39E+01	1.08E+02	1.7500	1.480E+11
Eu-155	4.8175E-03	2,200.12	4,400.23	0.00E+00	1.06E+01	2.12E+01	2.2500	1.298E+07
Fe-55	1.2397E-04	2,200.12	4,400.23	0.00E+00	2.73E-01	5.45E-01	2.7500	7.341E+06
H-3	4.5697E-03	2,200.12	4,400.23	0.00E+00	1.01E+01	2.01E+01	3.5000	3.372E+04
I-129	7.5300E-07	2,200.12	4,400.23	0.00E+00	1.66E-03	3.31E-03	5.0000	1.906E+03
Kr-85	1.0850E-01	2,200.12	4,400.23	0.00E+00	2.39E+02	4.77E+02	7.0000	2.105E+02
Np-237	9.5561E-06	2,200.12	4,400.23	0.00E+00	2.10E-02	4.20E-02	11.0000	2.359E+01
Pa-231	2.0359E-09	2,200.12	4,400.23	0.00E+00	4.48E-06	8.96E-06		
Pb-210	4.9728E-11	2,200.12	4,400.23	0.00E+00	1.09E-07	2.19E-07		
Pm-147	4.8502E-02	2,200.12	4,400.23	0.00E+00	1.07E+02	2.13E+02		
Pu-238	1.8254E-02	2,200.12	4,400.23	0.00E+00	4.02E+01	8.03E+01		
Pu-239	4.2810E-04	2,200.12	4,400.23	0.00E+00	9.42E-01	1.88E+00		
Pu-240	2.4368E-04	2,200.12	4,400.23	0.00E+00	5.36E-01	1.07E+00		
Pu-241	3.3415E-02	2,200.12	4,400.23	0.00E+00	7.35E+01	1.47E+02		
Pu-242	3.6329E-07	2,200.12	4,400.23	0.00E+00	7.99E-04	1.60E-03		
Ra-226	2.2854E-10	2,200.12	4,400.23	0.00E+00	5.03E-07	1.01E-06		
Ra-228	1.2426E-14	2,200.12	4,400.23	0.00E+00	2.73E-11	5.47E-11		
Ru-106	6.3589E-06	2,200.12	4,400.23	0.00E+00	1.40E-02	2.80E-02		
Se-79	1.2933E-05	2,200.12	4,400.23	0.00E+00	2.85E-02	5.69E-02		
Sn-126	1.1574E-05	2,200.12	4,400.23	0.00E+00	2.55E-02	5.09E-02		
Sr-90	1.9248E+00	2,200.12	4,400.23	0.00E+00	4.23E+03	8.47E+03		
Tc-99	4.2239E-04	2,200.12	4,400.23	0.00E+00	9.29E-01	1.86E+00		
Th-229	5.0953E-12	2,200.12	4,400.23	0.00E+00	1.12E-08	2.24E-08		
Th-230	4.1885E-08	2,200.12	4,400.23	0.00E+00	9.22E-05	1.84E-04		
Th-232	1.8270E-14	2,200.12	4,400.23	0.00E+00	4.24E-11	8.48E-11		
Ti-208	4.6024E-08	2,200.12	4,400.23	0.00E+00	1.01E-04	2.03E-04		
U-232	1.2582E-07	2,200.12	4,400.23	0.00E+00	2.77E-04	5.54E-04	Thermal Power	
U-233	2.5825E-09	2,200.12	4,400.23	0.00E+00	5.68E-06	1.14E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8450E-04	2,200.12	4,400.23	0.00E+00	4.06E-01	8.12E-01	8.24E+01	1.85E+02
U-235	-2.7235E-06	2,200.12	0.00	1.26E-02	6.56E-03	1.26E-02	Total	Total
U-236	1.5493E-05	2,200.12	4,400.23	0.00E+00	3.41E-02	6.82E-02		
U-238	-4.2851E-09	2,200.12	0.00	1.47E-04	1.38E-04	1.47E-04		
Y-90	1.9254E+00	2,200.12	4,400.23	0.00E+00	4.24E+03	8.47E+03		
Other Radionuclides					4.26E+03	8.51E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.99999055	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,200.12	
Bounding:		4,400.23	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	1.12		
Bounding:	2.24		1.03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) SWITZERLAND
 SNF ID #: 658
 Fuel Units & Descr: 55 - MTR TYPE
 Heavy Metal Mass: BOL=16.676kg; EOL=5.973kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimate 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: 20 years

Estimated
 Canister usage:
 18"x10"
 2.29

II. Estimates

	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	10,135.95	15,792.50	0.00E+00	6.72E-08	1.05E-05	Avg. MeV	
Am-241	2.0060E-03	10,135.95	15,792.50	0.00E+00	2.03E+01	3.17E+01	0.0150	1.667E+15
Am-242m	4.2429E-07	10,135.95	15,792.50	0.00E+00	4.30E-03	6.70E-03	0.0250	3.467E+14
Am-243	1.4899E-06	10,135.95	15,792.50	0.00E+00	1.51E-02	2.35E-02	0.0375	3.024E+14
C-14	5.7135E-09	10,135.95	15,792.50	0.00E+00	5.79E-05	9.02E-05	0.0575	3.238E+14
Cl-36	1.3124E-32	10,135.95	15,792.50	0.00E+00	1.33E-28	2.07E-28	0.0850	1.957E+14
Cm-243	1.6443E-07	10,135.95	15,792.50	0.00E+00	1.67E-03	2.60E-03	0.1250	1.324E+14
Cm-244	2.9330E-05	10,135.95	15,792.50	0.00E+00	2.97E-01	4.63E-01	0.2250	1.689E+14
Co-60	5.3186E-08	10,135.95	15,792.50	0.00E+00	5.39E-02	8.40E-02	0.3750	7.351E+13
Cs-134	3.1563E-03	10,135.95	15,792.50	0.00E+00	3.20E+01	4.98E+01	0.5750	1.199E+15
Cs-135	3.4477E-06	10,135.95	15,792.50	0.00E+00	3.49E-02	5.44E-02	0.8500	2.027E+13
Cs-137	2.0313E+00	10,135.95	15,792.50	0.00E+00	2.06E+04	3.21E+04	1.2500	1.157E+13
Eu-154	2.4513E-02	10,135.95	15,792.50	0.00E+00	2.48E+02	3.87E+02	1.7500	5.313E+11
Eu-155	4.8175E-03	10,135.95	15,792.50	0.00E+00	4.88E+01	7.61E+01	2.2500	4.660E+07
Fe-55	1.2397E-04	10,135.95	15,792.50	0.00E+00	1.26E+00	1.96E+00	2.7500	2.636E+07
H-3	4.5697E-03	10,135.95	15,792.50	0.00E+00	4.63E+01	7.22E+01	3.5000	1.210E+05
I-129	7.5300E-07	10,135.95	15,792.50	0.00E+00	7.63E-03	1.19E-02	5.0000	6.842E+03
Kr-85	1.0850E-01	10,135.95	15,792.50	0.00E+00	1.10E+03	1.71E+03	7.0000	7.553E+02
Np-237	9.5581E-08	10,135.95	15,792.50	0.00E+00	9.69E-02	1.51E-01	11.0000	8.465E+01
Pa-231	2.0359E-09	10,135.95	15,792.50	0.00E+00	2.06E-05	3.22E-05		
Pb-210	4.9728E-11	10,135.95	15,792.50	0.00E+00	5.04E-07	7.85E-07		
Pm-147	4.8502E-02	10,135.95	15,792.50	0.00E+00	4.92E+02	7.66E+02		
Pu-238	1.8254E-02	10,135.95	15,792.50	0.00E+00	1.85E+02	2.88E+02		
Pu-239	4.2810E-04	10,135.95	15,792.50	0.00E+00	4.34E+00	6.76E+00		
Pu-240	2.4368E-04	10,135.95	15,792.50	0.00E+00	2.47E+00	3.85E+00		
Pu-241	3.3415E-02	10,135.95	15,792.50	0.00E+00	3.39E+02	5.28E+02		
Pu-242	3.6329E-07	10,135.95	15,792.50	0.00E+00	3.68E-03	5.74E-03		
Ra-226	2.2854E-10	10,135.95	15,792.50	0.00E+00	2.32E-06	3.61E-06		
Ra-228	1.2426E-14	10,135.95	15,792.50	0.00E+00	1.26E-10	1.96E-10		
Ru-106	6.3589E-06	10,135.95	15,792.50	0.00E+00	6.45E-02	1.00E-01		
Sa-79	1.2933E-05	10,135.95	15,792.50	0.00E+00	1.31E-01	2.04E-01		
Sn-126	1.1574E-05	10,135.95	15,792.50	0.00E+00	1.17E-01	1.83E-01		
Sr-90	1.9248E+00	10,135.95	15,792.50	0.00E+00	1.95E+04	3.04E+04		
Tc-99	4.2239E-04	10,135.95	15,792.50	0.00E+00	4.28E+00	6.67E+00		
Th-229	5.0953E-12	10,135.95	15,792.50	0.00E+00	5.16E-08	8.05E-08		
Th-230	4.1885E-08	10,135.95	15,792.50	0.00E+00	4.25E-04	6.61E-04		
Th-232	1.9270E-14	10,135.95	15,792.50	0.00E+00	1.95E-10	3.04E-10		
Th-208	4.6024E-08	10,135.95	15,792.50	0.00E+00	4.66E-04	7.27E-04		
U-232	1.2582E-07	10,135.95	15,792.50	0.00E+00	1.28E-03	1.99E-03		
U-233	2.5825E-09	10,135.95	15,792.50	0.00E+00	2.62E-05	4.08E-05		
U-234	1.8450E-04	10,135.95	15,792.50	0.00E+00	1.87E+00	2.91E+00		
U-235	-2.7235E-06	10,135.95	0.00	3.35E-02	5.91E-03	3.35E-02		
U-236	1.5493E-05	10,135.95	15,792.50	0.00E+00	1.57E-01	2.45E-01		
U-238	-4.2851E-09	10,135.95	0.00	3.92E-04	3.49E-04	3.92E-04		
Y-90	1.9254E+00	10,135.95	15,792.50	0.00E+00	1.95E+04	3.04E+04		
Other Radionuclides					1.96E+04	3.05E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.42E+02	3.76E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000816	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		10,135.95
Bounding:		15,792.50

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.93	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM
 1.10

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) TURKEY
SNF ID #: 644
Fuel Units & Descr: 18 - MTR TYPE
Heavy Metal Mass: BOL=5.42kg; EOL=2.9kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.75

II. Estimates	m	K_0	K_1	b	y_0	y_1	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	2,386.49	4,772.98	0.00E+00	1.58E-06	3.17E-06	Avg. MeV	
Am-241	2.0060E-03	2,386.49	4,772.98	0.00E+00	4.79E+00	9.57E+00	0.0150	5.038E+14
Am-242m	4.2429E-07	2,386.49	4,772.98	0.00E+00	1.01E-03	2.03E-03	0.0250	1.048E+14
Am-243	1.4899E-06	2,386.49	4,772.98	0.00E+00	3.56E-03	7.11E-03	0.0375	9.138E+13
C-14	5.7135E-09	2,386.49	4,772.98	0.00E+00	1.36E-06	2.73E-06	0.0575	9.787E+13
Cl-36	1.3124E-32	2,386.49	4,772.98	0.00E+00	3.13E-29	6.26E-29	0.0850	5.915E+13
Cm-243	1.6443E-07	2,386.49	4,772.98	0.00E+00	3.92E-04	7.85E-04	0.1250	4.002E+13
Cm-244	2.9330E-05	2,386.49	4,772.98	0.00E+00	7.00E-02	1.40E-01	0.2250	5.103E+13
Co-60	5.3186E-06	2,386.49	4,772.98	0.00E+00	1.27E-02	2.54E-02	0.3750	2.222E+13
Cs-134	3.1563E-03	2,386.49	4,772.98	0.00E+00	7.53E+00	1.51E+01	0.5750	3.824E+14
Cs-135	3.4477E-06	2,386.49	4,772.98	0.00E+00	8.23E-03	1.65E-02	0.8500	6.126E+12
Cs-137	2.0313E+00	2,386.49	4,772.98	0.00E+00	4.85E+03	9.70E+03	1.2500	3.496E+12
Eu-154	2.4513E-02	2,386.49	4,772.98	0.00E+00	5.85E+01	1.17E+02	1.7500	1.806E+11
Eu-155	4.8175E-03	2,386.49	4,772.98	0.00E+00	1.15E+01	2.30E+01	2.2500	1.408E+07
Fe-55	1.2397E-04	2,386.49	4,772.98	0.00E+00	2.96E-01	5.92E-01	2.7500	7.963E+06
H-3	4.5697E-03	2,386.49	4,772.98	0.00E+00	1.09E+01	2.18E+01	3.5000	3.658E+04
I-129	7.5300E-07	2,386.49	4,772.98	0.00E+00	1.80E-03	3.59E-03	5.0000	2.068E+03
Kr-85	1.0850E-01	2,386.49	4,772.98	0.00E+00	2.59E+02	5.18E+02	7.0000	2.283E+02
Np-237	9.5561E-06	2,386.49	4,772.98	0.00E+00	2.28E-02	4.56E-02	11.0000	2.559E+01
Pa-231	2.0359E-09	2,386.49	4,772.98	0.00E+00	4.86E-06	9.72E-06		
Pb-210	4.9728E-11	2,386.49	4,772.98	0.00E+00	1.19E-07	2.37E-07		
Pm-147	4.8502E-02	2,386.49	4,772.98	0.00E+00	1.16E+02	2.31E+02		
Pu-238	1.8254E-02	2,386.49	4,772.98	0.00E+00	4.36E+01	8.71E+01		
Pu-239	4.2810E-04	2,386.49	4,772.98	0.00E+00	1.02E+00	2.04E+00		
Pu-240	2.4368E-04	2,386.49	4,772.98	0.00E+00	5.82E-01	1.16E+00		
Pu-241	3.3415E-02	2,386.49	4,772.98	0.00E+00	7.97E+01	1.59E+02		
Pu-242	3.6329E-07	2,386.49	4,772.98	0.00E+00	8.67E-04	1.73E-03		
Ra-226	2.2854E-10	2,386.49	4,772.98	0.00E+00	5.45E-07	1.09E-06		
Ra-228	1.2426E-14	2,386.49	4,772.98	0.00E+00	2.97E-11	5.93E-11		
Ru-106	6.3589E-06	2,386.49	4,772.98	0.00E+00	1.52E-02	3.04E-02		
Se-79	1.2933E-05	2,386.49	4,772.98	0.00E+00	3.09E-02	6.17E-02		
Sn-126	1.1574E-05	2,386.49	4,772.98	0.00E+00	2.78E-02	5.52E-02		
Sr-90	1.9248E+00	2,386.49	4,772.98	0.00E+00	4.59E+03	9.19E+03		
Tc-99	4.2239E-04	2,386.49	4,772.98	0.00E+00	1.01E+00	2.02E+00		
Th-229	5.0953E-12	2,386.49	4,772.98	0.00E+00	1.22E-08	2.43E-08		
Th-230	4.1885E-08	2,386.49	4,772.98	0.00E+00	1.00E-04	2.00E-04		
Th-232	1.9270E-14	2,386.49	4,772.98	0.00E+00	4.60E-11	9.20E-11		
Th-238	4.6024E-08	2,386.49	4,772.98	0.00E+00	1.10E-04	2.20E-04		
U-232	1.2582E-07	2,386.49	4,772.98	0.00E+00	3.00E-04	6.01E-04		
U-233	2.5825E-09	2,386.49	4,772.98	0.00E+00	6.16E-06	1.23E-05		
U-234	1.8450E-04	2,386.49	4,772.98	0.00E+00	4.40E-01	8.81E-01		
U-235	-2.7235E-06	2,386.49	0.00	1.09E-02	4.39E-03	1.09E-02		
U-236	1.5493E-05	2,386.49	4,772.98	0.00E+00	3.70E-02	7.39E-02		
U-238	-4.2851E-09	2,386.49	0.00	1.28E-04	1.17E-04	1.28E-04		
Y-90	1.9254E+00	2,386.49	4,772.98	0.00E+00	4.59E+03	9.19E+03		
Other Radionuclides					4.62E+03	9.23E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99998782	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		2,386.49
Bounding:		4,772.98

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM
1.05

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: FBR MTR-S (JALX-LEU) JAPAN
 SWF ID #: 553
 Fuel UMLA & Owner: 476 - ASSEMBLY
 Heavy Metal Mass: BOL-714kg, EOL-632.461kg
 ROD Storage Size: SRS

Fuel decay start date: 2010
 Estimate as of: 2030
 Template: HFBR (Heavy Water, Alim., 10 to 20%, U)
 Template BOL Heavy Metal Mass (HTR): 0.00034251
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18.83

II. Estimates	m	x _m	x _h	b	y _m	y _h	Gamma Sources
Radionuclide	CLAIMED From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group
Ac-227	8.533E-10	77.439.76	154.999.52	0.00E+00	6.61E-05	1.32E-04	Avg. MW
Am-241	2.2753E-02	77.439.76	154.999.52	0.00E+00	1.76E+03	3.52E+03	0.0150
Am-242m	8.9133E-08	77.439.76	154.999.52	0.00E+00	6.91E-01	1.39E+00	0.0250
Am-243	6.4007E-08	77.439.76	154.999.52	0.00E+00	4.09E-01	9.82E-01	0.0375
C-14	5.9613E-35	77.439.76	154.999.52	0.00E+00	2.30E-03	4.59E-03	0.0575
Co-57	2.2807E-06	77.439.76	154.999.52	0.00E+00	4.91E-30	9.22E-30	0.0690
Co-58	1.1007E-04	77.439.76	154.999.52	0.00E+00	1.71E-01	3.42E-01	0.1250
Co-60	1.6340E-05	77.439.76	154.999.52	0.00E+00	8.53E+00	1.71E+01	0.2250
Co-134	2.1953E-03	77.439.76	154.999.52	0.00E+00	1.27E+00	2.53E+00	0.2750
Co-136	4.8607E-06	77.439.76	154.999.52	0.00E+00	1.65E+02	3.31E+02	0.5750
Co-137	2.0227E+00	77.439.76	154.999.52	0.00E+00	3.77E-01	7.52E-01	0.8500
Eu-154	2.0887E-02	77.439.76	154.999.52	0.00E+00	3.77E-01	7.52E-01	1.2500
Eu-155	4.0867E-03	77.439.76	154.999.52	0.00E+00	1.62E+03	3.24E+03	1.2500
F-65	1.4167E-03	77.439.76	154.999.52	0.00E+00	3.17E+02	6.33E+02	2.2500
H-3	4.6653E-03	77.439.76	154.999.52	0.00E+00	1.10E+02	2.20E+02	2.7500
I-129	7.1600E-07	77.439.76	154.999.52	0.00E+00	3.62E+02	7.23E+02	3.5000
K-85	1.0240E-01	77.439.76	154.999.52	0.00E+00	5.55E+02	1.11E+01	5.0000
Np-237	3.7227E-06	77.439.76	154.999.52	0.00E+00	7.94E+03	1.59E+04	7.0000
Np-231	2.6727E-06	77.439.76	154.999.52	0.00E+00	2.89E-01	5.77E-01	11.0000
Pb-210	4.3313E-14	77.439.76	154.999.52	0.00E+00	2.07E-04	4.14E-04	
Pb-214	4.6307E-02	77.439.76	154.999.52	0.00E+00	3.59E+03	7.18E+03	
Pu-238	5.5273E-03	77.439.76	154.999.52	0.00E+00	4.29E+02	8.57E+02	
Pu-239	1.0313E-02	77.439.76	154.999.52	0.00E+00	7.99E+02	1.60E+03	
Pu-240	5.4190E-03	77.439.76	154.999.52	0.00E+00	4.20E+02	8.40E+02	
Pu-241	3.7573E-01	77.439.76	154.999.52	0.00E+00	2.91E+04	5.82E+04	
Pu-242	3.0713E-08	77.439.76	154.999.52	0.00E+00	2.38E-01	4.76E-01	
Pu-237	2.3807E-13	77.439.76	154.999.52	0.00E+00	1.85E-08	3.69E-08	
Pu-226	1.0807E-14	77.439.76	154.999.52	0.00E+00	8.22E-10	1.64E-09	
Pu-106	8.4800E-08	77.439.76	154.999.52	0.00E+00	6.57E-01	1.31E+00	
Sr-78	1.1383E-05	77.439.76	154.999.52	0.00E+00	8.33E-01	1.66E+00	
Sr-90	1.8400E+00	77.439.76	154.999.52	0.00E+00	8.33E-01	1.66E+00	
Tc-99	4.3533E-04	77.439.76	154.999.52	0.00E+00	1.43E+05	2.85E+05	
Tb-229	5.8947E-13	77.439.76	154.999.52	0.00E+00	3.37E+01	6.75E+01	
Tb-230	5.9500E-11	77.439.76	154.999.52	0.00E+00	4.57E-08	9.14E-08	
Th-232	1.6380E-14	77.439.76	154.999.52	0.00E+00	4.81E-08	9.22E-08	
Th-230	7.6000E-09	77.439.76	154.999.52	0.00E+00	1.27E-09	2.54E-09	
U-232	2.0747E-08	77.439.76	154.999.52	0.00E+00	5.89E-04	1.18E-03	
U-233	4.4013E-10	77.439.76	154.999.52	0.00E+00	1.61E-03	3.22E-03	
U-234	4.6500E-07	77.439.76	154.999.52	0.00E+00	3.41E-05	6.82E-05	
U-235	2.5333E-06	77.439.76	154.999.52	0.00E+00	3.90E-02	7.21E-02	
U-236	1.3000E-05	77.439.76	154.999.52	0.00E+00	1.12E-01	3.09E-01	
U-238	1.4207E-08	77.439.76	154.999.52	0.00E+00	1.01E+00	2.01E+00	
Y-90	1.8400E+00	77.439.76	154.999.52	0.00E+00	1.91E-01	1.92E-01	
Other Radionuclides					1.43E+05	2.85E+05	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SPD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HMI Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basic for Parameter Differences:

Burnup Summary (MWd/g)	From SFR	Estimated
Nominal:		77.439.76
Bounding:		154.999.52

Basic for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks	Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	4.90	2.40	

Estimated EOL HMI/Given EOL HMI

1.03

Reactor shutdown, core removal, storage, shipping or other data 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/kgU).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-LEU) PORTUGAL
 SNF ID #: 542
 Fuel Units & Descr: 6 - ASSEMBLY
 Heavy Metal Mass: BOL=5.4kg; EOL=5.152kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 16"x10"
 0.25

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	6.6313E-10	235.24	470.48	0.00E+00	1.56E-07	3.12E-07	Avg. MeV	
Am-241	2.0060E-03	235.24	470.48	0.00E+00	4.72E-01	9.44E-01	0.0150	4.968E+13
Am-242m	4.2429E-07	235.24	470.48	0.00E+00	9.98E-05	2.00E-04	0.0250	1.033E+13
Am-243	1.4899E-06	235.24	470.48	0.00E+00	3.50E-04	7.01E-04	0.0375	9.008E+12
C-14	5.7135E-09	235.24	470.48	0.00E+00	1.34E-06	2.69E-06	0.0575	9.648E+12
Cl-36	1.3124E-32	235.24	470.48	0.00E+00	3.09E-30	6.17E-30	0.0850	5.830E+12
Cm-243	1.8443E-07	235.24	470.48	0.00E+00	3.87E-05	7.74E-05	0.1250	3.945E+12
Cm-244	2.9330E-05	235.24	470.48	0.00E+00	6.90E-03	1.38E-02	0.2250	5.030E+12
Co-60	5.3186E-06	235.24	470.48	0.00E+00	1.25E-03	2.50E-03	0.3750	2.190E+12
Cs-134	3.1563E-03	235.24	470.48	0.00E+00	7.42E-01	1.48E+00	0.5750	3.572E+13
Cs-135	3.4477E-06	235.24	470.48	0.00E+00	8.11E-04	1.62E-03	0.8500	6.039E+11
Cs-137	2.0313E+00	235.24	470.48	0.00E+00	4.78E+02	9.56E+02	1.2500	3.448E+11
Eu-154	2.4513E-02	235.24	470.48	0.00E+00	5.77E+00	1.15E+01	1.7500	1.583E+10
Eu-155	4.8175E-03	235.24	470.48	0.00E+00	1.13E+00	2.27E+00	2.2500	1.388E+06
Fe-55	1.2397E-04	235.24	470.48	0.00E+00	2.82E-02	5.63E-02	2.7500	7.849E+05
H-3	4.5697E-03	235.24	470.48	0.00E+00	1.07E+00	2.15E+00	3.5000	3.813E+03
I-129	7.5300E-07	235.24	470.48	0.00E+00	1.77E-04	3.54E-04	5.0000	2.071E+02
Kr-85	1.0850E-01	235.24	470.48	0.00E+00	2.55E+01	5.10E+01	7.0000	2.288E+01
Np-237	9.5561E-06	235.24	470.48	0.00E+00	2.25E-03	4.50E-03	11.0000	2.566E+00
Pa-231	2.0359E-09	235.24	470.48	0.00E+00	4.79E-07	9.58E-07		
Pb-210	4.9728E-11	235.24	470.48	0.00E+00	1.17E-08	2.34E-08		
Pm-147	4.8502E-02	235.24	470.48	0.00E+00	1.14E+01	2.28E+01		
Pu-238	1.8254E-02	235.24	470.48	0.00E+00	4.29E+00	8.59E+00		
Pu-239	4.2810E-04	235.24	470.48	0.00E+00	1.01E-01	2.01E-01		
Pu-240	2.4368E-04	235.24	470.48	0.00E+00	5.73E-02	1.15E-01		
Pu-241	3.3415E-02	235.24	470.48	0.00E+00	7.86E+00	1.57E+01		
Pu-242	3.6329E-07	235.24	470.48	0.00E+00	8.55E-05	1.71E-04		
Ra-226	2.2854E-10	235.24	470.48	0.00E+00	5.38E-08	1.08E-07		
Ra-228	1.2426E-14	235.24	470.48	0.00E+00	2.92E-12	5.85E-12		
Ru-106	6.3589E-06	235.24	470.48	0.00E+00	1.50E-03	2.99E-03		
Se-79	1.2933E-05	235.24	470.48	0.00E+00	3.04E-03	6.08E-03		
Sn-126	1.1574E-05	235.24	470.48	0.00E+00	2.72E-03	5.45E-03		
Sr-90	1.9248E+00	235.24	470.48	0.00E+00	4.53E+02	9.06E+02		
Tc-99	4.2239E-04	235.24	470.48	0.00E+00	9.94E-02	1.99E-01		
Th-229	5.0953E-12	235.24	470.48	0.00E+00	1.20E-09	2.40E-09		
Th-230	4.1885E-08	235.24	470.48	0.00E+00	9.85E-06	1.97E-05		
Th-232	1.9270E-14	235.24	470.48	0.00E+00	4.53E-12	9.07E-12		
Ti-208	4.6024E-08	235.24	470.48	0.00E+00	1.08E-05	2.17E-05		
U-232	1.2582E-07	235.24	470.48	0.00E+00	2.96E-05	5.92E-05		
U-233	2.5825E-09	235.24	470.48	0.00E+00	6.08E-07	1.22E-06		
U-234	1.8450E-04	235.24	470.48	0.00E+00	4.34E-02	8.68E-02		
U-235	-2.7235E-06	235.24	0.00	2.33E-03	1.69E-03	2.33E-03		
U-236	1.5493E-05	235.24	470.48	0.00E+00	3.64E-03	7.29E-03		
U-238	-4.2851E-09	235.24	0.00	1.45E-03	1.45E-03	1.45E-03		
Y-90	1.9254E+00	235.24	470.48	0.00E+00	4.53E+02	9.06E+02		
Other Radionuclides					4.55E+02	9.10E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.0000132	60 to 100

Basis for Parameter Differences:
 This Template was used for the following reasons:
 This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		235.24
Bounding:		470.48

Basis for burnup used in estimate:
 Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.14	
Bounding:	0.28	

Estimated EOL HM/Given EOL HM
 1.00

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-MEU) GERMANY

SNF ID #: 1068

Fuel Units & Descr: 28 - MTR TYPE

Heavy Metal Mass: BOL=12.83kg; EOL=9.17kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x19"

1.17

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	3,513.44	7,026.88	0.00E+00	2.33E-06	4.66E-06	Avg. MeV	
Am-241	2.0060E-03	3,513.44	7,026.88	0.00E+00	7.05E+00	1.41E+01	0.0150	7.418E+14
Am-242m	4.2429E-07	3,513.44	7,026.88	0.00E+00	1.49E-03	2.98E-03	0.0250	1.542E+14
Am-243	1.4899E-06	3,513.44	7,026.88	0.00E+00	5.23E-03	1.05E-02	0.0375	1.345E+14
C-14	5.7135E-09	3,513.44	7,026.88	0.00E+00	2.01E-05	4.01E-05	0.0575	1.441E+14
Cf-252	1.3124E-32	3,513.44	7,026.88	0.00E+00	4.61E-29	9.22E-29	0.0850	8.707E+13
Cm-243	1.6443E-07	3,513.44	7,026.88	0.00E+00	5.78E-04	1.16E-03	0.1250	5.892E+13
Cm-244	2.9330E-06	3,513.44	7,026.88	0.00E+00	1.03E-01	2.06E-01	0.2250	7.513E+13
Co-60	5.3186E-06	3,513.44	7,026.88	0.00E+00	1.87E-02	3.74E-02	0.3750	3.271E+13
Cs-134	3.1563E-03	3,513.44	7,026.88	0.00E+00	1.11E+01	2.22E+01	0.5750	5.335E+14
Cs-135	3.4477E-06	3,513.44	7,026.88	0.00E+00	1.21E-02	2.42E-02	0.8500	9.019E+12
Cs-137	2.0313E+00	3,513.44	7,026.88	0.00E+00	7.14E+03	1.43E+04	1.2500	5.150E+12
Eu-154	2.4513E-02	3,513.44	7,026.88	0.00E+00	8.61E+01	1.72E+02	1.7500	2.364E+11
Eu-155	4.8175E-03	3,513.44	7,026.88	0.00E+00	1.69E+01	3.39E+01	2.2500	2.074E+07
Fe-55	1.2397E-04	3,513.44	7,026.88	0.00E+00	4.36E-01	8.71E-01	2.7500	1.172E+07
H-3	4.5697E-03	3,513.44	7,026.88	0.00E+00	1.61E+01	3.21E+01	3.5000	5.389E+04
I-129	7.5300E-07	3,513.44	7,026.88	0.00E+00	2.65E-03	5.29E-03	5.0000	3.049E+03
Kr-85	1.0850E-01	3,513.44	7,026.88	0.00E+00	3.81E+02	7.62E+02	7.0000	3.367E+02
Np-237	9.5561E-06	3,513.44	7,026.88	0.00E+00	3.36E-02	6.71E-02	11.0000	3.773E+01
Pa-231	2.0359E-09	3,513.44	7,026.88	0.00E+00	7.15E-06	1.43E-05		
Pb-210	4.9728E-11	3,513.44	7,026.88	0.00E+00	1.75E-07	3.49E-07		
Pm-147	4.8502E-02	3,513.44	7,026.88	0.00E+00	1.70E+02	3.41E+02		
Pu-238	1.8254E-02	3,513.44	7,026.88	0.00E+00	8.41E+01	1.28E+02		
Pu-239	4.2610E-04	3,513.44	7,026.88	0.00E+00	1.50E+00	3.01E+00		
Pu-240	2.4368E-04	3,513.44	7,026.88	0.00E+00	8.56E-01	1.71E+00		
Pu-241	3.3415E-02	3,513.44	7,026.88	0.00E+00	1.17E+02	2.35E+02		
Pu-242	3.6329E-07	3,513.44	7,026.88	0.00E+00	1.28E-03	2.55E-03		
Ra-226	2.2854E-10	3,513.44	7,026.88	0.00E+00	8.03E-07	1.61E-06		
Ra-228	1.2426E-14	3,513.44	7,026.88	0.00E+00	4.37E-11	8.73E-11		
Ru-106	6.3589E-06	3,513.44	7,026.88	0.00E+00	2.23E-02	4.47E-02		
Se-79	1.2933E-05	3,513.44	7,026.88	0.00E+00	4.54E-02	9.09E-02		
Sn-126	1.1574E-05	3,513.44	7,026.88	0.00E+00	4.07E-02	8.13E-02		
Sr-90	1.9248E+00	3,513.44	7,026.88	0.00E+00	6.76E+03	1.35E+04		
Tc-99	4.2239E-04	3,513.44	7,026.88	0.00E+00	1.48E+00	2.97E+00		
Th-229	5.0953E-12	3,513.44	7,026.88	0.00E+00	1.79E-08	3.58E-08		
Th-230	4.1885E-08	3,513.44	7,026.88	0.00E+00	1.47E-04	2.94E-04		
Th-232	1.9270E-14	3,513.44	7,026.88	0.00E+00	6.77E-11	1.35E-10		
Th-208	4.6024E-08	3,513.44	7,026.88	0.00E+00	1.62E-04	3.23E-04		
U-232	1.2582E-07	3,513.44	7,026.88	0.00E+00	4.42E-04	8.84E-04		
U-233	2.5825E-09	3,513.44	7,026.88	0.00E+00	9.07E-06	1.81E-05		
U-234	1.8450E-04	3,513.44	7,026.88	0.00E+00	6.48E-01	1.30E+00		
U-235	-2.7235E-06	3,513.44	0.00	1.25E-02	2.98E-03	1.25E-02		
U-238	1.5493E-05	3,513.44	7,026.88	0.00E+00	5.44E-02	1.09E-01		
U-238	-4.2851E-09	3,513.44	0.00	2.38E-03	2.36E-03	2.38E-03		
Y-90	1.9254E+00	3,513.44	7,026.88	0.00E+00	6.76E+03	1.35E+04		
Other Radionuclides					6.80E+03	1.36E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.38E+01	1.58E+02
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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	45.07	60 to 100	

Burnup Summary (MWd)^a

	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:		3,513.44	
Bounding:		7,026.88	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.02
Nominal:	0.87		
Bounding:	1.73		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3S2-LEU CANADA
 SNF ID #: 060
 Fuel Units & Descr: 1527 - MULTI-PIN CLUSTER
 Heavy Metal Mass: BOL=3796.275kg; EOL=3226.398kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x15"
 127.25

II. Estimates	m	x _m	x _b	b	y _m	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	8.5333E-10	541,647.53	1,083,295.06	0.00E+00	4.62E-04	9.24E-04	Avg. MeV	
Am-241	2.2753E-02	541,647.53	1,083,295.06	0.00E+00	1.23E+04	2.46E+04	0.0150	1.098E+17
Am-242m	8.9133E-06	541,647.53	1,083,295.06	0.00E+00	4.83E+00	9.66E+00	0.0250	2.280E+16
Am-243	6.4007E-06	541,647.53	1,083,295.06	0.00E+00	3.47E+00	6.93E+00	0.0375	2.003E+16
C-14	2.9620E-08	541,647.53	1,083,295.06	0.00E+00	1.80E-02	3.21E-02	0.0575	2.158E+16
Ci-36	5.9513E-35	541,647.53	1,083,295.06	0.00E+00	3.22E-29	6.45E-29	0.0850	1.284E+16
Cm-243	2.2087E-06	541,647.53	1,083,295.06	0.00E+00	1.20E+00	2.39E+00	0.1250	8.648E+15
Cm-244	1.1007E-04	541,647.53	1,083,295.06	0.00E+00	5.96E+01	1.19E+02	0.2250	1.107E+16
Co-60	1.6340E-05	541,647.53	1,083,295.06	0.00E+00	8.85E+00	1.77E+01	0.3750	4.818E+15
Cs-134	2.1353E-03	541,647.53	1,083,295.06	0.00E+00	1.16E+03	2.31E+03	0.5750	8.172E+16
Cs-135	4.8607E-06	541,647.53	1,083,295.06	0.00E+00	2.63E+00	5.27E+00	0.8500	1.249E+15
Cs-137	2.0227E+00	541,647.53	1,083,295.06	0.00E+00	1.10E+06	2.19E+06	1.2500	7.038E+14
Eu-154	2.0887E-02	541,647.53	1,083,295.06	0.00E+00	1.13E+04	2.26E+04	1.7500	3.322E+13
Eu-155	4.0867E-03	541,647.53	1,083,295.06	0.00E+00	2.21E+03	4.43E+03	2.2500	3.115E+09
Fe-55	1.4167E-03	541,647.53	1,083,295.06	0.00E+00	7.67E+02	1.53E+03	2.7500	3.886E+08
H-3	4.6653E-03	541,647.53	1,083,295.06	0.00E+00	2.53E+03	5.05E+03	3.5000	1.493E+07
I-129	7.1600E-07	541,647.53	1,083,295.06	0.00E+00	3.88E-01	7.76E-01	5.0000	2.268E+06
Kr-85	1.0240E-01	541,647.53	1,083,295.06	0.00E+00	5.55E+04	1.11E+05	7.0000	2.566E+06
Np-237	3.7227E-06	541,647.53	1,083,295.06	0.00E+00	2.02E+00	4.03E+00	11.0000	2.920E+04
Pa-231	2.6727E-09	541,647.53	1,083,295.06	0.00E+00	1.45E-03	2.90E-03		
Pb-210	4.3313E-14	541,647.53	1,083,295.06	0.00E+00	2.35E-08	4.69E-08		
Pm-147	4.6307E-02	541,647.53	1,083,295.06	0.00E+00	2.51E+04	5.02E+04		
Pu-238	5.5273E-03	541,647.53	1,083,295.06	0.00E+00	2.99E+03	5.99E+03		
Pu-239	1.0313E-02	541,647.53	1,083,295.06	0.00E+00	5.59E+03	1.12E+04		
Pu-240	5.4180E-03	541,647.53	1,083,295.06	0.00E+00	2.93E+03	5.87E+03		
Pu-241	3.7573E-01	541,647.53	1,083,295.06	0.00E+00	2.04E+05	4.07E+05		
Pu-242	3.0713E-06	541,647.53	1,083,295.06	0.00E+00	1.66E+00	3.33E+00		
Ra-226	2.3807E-13	541,647.53	1,083,295.06	0.00E+00	1.29E-07	2.58E-07		
Ra-228	1.0607E-14	541,647.53	1,083,295.06	0.00E+00	5.75E-09	1.15E-08		
Ru-106	8.4800E-06	541,647.53	1,083,295.06	0.00E+00	4.59E+00	9.19E+00		
Se-79	1.2533E-05	541,647.53	1,083,295.06	0.00E+00	6.79E+00	1.36E+01		
Sn-126	1.1393E-05	541,647.53	1,083,295.06	0.00E+00	6.17E+00	1.23E+01		
Sr-90	1.8400E+00	541,647.53	1,083,295.06	0.00E+00	9.97E+05	1.99E+06		
Tc-99	4.3533E-04	541,647.53	1,083,295.06	0.00E+00	2.36E+02	4.72E+02		
Th-229	5.8947E-13	541,647.53	1,083,295.06	0.00E+00	3.19E-07	6.39E-07		
Th-230	5.9500E-11	541,647.53	1,083,295.06	0.00E+00	3.22E-05	6.45E-05		
Th-232	1.6360E-14	541,647.53	1,083,295.06	0.00E+00	8.86E-09	1.77E-08		
Th-208	7.6000E-09	541,647.53	1,083,295.06	0.00E+00	4.12E-03	8.23E-03		
U-232	2.0747E-08	541,647.53	1,083,295.06	0.00E+00	1.12E-02	2.25E-02		
U-233	4.4013E-10	541,647.53	1,083,295.06	0.00E+00	2.38E-04	4.77E-04		
U-234	4.6500E-07	541,647.53	1,083,295.06	0.00E+00	2.52E-01	5.04E-01		
U-235	-2.5335E-06	541,647.53	0.00	1.62E+00	2.48E-01	1.62E+00		
U-236	1.3000E-05	541,647.53	1,083,295.06	0.00E+00	7.04E+00	1.41E+01		
U-238	-1.4207E-08	541,647.53	0.00	1.02E+00	1.02E+00	1.02E+00		
Y-90	1.8400E+00	541,647.53	1,083,295.06	0.00E+00	9.97E+05	1.99E+06		
Other Radionuclides					1.04E+06	2.08E+06		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.30E+04	2.59E+04
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.75000043	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		541,647.53
Bounding:		1,083,295.06

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.26	
Bounding:	6.52	

Estimated EOL HM/Given EOL HM

1.04

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3Si2-LEU SO. KOREA
SNF ID #: 293
Fuel Units & Descr: 48 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=59.52kg; EOL=52.138kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimate 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: 20 years

Estimated
Canister usage:
18"x15"
4.00

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	6,991.28	13,982.55	0.00E+00	4.64E-06	9.27E-06	Avg. MeV	
Am-241	2.0060E-03	6,991.28	13,982.55	0.00E+00	1.40E+01	2.80E+01	0.0150	1.476E+15
Am-242m	4.2429E-07	6,991.28	13,982.55	0.00E+00	2.97E-03	5.93E-03	0.0250	3.069E+14
Am-243	1.4899E-06	6,991.28	13,982.55	0.00E+00	1.04E-02	2.08E-02	0.0376	2.677E+14
C-14	5.7135E-09	6,991.28	13,982.55	0.00E+00	3.99E-05	7.99E-05	0.0576	2.867E+14
Cl-36	1.3124E-32	6,991.28	13,982.55	0.00E+00	9.18E-29	1.84E-28	0.0850	1.733E+14
Cm-243	1.6443E-07	6,991.28	13,982.55	0.00E+00	1.15E-03	2.30E-03	0.1250	1.172E+14
Cm-244	2.9330E-05	6,991.28	13,982.55	0.00E+00	2.05E-01	4.10E-01	0.2250	1.495E+14
Co-60	5.3186E-06	6,991.28	13,982.55	0.00E+00	3.72E-02	7.44E-02	0.3750	6.508E+13
Cs-134	3.1563E-03	6,991.28	13,982.55	0.00E+00	2.21E+01	4.41E+01	0.5750	1.082E+15
Cs-135	3.4477E-06	6,991.28	13,982.55	0.00E+00	2.41E-02	4.82E-02	0.8500	1.796E+13
Cs-137	2.0313E+00	6,991.28	13,982.55	0.00E+00	1.42E+04	2.84E+04	1.2500	1.025E+13
Eu-154	2.4513E-02	6,991.28	13,982.55	0.00E+00	1.71E+02	3.43E+02	1.7500	4.704E+11
Eu-155	4.8175E-03	6,991.28	13,982.55	0.00E+00	3.37E+01	6.74E+01	2.2500	4.126E+07
Fe-55	1.2397E-04	6,991.28	13,982.55	0.00E+00	8.67E-01	1.73E+00	2.7500	2.331E+07
H-3	4.5697E-03	6,991.28	13,982.55	0.00E+00	3.19E+01	6.39E+01	3.5000	1.072E+05
I-129	7.5300E-07	6,991.28	13,982.55	0.00E+00	5.26E-03	1.05E-02	5.0000	6.094E+03
Kr-85	1.0850E-01	6,991.28	13,982.55	0.00E+00	7.59E+02	1.52E+03	7.0000	6.729E+02
Np-237	9.5561E-06	6,991.28	13,982.55	0.00E+00	6.68E-02	1.34E-01	11.0000	7.543E+01
Pa-231	2.0359E-09	6,991.28	13,982.55	0.00E+00	1.42E-05	2.85E-05		
Pb-210	4.9728E-11	6,991.28	13,982.55	0.00E+00	3.48E-07	6.95E-07		
Pm-147	4.8502E-02	6,991.28	13,982.55	0.00E+00	3.39E+02	6.78E+02		
Pu-238	1.8254E-02	6,991.28	13,982.55	0.00E+00	1.28E+02	2.55E+02		
Pu-239	4.2810E-04	6,991.28	13,982.55	0.00E+00	2.99E+00	5.99E+00		
Pu-240	2.4368E-04	6,991.28	13,982.55	0.00E+00	1.70E+00	3.41E+00		
Pu-241	3.3415E-02	6,991.28	13,982.55	0.00E+00	2.34E+02	4.67E+02		
Pu-242	3.6329E-07	6,991.28	13,982.55	0.00E+00	2.54E-03	5.08E-03		
Ra-226	2.2854E-10	6,991.28	13,982.55	0.00E+00	1.60E-06	3.20E-06		
Ra-228	1.2426E-14	6,991.28	13,982.55	0.00E+00	8.69E-11	1.74E-10		
Ru-106	6.3589E-06	6,991.28	13,982.55	0.00E+00	4.45E-02	8.89E-02		
Se-79	1.2933E-05	6,991.28	13,982.55	0.00E+00	9.04E-02	1.81E-01		
Sn-126	1.1574E-05	6,991.28	13,982.55	0.00E+00	8.09E-02	1.62E-01		
Sr-90	1.9248E+00	6,991.28	13,982.55	0.00E+00	1.35E+04	2.69E+04		
Tc-99	4.2239E-04	6,991.28	13,982.55	0.00E+00	2.95E+00	5.91E+00		
Th-229	5.0953E-12	6,991.28	13,982.55	0.00E+00	3.56E-08	7.12E-08		
Th-230	4.1885E-08	6,991.28	13,982.55	0.00E+00	2.93E-04	5.86E-04		
Th-232	1.9270E-14	6,991.28	13,982.55	0.00E+00	1.35E-10	2.69E-10		
Th-208	4.6024E-08	6,991.28	13,982.55	0.00E+00	3.22E-04	6.44E-04		
U-232	1.2582E-07	6,991.28	13,982.55	0.00E+00	8.80E-04	1.76E-03		
U-233	2.5825E-09	6,991.28	13,982.55	0.00E+00	1.81E-05	3.61E-05		
U-234	1.8450E-04	6,991.28	13,982.55	0.00E+00	1.29E+00	2.58E+00		
U-235	-2.7235E-08	6,991.28	0.00	2.57E-02	6.68E-03	2.57E-02		
U-236	1.5493E-05	6,991.28	13,982.55	0.00E+00	1.08E-01	2.17E-01		
U-238	-4.2851E-09	6,991.28	0.00	1.60E-02	1.60E-02	1.60E-02		
Y-90	1.9254E+00	6,991.28	13,982.55	0.00E+00	1.35E+04	2.69E+04		
Other Radionuclides					1.35E+04	2.70E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.99999952	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:	From SFD	Estimated	
Bounding:		6,991.28 13,982.55	

Checks			Estimated EOL HM/Given EOL HM 1.01
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	0.37 0.75		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER USS12-LEU SO. KOREA
 SNF ID #: 659
 Fuel Units & Descr: 158 - MULTI-PIN CLUSTER
 Heavy Metal Mass: BOL=343.65kg. EOL=298.288kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x15"
 13.17

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	6.6313E-10	42,958.50	85,917.00	0.00E+00	2.85E-05	5.70E-05	Avg. MeV	
Am-241	2.0060E-03	42,958.50	85,917.00	0.00E+00	8.62E+01	1.72E+02	0.0150	9.069E+15
Am-242m	4.2429E-07	42,958.50	85,917.00	0.00E+00	1.82E-02	3.65E-02	0.0250	1.886E+15
Am-243	1.4899E-06	42,958.50	85,917.00	0.00E+00	6.40E-02	1.28E-01	0.0375	1.845E+15
C-14	5.7135E-09	42,958.50	85,917.00	0.00E+00	2.45E-04	4.91E-04	0.0575	1.762E+15
Cl-36	1.3124E-32	42,958.50	85,917.00	0.00E+00	5.64E-28	1.13E-27	0.0850	1.065E+15
Cm-243	1.6443E-07	42,958.50	85,917.00	0.00E+00	7.06E-03	1.41E-02	0.1250	7.204E+14
Cm-244	2.9330E-05	42,958.50	85,917.00	0.00E+00	1.26E+00	2.52E+00	0.2250	9.186E+14
Co-60	5.3186E-06	42,958.50	85,917.00	0.00E+00	2.28E-01	4.57E-01	0.3750	3.999E+14
Cs-134	3.1563E-03	42,958.50	85,917.00	0.00E+00	1.36E+02	2.71E+02	0.5750	6.523E+15
Cs-135	3.4477E-06	42,958.50	85,917.00	0.00E+00	1.48E-01	2.96E-01	0.8500	1.103E+14
Cs-137	2.0313E+00	42,958.50	85,917.00	0.00E+00	8.73E+04	1.75E+05	1.2500	6.297E+13
Eu-154	2.4513E-02	42,958.50	85,917.00	0.00E+00	1.05E+03	2.11E+03	1.7500	2.890E+12
Eu-155	4.6175E-03	42,958.50	85,917.00	0.00E+00	2.07E+02	4.14E+02	2.2500	2.535E+08
Fe-55	1.2397E-04	42,958.50	85,917.00	0.00E+00	5.33E+00	1.07E+01	2.7500	1.433E+08
H-3	4.5697E-03	42,958.50	85,917.00	0.00E+00	1.96E+02	3.93E+02	3.5000	6.589E+05
I-129	7.5300E-07	42,958.50	85,917.00	0.00E+00	3.23E-02	6.47E-02	5.0000	3.743E+04
Kr-85	1.0850E-01	42,958.50	85,917.00	0.00E+00	4.66E+03	9.32E+03	7.0000	4.133E+03
Np-237	9.5561E-06	42,958.50	85,917.00	0.00E+00	4.11E-01	8.21E-01	11.0000	4.633E+02
Pa-231	2.0359E-09	42,958.50	85,917.00	0.00E+00	8.75E-05	1.75E-04		
Pb-210	4.9728E-11	42,958.50	85,917.00	0.00E+00	2.14E-06	4.27E-06		
Pm-147	4.8502E-02	42,958.50	85,917.00	0.00E+00	2.08E+03	4.17E+03		
Pu-238	1.8254E-02	42,958.50	85,917.00	0.00E+00	7.84E+02	1.57E+03		
Pu-239	4.2810E-04	42,958.50	85,917.00	0.00E+00	1.84E+01	3.68E+01		
Pu-240	2.4368E-04	42,958.50	85,917.00	0.00E+00	1.05E+01	2.09E+01		
Pu-241	3.3415E-02	42,958.50	85,917.00	0.00E+00	1.44E+03	2.87E+03		
Pu-242	3.6329E-07	42,958.50	85,917.00	0.00E+00	1.56E-02	3.12E-02		
Ra-226	2.2854E-10	42,958.50	85,917.00	0.00E+00	9.82E-06	1.96E-05		
Ra-228	1.2426E-14	42,958.50	85,917.00	0.00E+00	5.34E-10	1.07E-09		
Ru-106	6.9589E-06	42,958.50	85,917.00	0.00E+00	2.73E-01	5.46E-01		
Se-79	1.2933E-05	42,958.50	85,917.00	0.00E+00	5.56E-01	1.11E+00		
Sn-126	1.1574E-05	42,958.50	85,917.00	0.00E+00	4.97E-01	9.94E-01		
Sr-90	1.8248E+00	42,958.50	85,917.00	0.00E+00	8.27E+04	1.65E+05		
Tc-99	4.2239E-04	42,958.50	85,917.00	0.00E+00	1.81E+01	3.63E+01		
Th-229	5.0953E-12	42,958.50	85,917.00	0.00E+00	2.19E-07	4.38E-07		
Th-230	4.1885E-08	42,958.50	85,917.00	0.00E+00	1.80E-03	3.60E-03		
Th-232	1.8270E-14	42,958.50	85,917.00	0.00E+00	8.28E-10	1.66E-09		
Ti-208	4.6024E-08	42,958.50	85,917.00	0.00E+00	1.98E-03	3.95E-03		
U-232	1.2582E-07	42,958.50	85,917.00	0.00E+00	5.40E-03	1.08E-02		
U-233	2.5825E-09	42,958.50	85,917.00	0.00E+00	1.11E-04	2.22E-04		
U-234	1.8450E-04	42,958.50	85,917.00	0.00E+00	7.93E+00	1.59E+01		
U-235	-2.7235E-06	42,958.50	0.00	1.49E-01	3.15E-02	1.49E-01		
U-236	1.5493E-05	42,958.50	85,917.00	0.00E+00	6.86E-01	1.33E+00		
U-238	-4.2851E-09	42,958.50	0.00	9.24E-02	9.22E-02	9.24E-02		
Y-90	1.8254E+00	42,958.50	85,917.00	0.00E+00	8.27E+04	1.65E+05		
Other Radionuclides					8.31E+04	1.66E+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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000055	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:		42,958.50	
Bounding:		85,917.00	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.40		
Bounding:	0.79		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER UALX HEU CANADA

SNF ID #: 661

Fuel Units & Descr: 225 - MULTI-PIN CLUSTER

Heavy Metal Mass: BOL=118.597kg; EOL=34.627kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x15"

18.75

II. Estimates

	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/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	6.6313E-10	79,521.22	112,314.13	0.00E+00	5.27E-05	7.45E-05	Avg. MeV	
Am-241	2.0060E-03	79,521.22	112,314.13	0.00E+00	1.60E+02	2.25E+02	0.0150	1.188E+16
Am-242m	4.2429E-07	79,521.22	112,314.13	0.00E+00	3.37E-02	4.77E-02	0.0250	2.465E+15
Am-243	1.4899E-06	79,521.22	112,314.13	0.00E+00	1.18E-01	1.67E-01	0.0375	2.150E+15
C-14	5.7135E-09	79,521.22	112,314.13	0.00E+00	4.54E-04	6.42E-04	0.0675	2.303E+15
Cl-36	1.3124E-32	79,521.22	112,314.13	0.00E+00	1.04E-27	1.47E-27	0.0850	1.392E+15
Cm-243	1.6443E-07	79,521.22	112,314.13	0.00E+00	1.31E-02	1.85E-02	0.1250	9.418E+14
Cm-244	2.9330E-05	79,521.22	112,314.13	0.00E+00	2.33E+00	3.29E+00	0.2250	1.201E+15
Co-60	5.3186E-06	79,521.22	112,314.13	0.00E+00	4.23E-01	5.97E-01	0.3750	5.228E+14
Cs-134	3.1563E-03	79,521.22	112,314.13	0.00E+00	2.51E+02	3.54E+02	0.5750	8.527E+15
Cs-135	3.4477E-08	79,521.22	112,314.13	0.00E+00	2.74E-01	3.87E-01	0.8500	1.442E+14
Cs-137	2.0313E+00	79,521.22	112,314.13	0.00E+00	1.62E+05	2.28E+05	1.2500	8.232E+13
Eu-154	2.4513E-02	79,521.22	112,314.13	0.00E+00	1.95E+03	2.75E+03	1.7500	3.778E+12
Eu-155	4.8175E-03	79,521.22	112,314.13	0.00E+00	3.83E+02	5.41E+02	2.2500	3.314E+08
Fe-55	1.2397E-04	79,521.22	112,314.13	0.00E+00	9.86E+00	1.39E+01	2.7500	1.874E+08
H-3	4.5697E-03	79,521.22	112,314.13	0.00E+00	3.63E+02	5.13E+02	3.5000	8.807E+05
I-129	7.5300E-07	79,521.22	112,314.13	0.00E+00	5.99E-02	8.46E-02	5.0000	4.866E+04
Kr-85	1.0850E-01	79,521.22	112,314.13	0.00E+00	8.63E+03	1.22E+04	7.0000	5.372E+03
Np-237	9.5561E-08	79,521.22	112,314.13	0.00E+00	7.60E-01	1.07E+00	11.0000	6.020E+02
Pa-231	2.0359E-09	79,521.22	112,314.13	0.00E+00	1.62E-04	2.29E-04		
Pb-210	4.9728E-11	79,521.22	112,314.13	0.00E+00	3.95E-06	5.59E-06		
Pm-147	4.8502E-02	79,521.22	112,314.13	0.00E+00	3.86E+03	5.45E+03		
Pu-238	1.8254E-02	79,521.22	112,314.13	0.00E+00	1.45E+03	2.05E+03		
Pu-239	4.2810E-04	79,521.22	112,314.13	0.00E+00	3.40E+01	4.81E+01		
Pu-240	2.4368E-04	79,521.22	112,314.13	0.00E+00	1.94E+01	2.74E+01		
Pu-241	3.3415E-02	79,521.22	112,314.13	0.00E+00	2.66E+03	3.75E+03		
Pu-242	3.6329E-07	79,521.22	112,314.13	0.00E+00	2.89E-02	4.08E-02		
Ra-226	2.2854E-10	79,521.22	112,314.13	0.00E+00	1.82E-05	2.57E-05		
Ra-228	1.2426E-14	79,521.22	112,314.13	0.00E+00	9.88E-10	1.40E-09		
Ru-106	6.3589E-06	79,521.22	112,314.13	0.00E+00	5.06E-01	7.14E-01		
Se-79	1.2933E-05	79,521.22	112,314.13	0.00E+00	1.03E+00	1.45E+00		
Sn-126	1.1574E-05	79,521.22	112,314.13	0.00E+00	9.20E-01	1.30E+00		
Sr-90	1.9248E+00	79,521.22	112,314.13	0.00E+00	1.53E+05	2.16E+05		
Tc-99	4.2239E-04	79,521.22	112,314.13	0.00E+00	3.36E+01	4.74E+01		
Th-229	5.0953E-12	79,521.22	112,314.13	0.00E+00	4.05E-07	5.72E-07		
Th-230	4.1885E-06	79,521.22	112,314.13	0.00E+00	3.33E-03	4.70E-03		
Th-232	1.9270E-14	79,521.22	112,314.13	0.00E+00	1.53E-09	2.16E-09		
Ti-206	4.6024E-08	79,521.22	112,314.13	0.00E+00	3.66E-03	5.17E-03		
U-232	1.2582E-07	79,521.22	112,314.13	0.00E+00	1.00E-02	1.41E-02		
U-233	2.5825E-09	79,521.22	112,314.13	0.00E+00	2.05E-04	2.90E-04		
U-234	1.8450E-04	79,521.22	112,314.13	0.00E+00	1.47E+01	2.07E+01		
U-235	-2.7235E-06	79,521.22	0.00	2.39E-01	2.22E-02	2.39E-01		
U-236	1.5493E-05	79,521.22	112,314.13	0.00E+00	1.23E+00	1.74E+00		
U-238	-4.2851E-09	79,521.22	0.00	2.73E-03	2.39E-03	2.73E-03		
Y-90	1.9254E+00	79,521.22	112,314.13	0.00E+00	1.53E+05	2.16E+05		
Other Radionuclides					1.54E+05	2.17E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1499856	60 to 100

Base for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		79,521.22
Bounding:		112,314.13

Base for burnup used in estimates:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.13	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM

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: FRR PIN CLUSTER UALX HEU CANADA

SNF ID #: 662

Fuel Units & Descr: 741 - MULTI-PIN CLUSTER

Heavy Metal Mass: BOL=395.694kg; EOL=97.59kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x15"

61.75

II. Estimates

	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	274,584.76	364,474.92	0.00E+00	8.61E-05	1.14E-04	Avg. MeV	
Am-241	8.0194E-03	274,584.76	364,474.92	0.00E+00	2.20E+03	2.92E+03	0.0150	3.853E+16
Am-242m	1.3694E-06	274,584.76	364,474.92	0.00E+00	3.76E-01	4.99E-01	0.0250	7.942E+15
Am-243	3.7096E-05	274,584.76	364,474.92	0.00E+00	1.02E+01	1.35E+01	0.0375	7.057E+15
C-14	2.6464E-08	274,584.76	364,474.92	0.00E+00	7.27E-03	9.65E-03	0.0575	7.471E+15
Cf-252	4.4441E-31	274,584.76	364,474.92	0.00E+00	1.22E-25	1.62E-25	0.0850	4.522E+15
Co-243	5.7029E-06	274,584.76	364,474.92	0.00E+00	1.57E+00	2.08E+00	0.1250	3.203E+15
Co-244	4.6555E-03	274,584.76	364,474.92	0.00E+00	1.28E+03	1.70E+03	0.2250	3.893E+15
Cm-240	4.8663E-05	274,584.76	364,474.92	0.00E+00	1.34E+01	1.77E+01	0.3750	1.885E+15
Cs-134	1.0638E-02	274,584.76	364,474.92	0.00E+00	2.92E+03	3.88E+03	0.5750	2.789E+16
Cs-135	4.2564E-06	274,584.76	364,474.92	0.00E+00	1.17E+00	1.55E+00	0.8500	7.303E+14
Cs-137	2.0358E+00	274,584.76	364,474.92	0.00E+00	5.59E+05	7.42E+05	1.2500	4.682E+14
Eu-154	5.1956E-02	274,584.76	364,474.92	0.00E+00	1.43E+04	1.89E+04	1.7500	1.804E+13
Eu-155	1.4295E-02	274,584.76	364,474.92	0.00E+00	3.93E+03	5.21E+03	2.2500	1.154E+09
Fe-55	1.3560E-03	274,584.76	364,474.92	0.00E+00	3.72E+02	4.94E+02	2.7500	6.750E+08
H-3	4.6258E-03	274,584.76	364,474.92	0.00E+00	1.27E+03	1.69E+03	3.5000	2.852E+07
I-129	6.6403E-07	274,584.76	364,474.92	0.00E+00	1.82E-01	2.42E-01	5.0000	1.097E+07
Kr-85	1.0808E-01	274,584.76	364,474.92	0.00E+00	2.97E+04	3.94E+04	7.0000	1.259E+06
Np-237	3.1537E-05	274,584.76	364,474.92	0.00E+00	8.66E+00	1.15E+01	11.0000	1.442E+05
Pa-231	9.7023E-10	274,584.76	364,474.92	0.00E+00	2.66E-04	3.54E-04		
Pb-210	1.1731E-11	274,584.76	364,474.92	0.00E+00	3.22E-06	4.28E-06		
Pm-147	2.4405E-02	274,584.76	364,474.92	0.00E+00	6.70E+03	8.89E+03		
Pu-238	1.5358E-01	274,584.76	364,474.92	0.00E+00	4.22E+04	5.60E+04		
Pu-239	6.9502E-04	274,584.76	364,474.92	0.00E+00	1.91E+02	2.53E+02		
Pu-240	3.7631E-04	274,584.76	364,474.92	0.00E+00	1.03E+02	1.37E+02		
Pu-241	1.3433E-01	274,584.76	364,474.92	0.00E+00	3.69E+04	4.90E+04		
Pu-242	3.0911E-06	274,584.76	364,474.92	0.00E+00	8.49E-01	1.13E+00		
Ra-226	5.5079E-11	274,584.76	364,474.92	0.00E+00	1.51E-05	2.01E-05		
Ra-228	1.3335E-14	274,584.76	364,474.92	0.00E+00	3.66E-09	4.86E-09		
Ru-106	7.3390E-06	274,584.76	364,474.92	0.00E+00	2.02E+00	2.67E+00		
Se-79	1.2339E-05	274,584.76	364,474.92	0.00E+00	3.39E+00	4.50E+00		
Sn-126	1.0194E-05	274,584.76	364,474.92	0.00E+00	2.80E+00	3.72E+00		
Sr-90	1.9064E+00	274,584.76	364,474.92	0.00E+00	5.23E+05	6.95E+05		
Tc-99	3.8056E-04	274,584.76	364,474.92	0.00E+00	1.04E+02	1.39E+02		
Th-229	4.9188E-12	274,584.76	364,474.92	0.00E+00	1.35E-06	1.79E-06		
Th-230	1.0547E-08	274,584.76	364,474.92	0.00E+00	2.90E-03	3.84E-03		
Th-232	2.0705E-14	274,584.76	364,474.92	0.00E+00	5.69E-09	7.55E-09		
Ti-208	4.8827E-08	274,584.76	364,474.92	0.00E+00	1.34E-02	1.78E-02		
U-232	1.3414E-07	274,584.76	364,474.92	0.00E+00	3.68E-02	4.89E-02		
U-233	3.7679E-09	274,584.76	364,474.92	0.00E+00	1.03E-03	1.37E-03		
U-234	5.2047E-05	274,584.76	364,474.92	0.00E+00	1.43E+01	1.90E+01		
U-235	-2.8661E-06	274,584.76	0.00	7.95E-01	8.24E-03	7.95E-01		
U-236	1.6701E-05	274,584.76	364,474.92	0.00E+00	4.59E+00	6.09E+00		
U-238	-9.4194E-09	274,584.76	0.00	9.31E-03	6.72E-03	9.31E-03		
Y-90	1.9070E+00	274,584.76	364,474.92	0.00E+00	5.24E+05	6.95E+05		
Other Radionuclides					5.35E+05	7.10E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999565	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		274,584.76
Bounding:		364,474.92

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.59	
Bounding:	2.11	

Estimated EOL HM/Given EOL HM
1.06

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER UALX HEU CANADA

SNF ID #: 663

Fuel Units & Descr: 131 - MULTI-PIN CLUSTER

Heavy Metal Mass: BOL=76.648kg; EOL=32.383kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated
Canister usage:

18"x15"

10.92

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	40,772.53	70,600.79	0.00E+00	1.28E-05	2.21E-05	Avg. MeV	
Am-241	8.0194E-03	40,772.53	70,600.79	0.00E+00	3.27E+02	5.66E+02	0.0150	7.464E+15
Am-242m	1.3694E-06	40,772.53	70,600.79	0.00E+00	5.58E-02	9.67E-02	0.0250	1.538E+15
Am-243	3.7096E-05	40,772.53	70,600.79	0.00E+00	1.51E+00	2.62E+00	0.0375	1.387E+15
C-14	2.6464E-08	40,772.53	70,600.79	0.00E+00	1.08E-03	1.87E-03	0.0575	1.447E+15
Cl-36	4.4441E-31	40,772.53	70,600.79	0.00E+00	1.81E-26	3.14E-26	0.0850	8.760E+14
Cm-243	5.7029E-06	40,772.53	70,600.79	0.00E+00	2.33E-01	4.03E-01	0.1250	6.204E+14
Cm-244	4.6555E-03	40,772.53	70,600.79	0.00E+00	1.90E+02	3.29E+02	0.2250	7.540E+14
Co-60	4.8663E-05	40,772.53	70,600.79	0.00E+00	1.98E+00	3.44E+00	0.3750	3.263E+14
Ce-134	1.0638E-02	40,772.53	70,600.79	0.00E+00	4.34E+02	7.51E+02	0.5750	5.402E+15
Ce-135	4.2564E-06	40,772.53	70,600.79	0.00E+00	1.74E-01	3.01E-01	0.8500	1.415E+14
Ce-137	2.0358E+00	40,772.53	70,600.79	0.00E+00	8.30E+04	1.44E+05	1.2500	9.089E+13
Eu-154	5.1956E-02	40,772.53	70,600.79	0.00E+00	2.12E+03	3.67E+03	1.7500	3.495E+12
Eu-155	1.4295E-02	40,772.53	70,600.79	0.00E+00	5.83E+02	1.01E+03	2.2500	2.235E+08
Fe-55	1.3560E-03	40,772.53	70,600.79	0.00E+00	5.53E+01	9.57E+01	2.7500	1.308E+08
H-3	4.6258E-03	40,772.53	70,600.79	0.00E+00	1.89E+02	3.27E+02	3.5000	5.525E+06
I-129	6.6403E-07	40,772.53	70,600.79	0.00E+00	2.71E-02	4.69E-02	5.0000	2.124E+06
Kr-85	1.0808E-01	40,772.53	70,600.79	0.00E+00	4.41E+03	7.63E+03	7.0000	2.438E+05
Np-237	3.1537E-05	40,772.53	70,600.79	0.00E+00	1.29E+00	2.23E+00	11.0000	2.794E+04
Pa-231	9.7023E-10	40,772.53	70,600.79	0.00E+00	3.96E-05	6.85E-05		
Pb-210	1.1731E-11	40,772.53	70,600.79	0.00E+00	4.78E-07	8.28E-07		
Pm-147	2.4405E-02	40,772.53	70,600.79	0.00E+00	9.95E+02	1.72E+03		
Pu-238	1.5358E-01	40,772.53	70,600.79	0.00E+00	6.26E+03	1.08E+04		
Pu-239	6.9502E-04	40,772.53	70,600.79	0.00E+00	2.83E+01	4.91E+01		
Pu-240	3.7631E-04	40,772.53	70,600.79	0.00E+00	1.53E+01	2.66E+01		
Pu-241	1.3433E-01	40,772.53	70,600.79	0.00E+00	5.48E+03	9.48E+03		
Pu-242	3.0911E-06	40,772.53	70,600.79	0.00E+00	1.28E-01	2.18E-01		
Ra-226	5.5079E-11	40,772.53	70,600.79	0.00E+00	2.25E-06	3.89E-06		
Ra-228	1.3335E-14	40,772.53	70,600.79	0.00E+00	5.44E-10	9.41E-10		
Ru-106	7.3390E-06	40,772.53	70,600.79	0.00E+00	2.99E-01	5.18E-01		
Se-79	1.2339E-05	40,772.53	70,600.79	0.00E+00	5.03E-01	8.71E-01		
Sn-126	1.0194E-05	40,772.53	70,600.79	0.00E+00	4.16E-01	7.20E-01		
Sr-90	1.9084E+00	40,772.53	70,600.79	0.00E+00	7.77E+04	1.36E+05		
Tc-99	3.8056E-04	40,772.53	70,600.79	0.00E+00	1.55E+01	2.69E+01		
Th-229	4.9198E-12	40,772.53	70,600.79	0.00E+00	2.01E-07	3.47E-07		
Th-230	1.0547E-08	40,772.53	70,600.79	0.00E+00	4.30E-04	7.45E-04		
Th-232	2.0705E-14	40,772.53	70,600.79	0.00E+00	8.44E-10	1.46E-09		
Th-206	4.8827E-08	40,772.53	70,600.79	0.00E+00	1.99E-03	3.45E-03		
U-232	1.3414E-07	40,772.53	70,600.79	0.00E+00	5.47E-03	9.47E-03		
U-233	3.7679E-09	40,772.53	70,600.79	0.00E+00	1.54E-04	2.66E-04		
U-234	5.2047E-05	40,772.53	70,600.79	0.00E+00	2.12E+00	3.67E+00		
U-235	2.8681E-06	40,772.53	0.00	1.54E-01	3.74E-02	1.54E-01		
U-238	1.6701E-05	40,772.53	70,600.79	0.00E+00	6.81E-01	1.18E+00		
U-238	-9.4194E-09	40,772.53	0.00	1.76E-03	1.38E-03	1.76E-03		
Y-90	1.9070E+00	40,772.53	70,600.79	0.00E+00	7.78E+04	1.35E+05		
Other Radionuclides					7.94E+04	1.37E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1500501	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		40,772.53
Bounding:		70,600.79

Basis for burnup used in estimates:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.22	
Bounding:	2.11	

Estimated EOL HM/Given EOL HM

1.03

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
SNF ID #: 665
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.06

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08	Avg. MeV	
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01	0.0150	5.962E+12
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05	0.0250	1.240E+12
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05	0.0375	1.061E+12
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07	0.0575	1.158E+12
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31	0.0850	6.999E+11
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06	0.1250	4.736E+11
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03	0.2250	6.040E+11
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04	0.3750	2.629E+11
Cs-134	3.1583E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01	0.5750	4.288E+12
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04	0.8500	7.250E+10
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02	1.2500	4.140E+10
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00	1.7500	1.900E+09
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01	2.2500	1.867E+05
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03	2.7500	9.422E+04
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01	3.5000	4.332E+02
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05	5.0000	2.461E+01
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00	7.0000	2.717E+00
Np-237	9.5561E-06	28.24	56.48	0.00E+00	2.70E-04	5.40E-04	11.0000	3.045E-01
Pa-231	2.0359E-09	28.24	56.48	0.00E+00	5.75E-08	1.15E-07		
Pb-210	4.9728E-11	28.24	56.48	0.00E+00	1.40E-09	2.81E-09		
Pm-147	4.8502E-02	28.24	56.48	0.00E+00	1.37E+00	2.74E+00		
Pu-238	1.8254E-02	28.24	56.48	0.00E+00	5.16E-01	1.03E+00		
Pu-239	4.2810E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4368E-04	28.24	56.48	0.00E+00	6.88E-03	1.38E-02		
Pu-241	3.3415E-02	28.24	56.48	0.00E+00	9.44E-01	1.89E+00		
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05		
Ra-226	2.2854E-10	28.24	56.48	0.00E+00	6.45E-09	1.29E-08		
Ra-228	1.2426E-14	28.24	56.48	0.00E+00	3.51E-13	7.02E-13		
Ru-106	6.3589E-06	28.24	56.48	0.00E+00	1.80E-04	3.59E-04		
Se-79	1.2933E-05	28.24	56.48	0.00E+00	3.85E-04	7.30E-04		
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04		
Sr-90	1.9248E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02		
Th-229	5.0953E-12	28.24	56.48	0.00E+00	1.44E-10	2.88E-10		
Th-230	4.1885E-08	28.24	56.48	0.00E+00	1.18E-06	2.37E-06		
Th-232	1.9270E-14	28.24	56.48	0.00E+00	5.44E-13	1.09E-12		
Ti-208	4.604E-08	28.24	56.48	0.00E+00	1.30E-06	2.60E-06		
U-232	1.2582E-07	28.24	56.48	0.00E+00	3.55E-06	7.11E-06		
U-233	2.5825E-09	28.24	56.48	0.00E+00	7.29E-08	1.46E-07		
U-234	1.8450E-04	28.24	56.48	0.00E+00	5.21E-03	1.04E-02		
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03		
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04		
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	1.9254E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Other Radionuclides					5.46E+01	1.09E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		28.24
Bounding:		56.48

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:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA

SNF ID #: 666

Fuel Units & Descr: 2 - 297 ROD ARRAY

Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg

ROD Storage Site: SRS

¹Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x10"

0.08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg. MeV	
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08	0.0150	5.962E+12
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01	0.0250	1.240E+12
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05	0.0375	1.091E+12
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05	0.0575	1.158E+12
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07	0.0850	6.999E+11
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31	0.1250	4.736E+11
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06	0.2250	6.040E+11
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03	0.3750	2.829E+11
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04	0.5750	4.288E+12
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01	0.8500	7.250E+10
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04	1.2500	4.140E+10
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02	1.7500	1.900E+09
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00	2.2500	1.867E+06
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01	2.7500	9.422E+04
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03	3.5000	4.332E+02
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01	5.0000	2.461E+01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05	7.0000	2.717E+00
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00	11.0000	3.045E-01
Np-237	9.5561E-08	28.24	56.48	0.00E+00	2.70E-04	5.40E-04		
Pa-231	2.0359E-09	28.24	56.48	0.00E+00	5.75E-08	1.15E-07		
Pb-210	4.9728E-11	28.24	56.48	0.00E+00	1.40E-09	2.81E-09		
Pm-147	4.8502E-02	28.24	56.48	0.00E+00	1.37E+00	2.74E+00		
Pu-238	1.8254E-02	28.24	56.48	0.00E+00	5.16E-01	1.03E+00		
Pu-239	4.2810E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4368E-04	28.24	56.48	0.00E+00	6.88E-03	1.38E-02		
Pu-241	3.3415E-02	28.24	56.48	0.00E+00	9.44E-01	1.89E+00		
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05		
Ra-226	2.2854E-10	28.24	56.48	0.00E+00	6.45E-09	1.29E-08		
Ra-228	1.2426E-14	28.24	56.48	0.00E+00	3.51E-13	7.02E-13		
Ru-106	6.3589E-06	28.24	56.48	0.00E+00	1.80E-04	3.59E-04		
Se-79	1.2933E-05	28.24	56.48	0.00E+00	3.65E-04	7.30E-04		
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04		
Sr-90	1.9248E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02		
Th-229	5.0953E-12	28.24	56.48	0.00E+00	1.44E-10	2.88E-10		
Th-230	4.1885E-08	28.24	56.48	0.00E+00	1.18E-06	2.37E-06		
Th-232	1.9270E-14	28.24	56.48	0.00E+00	5.44E-13	1.09E-12		
Ti-208	4.6024E-06	28.24	56.48	0.00E+00	1.30E-06	2.60E-06		
U-232	1.2582E-07	28.24	56.48	0.00E+00	3.55E-06	7.11E-06		
U-233	2.5825E-09	28.24	56.48	0.00E+00	7.29E-08	1.46E-07		
U-234	1.8450E-04	28.24	56.48	0.00E+00	5.21E-03	1.04E-02		
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03		
U-238	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04		
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	1.9254E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Other Radionuclides					5.46E+01	1.09E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		28.24
Bounding:		56.48

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:	0.05	
Bounding:	0.10	

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: FRR SLOWPOKE (HEU) CANADA
 SNF ID #: 068
 Fuel Units & Descr: 2 - 297 ROD ARRAY
 Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
 ROD Storage Site: SRS

*Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.08

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08	Avg. MeV	
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01	0.0150	5.962E+12
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05	0.0250	1.240E+12
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05	0.0375	1.081E+12
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07	0.0575	1.158E+12
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31	0.0850	6.999E+11
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.84E-06	9.29E-06	0.1250	4.736E+11
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03	0.2250	6.040E+11
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04	0.3750	2.629E+11
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01	0.5750	4.288E+12
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04	0.8500	7.250E+10
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	6.74E+01	1.15E+02	1.2500	4.140E+10
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00	1.7500	1.900E+09
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01	2.2500	1.867E+05
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03	2.7500	9.422E+04
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01	3.5000	4.332E+02
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05	5.0000	2.461E+01
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00	7.0000	2.717E+00
Np-237	9.5561E-06	28.24	56.48	0.00E+00	2.70E-04	5.40E-04	11.0000	3.045E-01
Pa-231	2.0359E-09	28.24	56.48	0.00E+00	5.75E-08	1.15E-07		
Pb-210	4.9728E-11	28.24	56.48	0.00E+00	1.40E-09	2.81E-09		
Pm-147	4.8502E-02	28.24	56.48	0.00E+00	1.37E+00	2.74E+00		
Pu-238	1.8254E-02	28.24	56.48	0.00E+00	5.16E-01	1.03E+00		
Pu-239	4.2810E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4368E-04	28.24	56.48	0.00E+00	6.68E-03	1.38E-02		
Pu-241	3.3415E-02	28.24	56.48	0.00E+00	9.44E-01	1.89E+00		
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05		
Ra-226	2.2854E-10	28.24	56.48	0.00E+00	6.45E-09	1.29E-08		
Ra-228	1.2426E-14	28.24	56.48	0.00E+00	3.51E-13	7.02E-13		
Ru-106	6.3589E-06	28.24	56.48	0.00E+00	1.80E-04	3.59E-04		
Se-79	1.2933E-05	28.24	56.48	0.00E+00	3.85E-04	7.30E-04		
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04		
Sr-90	1.9248E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02		
Th-229	5.0953E-12	28.24	56.48	0.00E+00	1.44E-10	2.88E-10		
Th-230	4.1885E-06	28.24	56.48	0.00E+00	1.18E-06	2.37E-06		
Th-232	1.9270E-14	28.24	56.48	0.00E+00	5.44E-13	1.09E-12		
Tl-208	4.6024E-08	28.24	56.48	0.00E+00	1.30E-06	2.60E-06		
U-232	1.2582E-07	28.24	56.48	0.00E+00	3.55E-06	7.11E-06	Thermal Power	
U-233	2.5825E-09	28.24	56.48	0.00E+00	7.29E-08	1.46E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8450E-04	28.24	56.48	0.00E+00	5.21E-03	1.04E-02	6.73E-01	1.35E+00
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03	Total	Total
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04		
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	1.9254E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Other Radionuclides					5.46E+01	1.09E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		28.24
Bounding:		56.48

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:	0.05	
Bounding:	0.10	

Estimated EOL HM/ Given EOL HM

1.00

*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
 SNF ID #: 669
 Fuel Units & Descr: 2 - 297 ROD ARRAY
 Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 60 to 100%, U)
 Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116699
 Template Decay Time: 20 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) 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	6.6313E-10	28.22	56.44	0.00E+00	1.87E-08	3.74E-08	Avg. MeV	
Am-241	2.0060E-03	28.22	56.44	0.00E+00	5.66E-02	1.13E-01	0.0150	5.958E+12
Am-242m	4.2429E-07	28.22	56.44	0.00E+00	1.20E-05	2.39E-05	0.0250	1.239E+12
Am-243	1.4899E-08	28.22	56.44	0.00E+00	4.20E-05	8.41E-05	0.0375	1.081E+12
C-14	5.7135E-09	28.22	56.44	0.00E+00	1.61E-07	3.22E-07	0.0575	1.157E+12
Ci-36	1.3124E-32	28.22	56.44	0.00E+00	3.70E-31	7.41E-31	0.0850	6.994E+11
Cm-243	1.6443E-07	28.22	56.44	0.00E+00	4.64E-06	9.28E-06	0.1250	4.733E+11
Cm-244	2.9330E-05	28.22	56.44	0.00E+00	8.28E-04	1.66E-03	0.2250	6.036E+11
Co-60	5.3186E-08	28.22	56.44	0.00E+00	1.50E-04	3.00E-04	0.3750	2.627E+11
Cs-134	3.1563E-03	28.22	56.44	0.00E+00	8.91E-02	1.78E-01	0.5750	4.285E+12
Cs-135	3.4477E-06	28.22	56.44	0.00E+00	9.73E-05	1.95E-04	0.8500	7.245E+10
Cs-137	2.0313E+00	28.22	56.44	0.00E+00	5.73E+01	1.15E+02	1.2500	4.137E+10
Eu-154	2.4513E-02	28.22	56.44	0.00E+00	6.92E-01	1.38E+00	1.7500	1.899E+09
Eu-155	4.8175E-03	28.22	56.44	0.00E+00	1.36E-01	2.72E-01	2.2500	1.666E+05
Fe-55	1.2397E-04	28.22	56.44	0.00E+00	3.50E-03	7.00E-03	2.7500	9.416E+04
H-3	4.5697E-03	28.22	56.44	0.00E+00	1.29E-01	2.58E-01	3.5000	4.329E+02
I-129	7.5300E-07	28.22	56.44	0.00E+00	2.13E-05	4.25E-05	5.0000	2.459E+01
Kr-85	1.0850E-01	28.22	56.44	0.00E+00	3.06E+00	6.12E+00	7.0000	2.715E+00
Np-237	9.5561E-08	28.22	56.44	0.00E+00	2.70E-04	5.39E-04	11.0000	3.043E-01
Pa-231	2.0359E-09	28.22	56.44	0.00E+00	5.75E-08	1.15E-07		
Pb-210	4.9728E-11	28.22	56.44	0.00E+00	1.40E-09	2.81E-09		
Pm-147	4.8502E-02	28.22	56.44	0.00E+00	1.37E+00	2.74E+00		
Pu-238	1.8254E-02	28.22	56.44	0.00E+00	5.15E-01	1.03E+00		
Pu-239	4.2810E-04	28.22	56.44	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4368E-04	28.22	56.44	0.00E+00	6.88E-03	1.38E-02		
Pu-241	3.3415E-02	28.22	56.44	0.00E+00	9.43E-01	1.89E+00		
Pu-242	3.6329E-07	28.22	56.44	0.00E+00	1.03E-05	2.05E-05		
Ra-226	2.2854E-10	28.22	56.44	0.00E+00	6.45E-09	1.29E-08		
Ra-228	1.2426E-14	28.22	56.44	0.00E+00	3.51E-13	7.01E-13		
Ru-106	6.3589E-06	28.22	56.44	0.00E+00	1.79E-04	3.59E-04		
Se-79	1.2933E-05	28.22	56.44	0.00E+00	3.65E-04	7.30E-04		
Sn-126	1.1574E-05	28.22	56.44	0.00E+00	3.27E-04	6.53E-04		
Sr-90	1.9248E+00	28.22	56.44	0.00E+00	5.43E+01	1.09E+02		
Tc-99	4.2239E-04	28.22	56.44	0.00E+00	1.19E-02	2.38E-02		
Th-229	5.0953E-12	28.22	56.44	0.00E+00	1.44E-10	2.88E-10		
Th-230	4.1885E-08	28.22	56.44	0.00E+00	1.18E-06	2.36E-06		
Th-232	1.9270E-14	28.22	56.44	0.00E+00	5.44E-13	1.09E-12		
Ti-208	4.8024E-08	28.22	56.44	0.00E+00	1.30E-06	2.60E-06		
U-232	1.2582E-07	28.22	56.44	0.00E+00	3.55E-06	7.10E-06		
U-233	2.5825E-09	28.22	56.44	0.00E+00	7.29E-08	1.46E-07		
U-234	1.8450E-04	28.22	56.44	0.00E+00	5.21E-03	1.04E-02		
U-235	-2.7235E-06	28.22	0.00	3.57E-03	3.49E-03	3.57E-03		
U-236	1.5493E-05	28.22	56.44	0.00E+00	4.37E-04	8.74E-04		
U-238	-4.2851E-09	28.22	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	1.9254E+00	28.22	56.44	0.00E+00	5.43E+01	1.09E+02		
Other Radionuclides					5.46E+01	1.09E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.11512415	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		28.22	
Bounding:		56.44	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.05		
Bounding:	0.10		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

L. Fuel and Template Information

Fuel decay start date:	2010
Estimates as of:	2030
Template:	ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup(MWD):	367.2
Heavy Metal Mass (MT):	0.00116689
Template Decay Time:	20 years

Estimated
Canister usage:
18"x10"
0.08

II. Estimates

II. Estimates	x_1	x_2	x_3	b	y_1	y_2	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08	Avg. MeV	
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01	0.0150	5.962E+12
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05	0.0250	1.240E+12
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05	0.0375	1.061E+12
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07	0.0575	1.158E+12
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31	0.0850	6.999E+11
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06	0.1250	4.736E+11
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03	0.2250	6.040E+11
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04	0.3750	2.629E+11
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01	0.5750	4.288E+12
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04	0.8500	7.250E+10
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02	1.2500	4.140E+10
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00	1.7500	1.900E+09
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01	2.2500	1.667E+05
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03	2.7500	9.422E+04
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01	3.5000	4.332E+02
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05	5.0000	2.461E+01
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00	7.0000	2.717E+00
Np-237	9.5561E-06	28.24	56.48	0.00E+00	2.70E-04	5.40E-04	11.0000	3.045E-01
Pb-231	2.0359E-09	28.24	56.48	0.00E+00	5.75E-08	1.15E-07		
Pb-210	4.9728E-11	28.24	56.48	0.00E+00	1.40E-09	2.81E-09		
Pm-147	4.8502E-02	28.24	56.48	0.00E+00	1.37E+00	2.74E+00		
Pu-238	1.8254E-02	28.24	56.48	0.00E+00	5.16E-01	1.03E+00		
Pu-239	4.2810E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4368E-04	28.24	56.48	0.00E+00	6.88E-03	1.38E-02		
Pu-241	3.3415E-02	28.24	56.48	0.00E+00	9.44E-01	1.89E+00		
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05		
Ra-226	2.2854E-10	28.24	56.48	0.00E+00	6.45E-09	1.29E-08		
Ra-228	1.2426E-14	28.24	56.48	0.00E+00	3.51E-13	7.02E-13		
Ru-106	6.3589E-06	28.24	56.48	0.00E+00	1.80E-04	3.59E-04		
Se-79	1.2933E-05	28.24	56.48	0.00E+00	3.65E-04	7.30E-04		
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04		
Sr-90	1.9248E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02		
Th-229	5.0953E-12	28.24	56.48	0.00E+00	1.44E-10	2.88E-10		
Th-230	4.1885E-08	28.24	56.48	0.00E+00	1.18E-06	2.37E-06		
Th-232	1.9270E-14	28.24	56.48	0.00E+00	6.44E-13	1.09E-12		
Th-208	4.6024E-08	28.24	56.48	0.00E+00	1.30E-06	2.60E-06		
U-232	1.2582E-07	28.24	56.48	0.00E+00	3.55E-06	7.11E-06		
U-233	2.5825E-09	28.24	56.48	0.00E+00	7.29E-08	1.46E-07		
U-234	1.8450E-04	28.24	56.48	0.00E+00	5.21E-03	1.04E-02		
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03		
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04		
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	1.9254E+00	28.24	56.48	0.00E+00	5.44E+01	1.09E+02		
Other Radionuclides					5.46E+01	1.09E+02		
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							8.73E-01	1.35E+00
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.11512415	60 to 100	

Burnup Summary (MWd) ^a		Basis for burnup used in estimate:
	From SFD	Estimated
Nominal:		26.24
Bounding:		56.48
		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:	0.05	
Bounding:	0.10	
		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: FRR TARGET ARGENTINA
SNF ID #: 297
Fuel Units & Descr: 48 - PARTICULATE
Heavy Metal Mass: BOL=3.97kg; EOL=3.97kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012682
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
1.33

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	8.0233E-09	75.00	149.99	0.00E+00	6.02E-07	1.20E-06	0.0150
Am-241	8.8502E-05	75.00	149.99	0.00E+00	6.64E-03	1.33E-02	0.0250
Am-242m	9.1098E-09	75.00	149.99	0.00E+00	6.83E-07	1.37E-06	0.0375
Am-243	9.8652E-10	75.00	149.99	0.00E+00	7.40E-08	1.48E-07	0.0675
C-14	2.3062E-04	75.00	149.99	0.00E+00	1.73E-02	3.46E-02	0.0850
Cl-36	1.2261E-06	75.00	149.99	0.00E+00	9.20E-05	1.84E-04	0.1250
Cm-243	3.5824E-10	75.00	149.99	0.00E+00	2.69E-08	5.37E-08	0.2250
Cm-244	4.1131E-09	75.00	149.99	0.00E+00	3.08E-07	6.17E-07	0.3750
Co-60	5.0882E-01	75.00	149.99	0.00E+00	3.82E+01	7.63E+01	0.5750
Ca-134	4.6705E-04	75.00	149.99	0.00E+00	3.50E-02	7.01E-02	0.8500
Ca-135	3.0316E-05	75.00	149.99	0.00E+00	2.27E-03	4.55E-03	1.2500
Ca-137	2.0618E+00	75.00	149.99	0.00E+00	1.54E+02	3.08E+02	1.7500
Eu-154	2.2413E-03	75.00	149.99	0.00E+00	1.68E-01	3.36E-01	2.2500
Eu-155	5.6772E-03	75.00	149.99	0.00E+00	4.26E-01	8.52E-01	2.7500
Fe-55	6.6988E-02	75.00	149.99	0.00E+00	5.02E+00	1.00E+01	3.5000
H-3	5.8303E-03	75.00	149.99	0.00E+00	4.37E-01	8.75E-01	5.0000
I-129	7.3195E-07	75.00	149.99	0.00E+00	5.49E-05	1.10E-04	7.0000
Kr-85	1.0880E-01	75.00	149.99	0.00E+00	8.16E+00	1.63E+01	11.0000
Np-237	1.1481E-06	75.00	149.99	0.00E+00	8.61E-05	1.72E-04	
Pa-231	2.3844E-08	75.00	149.99	0.00E+00	1.79E-06	3.58E-06	
Pb-210	9.6339E-14	75.00	149.99	0.00E+00	7.23E-12	1.45E-11	
Pm-147	6.1148E-02	75.00	149.99	0.00E+00	4.59E+00	9.17E+00	
Pu-238	3.3228E-04	75.00	149.99	0.00E+00	2.49E-02	4.98E-02	
Pu-239	6.6805E-04	75.00	149.99	0.00E+00	5.01E-02	1.00E-01	
Pu-240	8.6972E-05	75.00	149.99	0.00E+00	6.52E-03	1.30E-02	
Pu-241	1.4714E-03	75.00	149.99	0.00E+00	1.10E-01	2.21E-01	
Pu-242	1.9717E-09	75.00	149.99	0.00E+00	1.48E-07	2.96E-07	
Ra-226	4.4093E-13	75.00	149.99	0.00E+00	3.31E-11	6.61E-11	
Ra-228	7.8419E-12	75.00	149.99	0.00E+00	5.88E-10	1.18E-09	
Ru-106	5.5175E-06	75.00	149.99	0.00E+00	4.14E-04	8.28E-04	
Se-79	1.3226E-05	75.00	149.99	0.00E+00	9.92E-04	1.98E-03	
Sn-126	1.1493E-05	75.00	149.99	0.00E+00	8.62E-04	1.72E-03	
Sr-90	1.9501E+00	75.00	149.99	0.00E+00	1.46E+02	2.93E+02	
Tc-99	4.6656E-04	75.00	149.99	0.00E+00	3.50E-02	7.00E-02	
Th-229	7.2080E-12	75.00	149.99	0.00E+00	5.41E-10	1.08E-09	
Th-230	8.1248E-11	75.00	149.99	0.00E+00	6.09E-09	1.22E-08	
Th-232	8.3161E-12	75.00	149.99	0.00E+00	6.24E-10	1.25E-09	
Th-208	2.5008E-08	75.00	149.99	0.00E+00	1.88E-06	3.75E-06	
U-232	6.7754E-08	75.00	149.99	0.00E+00	5.08E-06	1.02E-05	
U-233	3.0582E-09	75.00	149.99	0.00E+00	2.29E-07	4.59E-07	
U-234	3.6722E-07	75.00	149.99	0.00E+00	2.75E-05	5.51E-05	
U-235	-2.7761E-06	75.00	0.00	4.15E-03	3.94E-03	4.15E-03	
U-236	1.6190E-05	75.00	149.99	0.00E+00	1.21E-03	2.43E-03	
U-238	-2.8547E-09	75.00	0.00	6.89E-04	6.89E-04	6.89E-04	
Y-90	1.9501E+00	75.00	149.99	0.00E+00	1.46E+02	2.93E+02	
Other Radionuclides					1.69E+02	3.38E+02	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	This Template was used for the following reasons: This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).
Fuel Claddings:	NONE	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	48.34531901	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.
Nominal:		75.00	
Bounding:		149.99	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	0.99
Nominal:	0.40		
Bounding:	0.81		

^a Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^a Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET CANADA

SNF ID #: 671

Fuel Units & Descr: 5952 - PARTICULATE

Heavy Metal Mass: BOL=492.23kg; EOL=492.23kg

ROD Storage Site: SRS

*Fuel decay start date: 2010

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: 20 years

Estimated

Canister usage:

18"x10"

165.33

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0233E-09	9,299.68	18,599.37	0.00E+00	7.46E-05	1.49E-04	Avg. MeV	
Am-241	8.8502E-05	9,299.68	18,599.37	0.00E+00	8.23E-01	1.65E+00	0.0150	2.003E+15
Am-242m	9.1098E-09	9,299.68	18,599.37	0.00E+00	8.47E-05	1.69E-04	0.0250	4.162E+14
Am-243	9.8652E-10	9,299.68	18,599.37	0.00E+00	9.17E-06	1.83E-05	0.0375	3.587E+14
C-14	2.3062E-04	9,299.68	18,599.37	0.00E+00	2.14E+00	4.29E+00	0.0675	3.868E+14
Ci-36	1.2261E-06	9,299.68	18,599.37	0.00E+00	1.14E-02	2.28E-02	0.0650	2.942E+14
Cm-243	3.5824E-10	9,299.68	18,599.37	0.00E+00	3.33E-06	6.66E-06	0.1250	1.521E+14
Cm-244	4.1131E-09	9,299.68	18,599.37	0.00E+00	3.83E-05	7.65E-05	0.2250	2.002E+14
Co-60	5.0882E-01	9,299.68	18,599.37	0.00E+00	4.73E+03	9.46E+03	0.3750	8.780E+13
Cs-134	4.6705E-04	9,299.68	18,599.37	0.00E+00	4.34E+00	8.69E+00	0.5750	1.422E+15
Cs-135	3.0316E-05	9,299.68	18,599.37	0.00E+00	2.82E-01	5.64E-01	0.8500	1.530E+13
Cs-137	2.0516E+00	9,299.68	18,599.37	0.00E+00	1.91E+04	3.82E+04	1.2500	7.060E+14
Eu-154	2.2413E-03	9,299.68	18,599.37	0.00E+00	2.06E+01	4.17E+01	1.7500	3.882E+11
Eu-155	5.6772E-03	9,299.68	18,599.37	0.00E+00	5.28E+01	1.06E+02	2.2500	3.765E+09
Fe-55	6.8988E-02	9,299.68	18,599.37	0.00E+00	6.23E+02	1.25E+03	2.7500	2.864E+07
H-3	5.8303E-03	9,299.68	18,599.37	0.00E+00	6.42E+01	1.08E+02	3.5000	1.083E+05
I-129	7.3195E-07	9,299.68	18,599.37	0.00E+00	6.81E-03	1.36E-02	5.0000	6.634E+02
Kr-85	1.0880E-01	9,299.68	18,599.37	0.00E+00	1.01E+03	2.02E+03	7.0000	7.416E+01
Np-237	1.1481E-06	9,299.68	18,599.37	0.00E+00	1.07E-02	2.14E-02	11.0000	8.384E+00
Pa-231	2.3844E-08	9,299.68	18,599.37	0.00E+00	2.22E-04	4.43E-04		
Pb-210	9.6339E-14	9,299.68	18,599.37	0.00E+00	8.96E-10	1.79E-09		
Pm-147	6.1148E-02	9,299.68	18,599.37	0.00E+00	5.69E+02	1.14E+03		
Pu-238	3.3228E-04	9,299.68	18,599.37	0.00E+00	3.09E+00	6.18E+00		
Pu-239	6.8805E-04	9,299.68	18,599.37	0.00E+00	6.21E+00	1.24E+01		
Pu-240	8.6972E-05	9,299.68	18,599.37	0.00E+00	8.09E-01	1.62E+00		
Pu-241	1.4714E-03	9,299.68	18,599.37	0.00E+00	1.37E+01	2.74E+01		
Pu-242	1.9717E-09	9,299.68	18,599.37	0.00E+00	1.83E-05	3.67E-05		
Ra-226	4.4093E-13	9,299.68	18,599.37	0.00E+00	4.10E-09	8.20E-09		
Ra-228	7.8419E-12	9,299.68	18,599.37	0.00E+00	7.29E-08	1.46E-07		
Ru-106	5.5175E-06	9,299.68	18,599.37	0.00E+00	5.13E-02	1.03E-01		
Se-79	1.3226E-05	9,299.68	18,599.37	0.00E+00	1.23E-01	2.46E-01		
Sn-126	1.1493E-05	9,299.68	18,599.37	0.00E+00	1.07E-01	2.14E-01		
Sr-90	1.9501E+00	9,299.68	18,599.37	0.00E+00	1.81E+04	3.63E+04		
Tc-99	4.8656E-04	9,299.68	18,599.37	0.00E+00	4.34E+00	8.68E+00		
Th-229	7.2080E-12	9,299.68	18,599.37	0.00E+00	6.70E-08	1.34E-07		
Th-230	8.1248E-11	9,299.68	18,599.37	0.00E+00	7.56E-07	1.51E-06		
Th-232	8.3161E-12	9,299.68	18,599.37	0.00E+00	7.73E-08	1.55E-07		
Th-208	2.5006E-08	9,299.68	18,599.37	0.00E+00	2.33E-04	4.65E-04		
U-232	6.7754E-08	9,299.68	18,599.37	0.00E+00	6.30E-04	1.26E-03		
U-233	3.0582E-09	9,299.68	18,599.37	0.00E+00	2.84E-05	5.69E-05	Thermal Power	
U-234	3.6722E-07	9,299.68	18,599.37	0.00E+00	3.42E-03	6.83E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7761E-06	9,299.68	0.00	5.14E-01	4.88E-01	5.14E-01	2.91E+02	5.62E+02
U-236	1.6190E-05	9,299.68	18,599.37	0.00E+00	1.51E-01	3.01E-01	Total	Total
U-238	-2.8547E-09	9,299.68	0.00	8.55E-02	8.54E-02	8.55E-02		
Y-90	1.9501E+00	9,299.68	18,599.37	0.00E+00	1.81E+04	3.63E+04		
Other Radionuclides					2.10E+04	4.19E+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: This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).
Fuel Cladding:	NONE	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	48.34531901	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		9,299.68	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		18,599.37	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.40		0.96
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: FRR TARGET NDOXESA
SNF ID #: 672
Fuel Units: 6 Direct, 48 - PARTICULATE
Heavy Metal Mass: BOL=3.97kg EOL=3.97kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimate as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
Template BOL Heavy Metal Mass (MT): 6.01
Template Decay Time: 0.00012882
20 years

Estimated
Canister usage:
18 "110"
1.33

Radionuclide	C/NAND From Template	Nominal Fuel Burnup (MWd/MT)	Bounding Fuel Burnup (MWd/MT)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photon/sec (bounding)
Ac-227	8.0233E-09	75.00	149.99	0.00E+00	8.02E-07	1.30E-08	Avg. MW	1.61E+13
Am-241	8.8602E-05	75.00	149.99	0.00E+00	6.64E-03	1.33E-02	0.0150	1.61E+13
Am-242m	8.1098E-09	75.00	149.99	0.00E+00	6.83E-07	1.37E-08	0.0250	3.57E+12
Am-243	9.8652E-10	75.00	149.99	0.00E+00	7.40E-09	1.48E-07	0.0375	2.88E+12
C-14	2.3062E-04	75.00	149.99	0.00E+00	1.73E-02	3.48E-02	0.0575	3.12E+12
C-36	1.2261E-06	75.00	149.99	0.00E+00	9.20E-05	1.84E-04	0.0850	1.88E+12
Cm-243	3.5824E-10	75.00	149.99	0.00E+00	2.69E-08	5.37E-08	0.1250	1.227E+12
Cm-244	4.1131E-09	75.00	149.99	0.00E+00	3.08E-07	6.17E-07	0.2250	1.61E+12
Co-60	5.0882E-01	75.00	149.99	0.00E+00	3.82E-01	7.63E-01	0.3750	7.06E+11
Co-134	4.6705E-04	75.00	149.99	0.00E+00	3.50E-02	7.01E-02	0.5750	1.147E+11
Co-136	3.0316E-05	75.00	149.99	0.00E+00	2.27E-03	4.55E-03	0.8500	1.204E+11
Co-137	2.0516E+00	75.00	149.99	0.00E+00	1.54E+02	3.08E+02	1.2500	5.68E+12
Eu-154	2.2413E-03	75.00	149.99	0.00E+00	1.69E-01	3.36E-01	1.7500	3.13E+09
Eu-155	5.6727E-03	75.00	149.99	0.00E+00	4.28E-01	8.52E-01	2.2500	3.03E+07
Fe-55	6.6989E-02	75.00	149.99	0.00E+00	5.02E+00	1.00E+01	2.7500	2.31E+05
H-3	5.8303E-03	75.00	149.99	0.00E+00	4.37E-01	8.75E-01	3.5000	8.73E+02
H-129	7.3195E-07	75.00	149.99	0.00E+00	5.49E-05	1.10E-04	5.0000	5.35E+00
Kr-95	1.0890E-01	75.00	149.99	0.00E+00	8.18E+00	1.63E+01	7.0000	5.98E-01
Np-237	1.1481E-06	75.00	149.99	0.00E+00	8.81E-05	1.72E-04	11.0000	8.78E-02
Pa-231	2.3844E-06	75.00	149.99	0.00E+00	1.79E-06	3.58E-06		
Pb-210	9.6539E-14	75.00	149.99	0.00E+00	7.23E-12	1.45E-11		
Pm-147	8.1148E-02	75.00	149.99	0.00E+00	4.59E+00	9.17E+00		
Pu-238	3.3222E-04	75.00	149.99	0.00E+00	2.49E-02	4.98E-02		
Pu-239	6.6805E-04	75.00	149.99	0.00E+00	5.01E-02	1.00E-01		
Pu-240	8.6972E-05	75.00	149.99	0.00E+00	6.52E-03	1.30E-02		
Pu-241	1.4714E-03	75.00	149.99	0.00E+00	1.10E-01	2.21E-01		
Pu-242	1.9717E-09	75.00	149.99	0.00E+00	1.48E-07	2.96E-07		
Ra-226	4.4083E-13	75.00	149.99	0.00E+00	3.31E-11	6.61E-11		
Ra-228	7.8419E-12	75.00	149.99	0.00E+00	5.88E-10	1.18E-09		
Ru-106	5.5175E-05	75.00	149.99	0.00E+00	4.14E-04	8.28E-04		
Sr-79	1.3226E-05	75.00	149.99	0.00E+00	9.92E-04	1.98E-03		
Sr-126	1.1483E-05	75.00	149.99	0.00E+00	8.62E-04	1.72E-03		
Sr-90	1.9501E+00	75.00	149.99	0.00E+00	1.48E+02	2.93E+02		
Tc-99	4.6856E-04	75.00	149.99	0.00E+00	3.50E-02	7.00E-02		
Th-228	7.2090E-12	75.00	149.99	0.00E+00	5.41E-10	1.08E-09		
Th-230	8.1248E-11	75.00	149.99	0.00E+00	6.09E-09	1.22E-08		
Th-232	8.3181E-12	75.00	149.99	0.00E+00	6.24E-10	1.25E-09		
Ti-208	2.5008E-06	75.00	149.99	0.00E+00	1.88E-06	3.75E-06		
U-232	8.7754E-06	75.00	149.99	0.00E+00	5.08E-06	1.02E-05		
U-233	3.0582E-09	75.00	149.99	0.00E+00	2.23E-07	4.59E-07		
U-234	3.6722E-07	75.00	149.99	0.00E+00	2.75E-05	5.51E-05		
U-235	-2.7761E-06	75.00	0.00	4.15E-03	3.94E-03	4.15E-03		
U-236	1.6190E-05	75.00	149.99	0.00E+00	1.21E-03	2.43E-03		
U-238	-2.8547E-09	75.00	0.00	6.89E-04	8.89E-04	8.89E-04		
U-90	1.9501E+00	75.00	149.99	0.00E+00	1.48E+02	2.93E+02		
Other Radionuclides					1.69E+02	3.38E+02		
Thermal Power								
Nominal Heat Output (Watts)								
Bounding Heat Output (Watts)								
Total								

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used	Notes for Parameter Differences:
Reactor Moderator: LIGHT WATER	Used	The template was used for the following reasons:
Fuel Cladding: NONE	SST	This fuel matches Pathfinder Template except enrichment and cladding (but excluding Stainless BOL H/M Constituents)
BOL H/M Constituents: U	U	See a good conservative assumption.
BOL Enrichment %: 48.34531901	60 to 100	

Burnup Summary (MWd/MT)

From SFD	Estimated	Notes for Burnup used in estimates:
Nominal: 75.00	75.00	Nominal burnup assumed to be 5% of BOL heavy metal mass.
Bounding: 149.99	149.99	Bounding burnup assumed to be twice nominal burnup.

Checks

Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL H/M/Given EOL H/M
Bounding:	0.40	0.58	0.58
	0.91		

*Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.
*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (JSS2 LEU) DENMARK
 SNF ID #: 298
 Fuel Units & Descr: 184 - ASSEMBLY
 Heavy Metal Mass: BOL=165.6kg; EOL=142.618kg
 ROD Storage Site: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 16"x10"
 5.11

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	8.5333E-10	21,843.20	43,686.40	0.00E+00	1.86E-05	3.73E-05	Avg. MeV	
Am-241	2.2753E-02	21,843.20	43,686.40	0.00E+00	4.97E+02	9.94E+02	0.0150	4.427E+15
Am-242m	8.9133E-06	21,843.20	43,686.40	0.00E+00	1.95E-01	3.89E-01	0.0250	9.196E+14
Am-243	6.4007E-06	21,843.20	43,686.40	0.00E+00	1.40E-01	2.80E-01	0.0375	8.077E+14
C-14	2.9620E-08	21,843.20	43,686.40	0.00E+00	6.47E-04	1.29E-03	0.0575	8.702E+14
Ci-36	5.9513E-35	21,843.20	43,686.40	0.00E+00	1.30E-30	2.60E-30	0.0850	5.180E+14
Cm-243	2.2087E-06	21,843.20	43,686.40	0.00E+00	4.82E-02	9.65E-02	0.1250	3.488E+14
Cm-244	1.1007E-04	21,843.20	43,686.40	0.00E+00	2.40E+00	4.81E+00	0.2250	4.464E+14
Co-60	1.6340E-05	21,843.20	43,686.40	0.00E+00	3.57E-01	7.14E-01	0.3750	1.943E+14
Cs-134	2.1353E-03	21,843.20	43,686.40	0.00E+00	4.66E+01	9.33E+01	0.5750	3.298E+15
Cs-135	4.8607E-06	21,843.20	43,686.40	0.00E+00	1.06E-01	2.12E-01	0.8500	5.037E+13
Cs-137	2.0227E+00	21,843.20	43,686.40	0.00E+00	4.42E+04	8.84E+04	1.2500	2.838E+13
Eu-154	2.0887E-02	21,843.20	43,686.40	0.00E+00	4.56E+02	9.12E+02	1.7500	1.340E+12
Eu-155	4.0867E-03	21,843.20	43,686.40	0.00E+00	8.93E+01	1.79E+02	2.2500	1.258E+08
Fe-55	1.4167E-03	21,843.20	43,686.40	0.00E+00	3.09E+01	6.19E+01	2.7500	1.487E+07
H-3	4.8653E-03	21,843.20	43,686.40	0.00E+00	1.02E+02	2.04E+02	3.5000	6.022E+06
I-129	7.1600E-07	21,843.20	43,686.40	0.00E+00	1.56E-02	3.13E-02	5.0000	9.146E+04
Kr-85	1.0240E-01	21,843.20	43,686.40	0.00E+00	2.24E+03	4.47E+03	7.0000	1.035E+04
Np-237	3.7227E-06	21,843.20	43,686.40	0.00E+00	8.13E-02	1.63E-01	11.0000	1.178E+03
Pa-231	2.6727E-09	21,843.20	43,686.40	0.00E+00	5.84E-05	1.17E-04		
Pb-210	4.3313E-14	21,843.20	43,686.40	0.00E+00	9.46E-10	1.89E-09		
Pm-147	4.6307E-02	21,843.20	43,686.40	0.00E+00	1.01E+03	2.02E+03		
Pu-238	5.5273E-03	21,843.20	43,686.40	0.00E+00	1.21E+02	2.41E+02		
Pu-239	1.0313E-02	21,843.20	43,686.40	0.00E+00	2.25E+02	4.51E+02		
Pu-240	5.4180E-03	21,843.20	43,686.40	0.00E+00	1.18E+02	2.37E+02		
Pu-241	3.7573E-01	21,843.20	43,686.40	0.00E+00	8.21E+03	1.64E+04		
Pu-242	3.0713E-06	21,843.20	43,686.40	0.00E+00	6.71E-02	1.34E-01		
Ra-226	2.3807E-13	21,843.20	43,686.40	0.00E+00	5.20E-09	1.04E-08		
Ra-228	1.0607E-14	21,843.20	43,686.40	0.00E+00	2.32E-10	4.63E-10		
Ru-106	8.4800E-06	21,843.20	43,686.40	0.00E+00	1.85E-01	3.70E-01		
Se-79	1.2533E-05	21,843.20	43,686.40	0.00E+00	2.74E-01	5.48E-01		
Sn-126	1.1393E-05	21,843.20	43,686.40	0.00E+00	2.49E-01	4.98E-01		
Sr-90	1.8400E+00	21,843.20	43,686.40	0.00E+00	4.02E+04	8.04E+04		
Tc-99	4.3533E-04	21,843.20	43,686.40	0.00E+00	9.51E+00	1.90E+01		
Th-229	5.8947E-13	21,843.20	43,686.40	0.00E+00	1.29E-08	2.58E-08		
Th-230	5.9500E-11	21,843.20	43,686.40	0.00E+00	1.30E-06	2.60E-06		
Th-232	1.8360E-14	21,843.20	43,686.40	0.00E+00	3.57E-10	7.15E-10		
Ti-208	7.6000E-09	21,843.20	43,686.40	0.00E+00	1.66E-04	3.32E-04		
U-232	2.0747E-08	21,843.20	43,686.40	0.00E+00	4.53E-04	9.06E-04		
U-233	4.4013E-10	21,843.20	43,686.40	0.00E+00	9.61E-06	1.92E-05		
U-234	4.6500E-07	21,843.20	43,686.40	0.00E+00	1.02E-02	2.03E-02		
U-235	2.5335E-06	21,843.20	0.00	7.16E-02	1.62E-02	7.16E-02		
U-236	1.3000E-05	21,843.20	43,686.40	0.00E+00	2.84E-01	5.68E-01		
U-238	-1.4207E-08	21,843.20	0.00	4.45E-02	4.42E-02	4.45E-02		
Y-90	1.8400E+00	21,843.20	43,686.40	0.00E+00	4.02E+04	8.04E+04		
Other Radionuclides					4.20E+04	8.39E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		
	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20
Basis for Parameter Differences:		
Burnup Summary (MWd) ²		
	From SFD	Estimated
Nominal:		21,843.20
Bounding:		43,686.40
Basis for burnup used in estimate:		
Nominal burnup calculated from the heavy metal mass destroyed.		
Bounding burnup assumed to be twice nominal burnup.		
Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.01	
Bounding:	6.02	
		Estimated EOL HM/Given EOL HM
		1.04

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 673
Fuel Units & Descr: 135 - ASSEMBLY
Heavy Metal Mass: BOL=121.5kg; EOL=109.35kg
ROO Storage Site: SRS

Fuel decay start date: 2010
Estimate 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: 20 years

Estimated
Canister usage:
18"x10"
3.75

II. Estimates	m	X ₀	X _b	b	Y ₀	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5333E-10	11,548.15	23,096.29	0.00E+00	9.85E-06	1.97E-05	Avg. MeV	
Am-241	2.2753E-02	11,548.15	23,096.29	0.00E+00	2.63E+02	5.26E+02	0.0150	2.340E+15
Am-242m	8.9133E-06	11,548.15	23,096.29	0.00E+00	1.03E-01	2.06E-01	0.0250	4.882E+14
Am-243	6.4007E-06	11,548.15	23,096.29	0.00E+00	7.39E-02	1.48E-01	0.0375	4.270E+14
C-14	2.9620E-08	11,548.15	23,096.29	0.00E+00	3.42E-04	6.84E-04	0.0675	4.601E+14
Cl-36	5.9513E-35	11,548.15	23,096.29	0.00E+00	6.87E-31	1.37E-30	0.0850	2.738E+14
Cm-243	2.2087E-06	11,548.15	23,096.29	0.00E+00	2.55E-02	5.10E-02	0.1250	1.844E+14
Cm-244	1.1007E-04	11,548.15	23,096.29	0.00E+00	1.27E+00	2.54E+00	0.2250	2.360E+14
Co-60	1.6340E-05	11,548.15	23,096.29	0.00E+00	1.89E-01	3.77E-01	0.3750	1.027E+14
Cs-134	2.1353E-03	11,548.15	23,096.29	0.00E+00	2.47E+01	4.93E+01	0.5750	1.742E+15
Cs-136	4.8607E-06	11,548.15	23,096.29	0.00E+00	5.61E-02	1.12E-01	0.8500	2.663E+13
Cs-137	2.0227E+00	11,548.15	23,096.29	0.00E+00	2.34E+04	4.67E+04	1.2500	1.501E+13
Eu-154	2.0887E-02	11,548.15	23,096.29	0.00E+00	2.41E+02	4.82E+02	1.7500	7.082E+11
Eu-155	4.0867E-03	11,548.15	23,096.29	0.00E+00	4.72E+01	9.44E+01	2.2500	6.642E+07
Fe-55	1.4167E-03	11,548.15	23,096.29	0.00E+00	1.64E+01	3.27E+01	2.7500	7.859E+06
H-3	4.6653E-03	11,548.15	23,096.29	0.00E+00	5.39E+01	1.08E+02	3.5000	3.184E+05
I-129	7.1600E-07	11,548.15	23,096.29	0.00E+00	8.27E-03	1.65E-02	5.0000	4.837E+04
Kr-85	1.0240E-01	11,548.15	23,096.29	0.00E+00	1.18E+03	2.37E+03	7.0000	5.473E+03
Np-237	3.7227E-06	11,548.15	23,096.29	0.00E+00	4.30E-02	8.60E-02	11.0000	6.228E+02
Pa-231	2.6727E-09	11,548.15	23,096.29	0.00E+00	3.09E-05	6.17E-05		
Pb-210	4.3313E-14	11,548.15	23,096.29	0.00E+00	5.00E-10	1.00E-09		
Pm-147	4.6307E-02	11,548.15	23,096.29	0.00E+00	5.35E+02	1.07E+03		
Pu-238	5.5273E-03	11,548.15	23,096.29	0.00E+00	6.38E+01	1.28E+02		
Pu-239	1.0313E-02	11,548.15	23,096.29	0.00E+00	1.19E+02	2.38E+02		
Pu-240	5.4180E-03	11,548.15	23,096.29	0.00E+00	6.26E+01	1.25E+02		
Pu-241	3.7573E-01	11,548.15	23,096.29	0.00E+00	4.34E+03	8.68E+03		
Pu-242	3.0713E-06	11,548.15	23,096.29	0.00E+00	3.55E-02	7.09E-02		
Ra-226	2.3807E-13	11,548.15	23,096.29	0.00E+00	2.75E-09	5.50E-09		
Ra-228	1.0607E-14	11,548.15	23,096.29	0.00E+00	1.22E-10	2.45E-10		
Ru-106	8.4800E-06	11,548.15	23,096.29	0.00E+00	9.79E-02	1.96E-01		
Se-79	1.2533E-05	11,548.15	23,096.29	0.00E+00	1.45E-01	2.89E-01		
Sn-126	1.1393E-05	11,548.15	23,096.29	0.00E+00	1.32E-01	2.63E-01		
Sr-90	1.8400E+00	11,548.15	23,096.29	0.00E+00	2.12E+04	4.25E+04		
Tc-99	4.3533E-04	11,548.15	23,096.29	0.00E+00	5.03E+00	1.01E+01		
Th-229	5.8947E-13	11,548.15	23,096.29	0.00E+00	6.81E-09	1.36E-08		
Th-230	5.9500E-11	11,548.15	23,096.29	0.00E+00	6.87E-07	1.37E-06		
Th-232	1.6360E-14	11,548.15	23,096.29	0.00E+00	1.89E-10	3.78E-10		
Th-208	7.6000E-09	11,548.15	23,096.29	0.00E+00	8.78E-05	1.76E-04		
U-232	2.0747E-08	11,548.15	23,096.29	0.00E+00	2.40E-04	4.79E-04		
U-233	4.4013E-10	11,548.15	23,096.29	0.00E+00	5.08E-06	1.02E-05		
U-234	4.6500E-07	11,548.15	23,096.29	0.00E+00	5.37E-03	1.07E-02		
U-235	-2.5335E-06	11,548.15	0.00	5.25E-02	2.33E-02	5.25E-02		
U-236	1.3000E-05	11,548.15	23,096.29	0.00E+00	1.50E-01	3.00E-01		
U-238	-1.4207E-08	11,548.15	0.00	3.27E-02	3.25E-02	3.27E-02		
Y-90	1.8400E+00	11,548.15	23,096.29	0.00E+00	2.12E+04	4.25E+04		
Other Radionuclides					2.22E+04	4.44E+04		

Thermal Power		
Nominal Heat	Bounding	
Output (Watts)	Heat Output (Watts)	
2.76E+02	5.52E+02	
Total	Total	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALLUM	ALLUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		11,548.15	
Bounding:		23,096.29	

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:	2.17		
Bounding:	4.34		

1.02

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (US2 LEU) GERMANY
SNF ID #: 674
Fuel Units & Descr: 18 - ASSEMBLY
Heavy Metal Mass: BOL=18kg; EOL=16.2kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
²Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.50

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5333E-10	1,710.84	3,421.67	0.00E+00	1.46E-06	2.92E-06	Avg. MeV	
Am-241	2.2753E-02	1,710.84	3,421.67	0.00E+00	3.89E+01	7.79E+01	0.0150	3.467E+14
Am-242m	8.9133E-06	1,710.84	3,421.67	0.00E+00	1.52E-02	3.05E-02	0.0250	7.202E+13
Am-243	6.4007E-06	1,710.84	3,421.67	0.00E+00	1.10E-02	2.19E-02	0.0375	6.327E+13
C-14	2.9620E-08	1,710.84	3,421.67	0.00E+00	5.07E-06	1.01E-04	0.0575	6.816E+13
Ci-36	5.9513E-35	1,710.84	3,421.67	0.00E+00	1.02E-31	2.04E-31	0.0850	4.057E+13
Cm-243	2.2087E-06	1,710.84	3,421.67	0.00E+00	3.78E-03	7.56E-03	0.1250	2.732E+13
Cm-244	1.1007E-04	1,710.84	3,421.67	0.00E+00	1.88E-01	3.77E-01	0.2250	3.497E+13
Co-60	1.6340E-05	1,710.84	3,421.67	0.00E+00	2.80E-02	5.59E-02	0.3750	1.522E+13
Cs-134	2.1353E-03	1,710.84	3,421.67	0.00E+00	3.65E+00	7.31E+00	0.5750	2.581E+14
Cs-135	4.8607E-06	1,710.84	3,421.67	0.00E+00	8.32E-03	1.66E-02	0.8500	3.945E+12
Cs-137	2.0227E+00	1,710.84	3,421.67	0.00E+00	3.46E+03	6.92E+03	1.2500	2.223E+12
Eu-154	2.0887E-02	1,710.84	3,421.67	0.00E+00	3.57E+01	7.15E+01	1.7500	1.049E+11
Eu-155	4.0867E-03	1,710.84	3,421.67	0.00E+00	6.99E+00	1.40E+01	2.2500	9.840E+06
Fe-55	1.4167E-03	1,710.84	3,421.67	0.00E+00	2.42E+00	4.85E+00	2.7500	1.164E+06
H-3	4.6653E-03	1,710.84	3,421.67	0.00E+00	7.98E+00	1.60E+01	3.5000	4.717E+04
I-129	7.1600E-07	1,710.84	3,421.67	0.00E+00	1.22E-03	2.45E-03	5.0000	7.166E+03
Kr-85	1.0240E-01	1,710.84	3,421.67	0.00E+00	1.75E+02	3.50E+02	7.0000	8.108E+02
Np-237	3.7227E-06	1,710.84	3,421.67	0.00E+00	6.37E-03	1.27E-02	11.0000	9.227E+01
Pa-231	2.6727E-09	1,710.84	3,421.67	0.00E+00	4.57E-06	9.14E-06		
Pb-210	4.3313E-14	1,710.84	3,421.67	0.00E+00	7.41E-11	1.48E-10		
Pm-147	4.6307E-02	1,710.84	3,421.67	0.00E+00	7.92E+01	1.58E+02		
Pu-238	5.5273E-03	1,710.84	3,421.67	0.00E+00	9.46E+00	1.89E+01		
Pu-239	1.0313E-02	1,710.84	3,421.67	0.00E+00	1.76E+01	3.53E+01		
Pu-240	5.4180E-03	1,710.84	3,421.67	0.00E+00	9.27E+00	1.85E+01		
Pu-241	3.7573E-01	1,710.84	3,421.67	0.00E+00	6.43E+02	1.29E+03		
Pu-242	3.0713E-06	1,710.84	3,421.67	0.00E+00	5.25E-03	1.05E-02		
Ra-226	2.3807E-13	1,710.84	3,421.67	0.00E+00	4.07E-10	8.15E-10		
Ra-228	1.0607E-14	1,710.84	3,421.67	0.00E+00	1.81E-11	3.63E-11		
Ru-106	8.4800E-06	1,710.84	3,421.67	0.00E+00	1.45E-02	2.90E-02		
Se-79	1.2533E-05	1,710.84	3,421.67	0.00E+00	2.14E-02	4.29E-02		
Sn-126	1.1393E-05	1,710.84	3,421.67	0.00E+00	1.95E-02	3.90E-02		
Sr-90	1.8400E+00	1,710.84	3,421.67	0.00E+00	3.15E+03	6.30E+03		
Tc-99	4.3533E-04	1,710.84	3,421.67	0.00E+00	7.45E-01	1.49E+00		
Th-229	5.8947E-13	1,710.84	3,421.67	0.00E+00	1.01E-09	2.02E-09		
Th-230	5.9500E-11	1,710.84	3,421.67	0.00E+00	1.02E-07	2.04E-07		
Th-232	1.6360E-14	1,710.84	3,421.67	0.00E+00	2.80E-11	5.60E-11		
Ti-208	7.6000E-09	1,710.84	3,421.67	0.00E+00	1.30E-05	2.60E-05		
U-232	2.0747E-08	1,710.84	3,421.67	0.00E+00	3.55E-05	7.10E-05		
U-233	4.4013E-10	1,710.84	3,421.67	0.00E+00	7.53E-07	1.51E-06		
U-234	4.6500E-07	1,710.84	3,421.67	0.00E+00	7.96E-04	1.59E-03		
U-235	2.5335E-06	1,710.84	0.00	7.78E-03	3.45E-03	7.78E-03		
U-236	1.3000E-05	1,710.84	3,421.67	0.00E+00	2.22E-02	4.45E-02		
U-238	1.4207E-08	1,710.84	0.00	4.84E-03	4.82E-03	4.84E-03		
Y-90	1.8400E+00	1,710.84	3,421.67	0.00E+00	3.15E+03	6.30E+03		
Other Radionuclides					3.29E+03	6.57E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	10 to 20	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,710.84	
Bounding:		3,421.67	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:	2.17		
Bounding:	4.34		1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
 SNF ID #: 675
 Fuel Units & Descr: 135 - ASSEMBLY
 Heavy Metal Mass: BOL=151.875kg; EOL=136.688kg
 ROD Storage Slic: SRS

Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 3.75

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5333E-10	14,435.18	28,870.37	0.00E+00	1.23E-05	2.46E-05	Avg. MeV	
Am-241	2.2753E-02	14,435.18	28,870.37	0.00E+00	3.28E+02	6.57E+02	0.0150	2.925E+15
Am-242m	8.9133E-06	14,435.18	28,870.37	0.00E+00	1.29E-01	2.57E-01	0.0250	6.077E+14
Am-243	6.4007E-06	14,435.18	28,870.37	0.00E+00	9.24E-02	1.85E-01	0.0375	5.338E+14
C-14	2.9620E-08	14,435.18	28,870.37	0.00E+00	4.28E-04	8.55E-04	0.0575	5.751E+14
Ci-36	5.9513E-35	14,435.18	28,870.37	0.00E+00	8.59E-31	1.72E-30	0.0850	3.423E+14
Cm-243	2.2087E-06	14,435.18	28,870.37	0.00E+00	3.19E-02	6.38E-02	0.1250	2.305E+14
Cm-244	1.1007E-04	14,435.18	28,870.37	0.00E+00	1.59E+00	3.18E+00	0.2250	2.950E+14
Co-60	1.6340E-05	14,435.18	28,870.37	0.00E+00	2.36E-01	4.72E-01	0.3750	1.284E+14
Cs-134	2.1353E-03	14,435.18	28,870.37	0.00E+00	3.08E+01	6.16E+01	0.5750	2.178E+15
Cs-135	4.8607E-06	14,435.18	28,870.37	0.00E+00	7.02E-02	1.40E-01	0.8500	3.329E+13
Cs-137	2.0227E+00	14,435.18	28,870.37	0.00E+00	2.92E+04	5.84E+04	1.2500	1.878E+13
Eu-154	2.0887E-02	14,435.18	28,870.37	0.00E+00	3.02E+02	6.03E+02	1.7500	8.853E+11
Eu-155	4.0867E-03	14,435.18	28,870.37	0.00E+00	5.90E+01	1.18E+02	2.2500	8.303E+07
Fe-55	1.4167E-03	14,435.18	28,870.37	0.00E+00	2.04E+01	4.09E+01	2.7500	9.824E+06
H-3	4.6653E-03	14,435.18	28,870.37	0.00E+00	6.73E+01	1.35E+02	3.5000	3.980E+05
I-129	7.1600E-07	14,435.18	28,870.37	0.00E+00	1.03E-02	2.07E-02	5.0000	6.047E+04
Kr-85	1.0240E-01	14,435.18	28,870.37	0.00E+00	1.48E+03	2.96E+03	7.0000	6.841E+03
Np-237	3.7227E-06	14,435.18	28,870.37	0.00E+00	5.37E-02	1.07E-01	11.0000	7.785E+02
Pa-231	2.6727E-09	14,435.18	28,870.37	0.00E+00	3.86E-05	7.72E-05		
Pb-210	4.3313E-14	14,435.18	28,870.37	0.00E+00	6.25E-10	1.25E-09		
Pm-147	4.6307E-02	14,435.18	28,870.37	0.00E+00	6.68E+02	1.34E+03		
Pu-238	5.5273E-03	14,435.18	28,870.37	0.00E+00	7.98E+01	1.60E+02		
Pu-239	1.0313E-02	14,435.18	28,870.37	0.00E+00	1.49E+02	2.98E+02		
Pu-240	5.4180E-03	14,435.18	28,870.37	0.00E+00	7.82E+01	1.56E+02		
Pu-241	3.7573E-01	14,435.18	28,870.37	0.00E+00	5.42E+03	1.08E+04		
Pu-242	3.0713E-06	14,435.18	28,870.37	0.00E+00	4.43E-02	8.87E-02		
Ra-226	2.3807E-13	14,435.18	28,870.37	0.00E+00	3.44E-09	6.87E-09		
Ra-228	1.0607E-14	14,435.18	28,870.37	0.00E+00	1.53E-10	3.06E-10		
Ru-106	8.4800E-06	14,435.18	28,870.37	0.00E+00	1.22E-01	2.45E-01		
Se-79	1.2533E-05	14,435.18	28,870.37	0.00E+00	1.81E-01	3.62E-01		
Sn-126	1.1393E-05	14,435.18	28,870.37	0.00E+00	1.64E-01	3.29E-01		
Sr-90	1.8400E+00	14,435.18	28,870.37	0.00E+00	2.66E+04	5.31E+04		
Tc-99	4.3533E-04	14,435.18	28,870.37	0.00E+00	6.28E+00	1.26E+01		
Th-229	5.8947E-13	14,435.18	28,870.37	0.00E+00	8.51E-09	1.70E-08		
Th-230	5.9500E-11	14,435.18	28,870.37	0.00E+00	8.59E-07	1.72E-06		
Th-232	1.6360E-14	14,435.18	28,870.37	0.00E+00	2.36E-10	4.72E-10		
Ti-208	7.6000E-09	14,435.18	28,870.37	0.00E+00	1.10E-04	2.19E-04		
U-232	2.0747E-08	14,435.18	28,870.37	0.00E+00	2.99E-04	5.99E-04		
U-233	4.4013E-10	14,435.18	28,870.37	0.00E+00	6.35E-06	1.27E-05		
U-234	4.6500E-07	14,435.18	28,870.37	0.00E+00	8.71E-03	1.34E-02		
U-235	-2.5335E-06	14,435.18	0.00	6.56E-02	2.91E-02	6.56E-02		
U-236	1.3000E-05	14,435.18	28,870.37	0.00E+00	1.88E-01	3.75E-01		
U-238	-1.4207E-08	14,435.18	0.00	4.08E-02	4.06E-02	4.08E-02		
Y-90	1.8400E+00	14,435.18	28,870.37	0.00E+00	2.66E+04	5.31E+04		
Other Radionuclides					2.77E+04	5.55E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	HEAVY WATER	HEAVY WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	20	10 to 20	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		14,435.18	
Bounding:		28,870.37	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	2.17		
Bounding:	4.34		1.02

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX LEU) AUSTRALIA
 SNF ID #: 289
 Fuel Units & Descr: 289 - ASSEMBLY
 Heavy Metal Mass: BOL=289kg; EOL=260.1kg
 ROD Storage Site: SRS

*Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 8.03

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5333E-10	27,468.45	54,936.90	0.00E+00	2.34E-05	4.69E-05	Avg. MeV	
Am-241	2.2753E-02	27,468.45	54,936.90	0.00E+00	6.25E+02	1.25E+03	0.0150	5.566E+15
Am-242m	8.9133E-06	27,468.45	54,936.90	0.00E+00	2.45E-01	4.90E-01	0.0250	1.156E+15
Am-243	6.4007E-06	27,468.45	54,936.90	0.00E+00	1.76E-01	3.52E-01	0.0375	1.016E+15
C-14	2.9620E-08	27,468.45	54,936.90	0.00E+00	8.14E-04	1.63E-03	0.0575	1.094E+15
Cl-36	5.9513E-35	27,468.45	54,936.90	0.00E+00	1.63E-30	3.27E-30	0.0650	6.514E+14
Cm-243	2.2087E-06	27,468.45	54,936.90	0.00E+00	6.07E-02	1.21E-01	0.1250	4.386E+14
Cm-244	1.1007E-04	27,468.45	54,936.90	0.00E+00	3.02E+00	6.05E+00	0.2250	5.614E+14
Co-60	1.6340E-05	27,468.45	54,936.90	0.00E+00	4.49E-01	8.98E-01	0.3750	2.444E+14
Cs-134	2.1353E-03	27,468.45	54,936.90	0.00E+00	5.87E+01	1.17E+02	0.5750	4.144E+15
Cs-135	4.8607E-06	27,468.45	54,936.90	0.00E+00	1.34E-01	2.67E-01	0.8500	8.335E+13
Cs-137	2.0227E+00	27,468.45	54,936.90	0.00E+00	5.56E+04	1.11E+05	1.2500	3.569E+13
Eu-154	2.0887E-02	27,468.45	54,936.90	0.00E+00	5.74E+02	1.15E+03	1.7500	1.685E+12
Eu-155	4.0867E-03	27,468.45	54,936.90	0.00E+00	1.12E+02	2.25E+02	2.2500	1.580E+08
Fe-55	1.4167E-03	27,468.45	54,936.90	0.00E+00	3.89E+01	7.78E+01	2.7500	1.669E+07
H-3	4.6653E-03	27,468.45	54,936.90	0.00E+00	1.28E+02	2.56E+02	3.8000	7.574E+06
I-129	7.1600E-07	27,468.45	54,936.90	0.00E+00	1.97E-02	3.93E-02	5.0000	1.151E+05
Kr-85	1.0240E-01	27,468.45	54,936.90	0.00E+00	2.81E+03	5.63E+03	7.0000	1.302E+04
Np-237	3.7227E-06	27,468.45	54,936.90	0.00E+00	1.02E-01	2.05E-01	11.0000	1.481E+03
Pa-231	2.6727E-09	27,468.45	54,936.90	0.00E+00	7.34E-05	1.47E-04		
Pb-210	4.3313E-14	27,468.45	54,936.90	0.00E+00	1.19E-09	2.38E-09		
Pm-147	4.6307E-02	27,468.45	54,936.90	0.00E+00	1.27E+03	2.54E+03		
Pu-238	5.5273E-03	27,468.45	54,936.90	0.00E+00	1.52E+02	3.04E+02		
Pu-239	1.0313E-02	27,468.45	54,936.90	0.00E+00	2.83E+02	5.67E+02		
Pu-240	5.4180E-03	27,468.45	54,936.90	0.00E+00	1.49E+02	2.98E+02		
Pu-241	3.7573E-01	27,468.45	54,936.90	0.00E+00	1.03E+04	2.06E+04		
Pu-242	3.0713E-06	27,468.45	54,936.90	0.00E+00	8.44E-02	1.69E-01		
Ra-226	2.3807E-13	27,468.45	54,936.90	0.00E+00	6.54E-09	1.31E-08		
Ra-228	1.0507E-14	27,468.45	54,936.90	0.00E+00	2.91E-10	5.83E-10		
Ru-106	8.4800E-06	27,468.45	54,936.90	0.00E+00	2.33E-01	4.66E-01		
Se-79	1.2533E-05	27,468.45	54,936.90	0.00E+00	3.44E-01	6.89E-01		
Sn-126	1.1393E-05	27,468.45	54,936.90	0.00E+00	3.13E-01	6.26E-01		
Sr-90	1.8400E+00	27,468.45	54,936.90	0.00E+00	5.05E+04	1.01E+05		
Tc-99	4.3533E-04	27,468.45	54,936.90	0.00E+00	1.20E+01	2.39E+01		
Th-229	5.8947E-13	27,468.45	54,936.90	0.00E+00	1.62E-08	3.24E-08		
Th-230	5.9500E-11	27,468.45	54,936.90	0.00E+00	1.63E-06	3.27E-06		
Th-232	1.6360E-14	27,468.45	54,936.90	0.00E+00	4.49E-10	8.99E-10		
Ti-208	7.6000E-09	27,468.45	54,936.90	0.00E+00	2.09E-04	4.18E-04		
U-232	2.0747E-08	27,468.45	54,936.90	0.00E+00	5.70E-04	1.14E-03		
U-233	4.4013E-10	27,468.45	54,936.90	0.00E+00	1.21E-05	2.42E-05		
U-234	4.8500E-07	27,468.45	54,936.90	0.00E+00	1.28E-02	2.55E-02		
U-235	2.5335E-06	27,468.45	0.00	1.25E-01	5.53E-02	1.25E-01		
U-236	1.3000E-05	27,468.45	54,936.90	0.00E+00	3.57E-01	7.14E-01		
U-238	-1.4207E-08	27,468.45	0.00	7.77E-02	7.73E-02	7.77E-02		
Y-90	1.8400E+00	27,468.45	54,936.90	0.00E+00	5.05E+04	1.01E+05		
Other Radionuclides					5.28E+04	1.06E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.0000003	10 to 20

Basis for Parameter Differences:
 This Template was used for the following reasons:
 This fuel matches on all parameters.

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		27,468.45
Bounding:		54,936.90

Basis for burnup used in estimate:
 Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.17	
Bounding:	4.34	

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) AUSTRALIA
SNF ID #: 300
Fuel Units & Descr: 266 - ASSEMBLY
Heavy Metal Mass: BOL=38.251kg; EOL=22.025kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
7.39

II. Estimates	m	x ₀	x ₀	b	y ₀	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	3.1355E-10	14,945.82	29,891.64	0.00E+00	4.69E-06	9.37E-06	Avg. MeV	
Am-241	8.0194E-03	14,945.82	29,891.64	0.00E+00	1.20E+02	2.40E+02	0.0150	3.160E+15
Am-242m	1.3694E-06	14,945.82	29,891.64	0.00E+00	2.05E-02	4.09E-02	0.0250	6.514E+14
Am-243	3.7096E-05	14,945.82	29,891.64	0.00E+00	5.54E-01	1.11E+00	0.0375	5.787E+14
C-14	2.6464E-08	14,945.82	29,891.64	0.00E+00	3.96E-04	7.91E-04	0.0575	6.128E+14
Cl-36	4.4441E-31	14,945.82	29,891.64	0.00E+00	6.64E-27	1.33E-26	0.0850	3.709E+14
Cm-243	5.7029E-06	14,945.82	29,891.64	0.00E+00	8.52E-02	1.70E-01	0.1250	2.627E+14
Cm-244	4.6555E-03	14,945.82	29,891.64	0.00E+00	6.96E+01	1.39E+02	0.2250	3.192E+14
Co-60	4.8663E-05	14,945.82	29,891.64	0.00E+00	7.27E-01	1.45E+00	0.3750	1.382E+14
Cs-134	1.0638E-02	14,945.82	29,891.64	0.00E+00	1.59E+02	3.18E+02	0.5750	2.287E+15
Cs-135	4.2564E-06	14,945.82	29,891.64	0.00E+00	6.36E-02	1.27E-01	0.8500	5.989E+13
Cs-137	2.0358E+00	14,945.82	29,891.64	0.00E+00	3.04E+04	6.09E+04	1.2500	3.840E+13
Eu-154	5.1966E-02	14,945.82	29,891.64	0.00E+00	7.77E+02	1.55E+03	1.7500	1.480E+12
Eu-155	1.4295E-02	14,945.82	29,891.64	0.00E+00	2.14E+02	4.27E+02	2.2500	9.461E+07
Fe-55	1.3580E-03	14,945.82	29,891.64	0.00E+00	2.03E+01	4.05E+01	2.7500	5.536E+07
H-3	4.6258E-03	14,945.82	29,891.64	0.00E+00	6.91E+01	1.38E+02	3.5000	2.339E+06
I-129	6.6403E-07	14,945.82	29,891.64	0.00E+00	9.92E-03	1.98E-02	5.0000	8.993E+05
Kr-85	1.0808E-01	14,945.82	29,891.64	0.00E+00	1.62E+03	3.23E+03	7.0000	1.032E+06
Np-237	3.1537E-05	14,945.82	29,891.64	0.00E+00	4.71E-01	9.43E-01	11.0000	1.183E+04
Pa-231	9.7023E-10	14,945.82	29,891.64	0.00E+00	1.45E-05	2.90E-05		
Pb-210	1.1731E-11	14,945.82	29,891.64	0.00E+00	1.75E-07	3.51E-07		
Pm-147	2.4405E-02	14,945.82	29,891.64	0.00E+00	3.65E+02	7.29E+02		
Pu-238	1.5358E-01	14,945.82	29,891.64	0.00E+00	2.30E+03	4.59E+03		
Pu-239	6.9502E-04	14,945.82	29,891.64	0.00E+00	1.04E+01	2.08E+01		
Pu-240	3.7631E-04	14,945.82	29,891.64	0.00E+00	5.62E+00	1.12E+01		
Pu-241	1.3433E-01	14,945.82	29,891.64	0.00E+00	2.01E+03	4.02E+03		
Pu-242	3.0911E-06	14,945.82	29,891.64	0.00E+00	4.62E-02	9.24E-02		
Ra-226	5.5079E-11	14,945.82	29,891.64	0.00E+00	8.23E-07	1.65E-06		
Ra-228	1.3335E-14	14,945.82	29,891.64	0.00E+00	1.99E-10	3.99E-10		
Ru-106	7.3390E-06	14,945.82	29,891.64	0.00E+00	1.10E-01	2.19E-01		
Se-79	1.2339E-05	14,945.82	29,891.64	0.00E+00	1.84E-01	3.69E-01		
Sn-126	1.0194E-05	14,945.82	29,891.64	0.00E+00	1.52E-01	3.05E-01		
Sr-90	1.9084E+00	14,945.82	29,891.64	0.00E+00	2.85E+04	5.70E+04		
Tc-99	3.8056E-04	14,945.82	29,891.64	0.00E+00	5.69E+00	1.14E+01		
Th-229	4.9198E-12	14,945.82	29,891.64	0.00E+00	7.35E-08	1.47E-07		
Th-230	1.0547E-08	14,945.82	29,891.64	0.00E+00	1.58E-04	3.15E-04		
Th-232	2.0705E-14	14,945.82	29,891.64	0.00E+00	3.09E-10	6.19E-10		
Th-208	4.8827E-08	14,945.82	29,891.64	0.00E+00	7.30E-04	1.46E-03		
U-232	1.3414E-07	14,945.82	29,891.64	0.00E+00	2.00E-03	4.01E-03		
U-233	3.7679E-09	14,945.82	29,891.64	0.00E+00	5.63E-05	1.13E-04		
U-234	5.2047E-05	14,945.82	29,891.64	0.00E+00	7.78E-01	1.56E+00		
U-235	-2.8661E-08	14,945.82	0.00	6.61E-02	2.33E-02	6.61E-02		
U-236	1.6701E-05	14,945.82	29,891.64	0.00E+00	2.50E-01	4.99E-01		
U-238	-9.4194E-09	14,945.82	0.00	2.57E-03	2.43E-03	2.57E-03		
Y-90	1.9070E+00	14,945.82	29,891.64	0.00E+00	2.85E+04	5.70E+04		
Other Radionuclides					2.91E+04	5.82E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	80.00000311	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		14,945.82
Bounding:		29,891.64

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	
Bounding:	1.79	

Estimated EOL HM/Given EOL HM
1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) AUSTRALIA
 SNF ID #: 684
 Fuel Units & Descr: 169 - ASSEMBLY
 Heavy Metal Mass: BOL=47.878kg; EOL=32.851kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 4.69

II. Estimates

Radionuclide	m	K _a	K _b	b	Y _a	Y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	14,025.54	28,051.09	0.00E+00	4.40E-06	8.80E-06	Avg. MeV	
Am-241	8.0194E-03	14,025.54	28,051.09	0.00E+00	1.12E+02	2.25E+02	0.0150	2.966E+15
Am-242m	1.3694E-06	14,025.54	28,051.09	0.00E+00	1.92E-02	3.84E-02	0.0250	6.113E+14
Am-243	3.7096E-05	14,025.54	28,051.09	0.00E+00	5.20E-01	1.04E+00	0.0375	5.431E+14
C-14	2.6464E-08	14,025.54	28,051.09	0.00E+00	3.71E-04	7.42E-04	0.0575	5.750E+14
Ci-36	4.4441E-31	14,025.54	28,051.09	0.00E+00	6.23E-27	1.25E-26	0.0850	3.481E+14
Cm-243	5.7029E-06	14,025.54	28,051.09	0.00E+00	8.00E-02	1.60E-01	0.1250	2.465E+14
Cm-244	4.6555E-03	14,025.54	28,051.09	0.00E+00	6.53E+01	1.31E+02	0.2250	2.996E+14
Co-60	4.8663E-05	14,025.54	28,051.09	0.00E+00	6.83E-01	1.37E+00	0.3750	1.297E+14
Cs-134	1.0638E-02	14,025.54	28,051.09	0.00E+00	1.49E+02	2.98E+02	0.5750	2.146E+15
Cs-135	4.2564E-06	14,025.54	28,051.09	0.00E+00	5.97E-02	1.19E-01	0.8500	5.620E+13
Cs-137	2.0358E+00	14,025.54	28,051.09	0.00E+00	2.86E+04	5.71E+04	1.2500	3.803E+13
Eu-154	5.1956E-02	14,025.54	28,051.09	0.00E+00	7.29E+02	1.46E+03	1.7500	1.388E+12
Eu-155	1.4295E-02	14,025.54	28,051.09	0.00E+00	2.00E+02	4.01E+02	2.2500	8.879E+07
Fe-55	1.3560E-03	14,025.54	28,051.09	0.00E+00	1.90E+01	3.80E+01	2.7500	5.195E+07
H-3	4.6258E-03	14,025.54	28,051.09	0.00E+00	6.49E+01	1.30E+02	3.5000	2.195E+06
I-129	6.6403E-07	14,025.54	28,051.09	0.00E+00	9.31E-03	1.86E-02	8.0000	8.440E+05
Kr-85	1.0608E-01	14,025.54	28,051.09	0.00E+00	1.52E+03	3.03E+03	7.0000	9.888E+04
Np-237	3.1537E-05	14,025.54	28,051.09	0.00E+00	4.42E-01	8.85E-01	11.0000	1.110E+04
Pa-231	9.7023E-10	14,025.54	28,051.09	0.00E+00	1.36E-05	2.72E-05		
Pb-210	1.1731E-11	14,025.54	28,051.09	0.00E+00	1.65E-07	3.29E-07		
Pm-147	2.4405E-02	14,025.54	28,051.09	0.00E+00	3.42E+02	6.85E+02		
Pu-238	1.5358E-01	14,025.54	28,051.09	0.00E+00	2.15E+03	4.31E+03		
Pu-239	6.9502E-04	14,025.54	28,051.09	0.00E+00	9.75E+00	1.95E+01		
Pu-240	3.7631E-04	14,025.54	28,051.09	0.00E+00	5.28E+00	1.06E+01		
Pu-241	1.3433E-01	14,025.54	28,051.09	0.00E+00	1.88E+03	3.77E+03		
Pu-242	3.0911E-06	14,025.54	28,051.09	0.00E+00	4.34E-02	8.67E-02		
Ra-226	5.5079E-11	14,025.54	28,051.09	0.00E+00	7.73E-07	1.55E-06		
Ra-228	1.3335E-14	14,025.54	28,051.09	0.00E+00	1.87E-10	3.74E-10		
Ru-106	7.3390E-06	14,025.54	28,051.09	0.00E+00	1.03E-01	2.06E-01		
Se-79	1.2339E-05	14,025.54	28,051.09	0.00E+00	1.73E-01	3.46E-01		
Sn-126	1.0194E-05	14,025.54	28,051.09	0.00E+00	1.43E-01	2.86E-01		
Sr-90	1.8064E+00	14,025.54	28,051.09	0.00E+00	2.67E+04	5.35E+04		
Tc-99	3.8056E-04	14,025.54	28,051.09	0.00E+00	5.34E+00	1.07E+01		
Th-229	4.9198E-12	14,025.54	28,051.09	0.00E+00	6.90E-08	1.38E-07		
Th-230	1.0547E-08	14,025.54	28,051.09	0.00E+00	1.48E-04	2.96E-04		
Th-232	2.0706E-14	14,025.54	28,051.09	0.00E+00	2.90E-10	5.81E-10		
Ti-208	4.8827E-08	14,025.54	28,051.09	0.00E+00	6.85E-04	1.37E-03		
U-232	1.3414E-07	14,025.54	28,051.09	0.00E+00	1.88E-03	3.76E-03		
U-233	3.7679E-09	14,025.54	28,051.09	0.00E+00	5.28E-05	1.06E-04		
U-234	5.2047E-05	14,025.54	28,051.09	0.00E+00	7.30E-01	1.46E+00		
U-235	-2.8661E-06	14,025.54	0.00	6.21E-02	2.19E-02	6.21E-02		
U-236	1.6701E-05	14,025.54	28,051.09	0.00E+00	2.34E-01	4.68E-01		
U-238	-9.4194E-09	14,025.54	0.00	6.44E-03	6.30E-03	6.44E-03		
Y-90	1.9070E+00	14,025.54	28,051.09	0.00E+00	2.67E+04	5.35E+04		
Other Radionuclides					2.73E+04	5.46E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	80.0000706	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		14,025.54	
Bounding:		28,051.09	

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.67		1.01
Bounding:	1.34		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) DENMARK

SNF ID #: 676

Fuel Units & Descr: 5 - ASSEMBLY

Heavy Metal Mass: BOL=0.64kg; EOL=0.336kg

ROD Storage Site: SRS

Fuel decay start date: 2010

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: 20 years

Estimated
Canister usage:

18"x10"

0.14

II. Estimates

	m	x ₀	x ₁	b	y ₀	y ₁	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	3.1355E-10	279.55	559.11	0.00E+00	8.77E-08	1.75E-07	Avg. MeV	
Am-241	8.0194E-03	279.55	559.11	0.00E+00	2.24E+00	4.48E+00	0.0150	5.911E+13
Am-242m	1.3694E-06	279.55	559.11	0.00E+00	3.83E-04	7.66E-04	0.0250	1.218E+13
Am-243	3.7096E-05	279.55	559.11	0.00E+00	1.04E-02	2.07E-02	0.0375	1.082E+13
C-14	2.6464E-08	279.55	559.11	0.00E+00	7.40E-08	1.48E-07	0.0575	1.148E+13
Ci-36	4.4441E-31	279.55	559.11	0.00E+00	1.24E-28	2.48E-28	0.0850	6.937E+12
Cm-243	5.7029E-06	279.55	559.11	0.00E+00	1.59E-03	3.19E-03	0.1250	4.913E+12
Cm-244	4.6555E-03	279.55	559.11	0.00E+00	1.30E+00	2.60E+00	0.2250	5.971E+12
Co-60	4.8683E-05	279.55	559.11	0.00E+00	1.36E-02	2.72E-02	0.3750	2.584E+12
Cs-134	1.0638E-02	279.55	559.11	0.00E+00	2.97E+00	5.95E+00	0.5750	4.278E+13
Cs-135	4.2564E-06	279.55	559.11	0.00E+00	1.19E-03	2.38E-03	0.8500	1.120E+12
Cs-137	2.0358E+00	279.55	559.11	0.00E+00	5.69E+02	1.14E+03	1.2500	7.182E+11
Eu-154	5.1966E-02	279.55	559.11	0.00E+00	1.45E+01	2.90E+01	1.7500	2.767E+10
Eu-155	1.4295E-02	279.55	559.11	0.00E+00	4.00E+00	7.99E+00	2.2500	1.770E+08
Fe-55	1.3560E-03	279.55	559.11	0.00E+00	3.79E-01	7.58E-01	2.7500	1.038E+08
H-3	4.6258E-03	279.55	559.11	0.00E+00	1.29E+00	2.59E+00	3.5000	4.376E+04
I-129	6.6403E-07	279.55	559.11	0.00E+00	1.86E-04	3.71E-04	5.0000	1.682E+04
Kr-85	1.0808E-01	279.55	559.11	0.00E+00	3.02E+01	6.04E+01	7.0000	1.931E+03
Np-237	3.1537E-05	279.55	559.11	0.00E+00	8.82E-03	1.76E-02	11.0000	2.213E+02
Pa-231	9.7023E-10	279.55	559.11	0.00E+00	2.71E-07	5.42E-07		
Pb-210	1.1731E-11	279.55	559.11	0.00E+00	3.28E-09	6.56E-09		
Pm-147	2.4405E-02	279.55	559.11	0.00E+00	6.82E+00	1.36E+01		
Pu-238	1.5358E-01	279.55	559.11	0.00E+00	4.29E+01	8.59E+01		
Pu-239	6.9502E-04	279.55	559.11	0.00E+00	1.94E-01	3.89E-01		
Pu-240	3.7631E-04	279.55	559.11	0.00E+00	1.05E-01	2.10E-01		
Pu-241	1.3433E-01	279.55	559.11	0.00E+00	3.76E+01	7.51E+01		
Pu-242	3.0911E-08	279.55	559.11	0.00E+00	8.64E-04	1.73E-03		
Ra-226	5.5079E-11	279.55	559.11	0.00E+00	1.54E-08	3.08E-08		
Ra-228	1.3335E-14	279.55	559.11	0.00E+00	3.73E-12	7.46E-12		
Ru-106	7.3390E-06	279.55	559.11	0.00E+00	2.05E-03	4.10E-03		
Se-79	1.2339E-05	279.55	559.11	0.00E+00	3.45E-03	6.90E-03		
Sn-126	1.0194E-05	279.55	559.11	0.00E+00	2.85E-03	5.70E-03		
Sr-90	1.9064E+00	279.55	559.11	0.00E+00	5.33E+02	1.07E+03		
Tc-99	3.8066E-04	279.55	559.11	0.00E+00	1.06E-01	2.13E-01		
Th-229	4.9198E-12	279.55	559.11	0.00E+00	1.38E-09	2.75E-09		
Th-230	1.0547E-08	279.55	559.11	0.00E+00	2.95E-08	5.90E-08		
Th-232	2.0705E-14	279.55	559.11	0.00E+00	5.79E-12	1.16E-11		
Ti-208	4.8827E-08	279.55	559.11	0.00E+00	1.36E-05	2.73E-05		
U-232	1.3414E-07	279.55	559.11	0.00E+00	3.75E-05	7.50E-05		
U-233	3.7679E-09	279.55	559.11	0.00E+00	1.05E-08	2.11E-08		
U-234	5.2047E-05	279.55	559.11	0.00E+00	1.46E-02	2.91E-02		
U-235	-2.8681E-06	279.55	0.00	1.29E-03	4.85E-04	1.29E-03		
U-236	1.6701E-05	279.55	559.11	0.00E+00	4.67E-03	9.34E-03		
U-238	-9.4194E-09	279.55	0.00	1.51E-05	1.24E-05	1.51E-05		
Y-90	1.9070E+00	279.55	559.11	0.00E+00	5.33E+02	1.07E+03		
Other Radionuclides					5.44E+02	1.09E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.09E+08	1.62E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999218	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		279.55
Bounding:		559.11

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:	1.00	
Bounding:	2.00	

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) DENMARK
 SNF ID #: 678
 Fuel Units & Descr: 5 - ASSEMBLY
 Heavy Metal Mass: BOL=0.79kg; EOL=0.423kg
 ROD Storage Site: SRS

*Fuel decay start date: 2010
 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.14

II. Estimates	m	Z _m	Z _b	b	Y _m	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	338.51	677.01	0.00E+00	1.06E-07	2.12E-07	Avg. MeV	
Am-241	8.0194E-03	338.51	677.01	0.00E+00	2.71E+00	5.43E+00	0.0150	7.158E+13
Am-242m	1.3694E-06	338.51	677.01	0.00E+00	4.84E-04	9.27E-04	0.0250	1.475E+13
Am-243	3.7096E-05	338.51	677.01	0.00E+00	1.26E-02	2.51E-02	0.0375	1.311E+13
C-14	2.6464E-08	338.51	677.01	0.00E+00	8.96E-06	1.79E-05	0.0575	1.388E+13
Cl-36	4.4441E-31	338.51	677.01	0.00E+00	1.50E-28	3.01E-28	0.0850	8.400E+12
Cm-243	5.7029E-06	338.51	677.01	0.00E+00	1.93E-03	3.86E-03	0.1250	5.950E+12
Cm-244	4.6555E-03	338.51	677.01	0.00E+00	1.58E+00	3.15E+00	0.2250	7.230E+12
Co-60	4.8663E-05	338.51	677.01	0.00E+00	1.65E-02	3.29E-02	0.3750	3.129E+12
Cs-134	1.0638E-02	338.51	677.01	0.00E+00	3.60E+00	7.20E+00	0.5750	5.180E+13
Cs-135	4.2564E-06	338.51	677.01	0.00E+00	1.44E-03	2.88E-03	0.8500	1.366E+12
Cs-137	2.0358E+00	338.51	677.01	0.00E+00	6.89E+02	1.38E+03	1.2500	8.696E+11
Eu-154	5.1856E-02	338.51	677.01	0.00E+00	1.76E+01	3.52E+01	1.7500	3.351E+10
Eu-155	1.4295E-02	338.51	677.01	0.00E+00	4.84E+00	9.68E+00	2.2500	2.143E+06
Fe-55	1.3560E-03	338.51	677.01	0.00E+00	4.59E-01	9.18E-01	2.7500	1.254E+06
H-3	4.6258E-03	338.51	677.01	0.00E+00	1.57E+00	3.13E+00	3.5000	6.298E+04
I-129	6.8403E-07	338.51	677.01	0.00E+00	2.25E-04	4.50E-04	5.0000	2.037E+04
Kr-85	1.0808E-01	338.51	677.01	0.00E+00	3.66E+01	7.32E+01	7.0000	2.338E+03
Np-237	3.1537E-05	338.51	677.01	0.00E+00	1.07E-02	2.14E-02	11.0000	2.679E+02
Pa-231	9.7023E-10	338.51	677.01	0.00E+00	3.28E-07	6.57E-07		
Pb-210	1.1731E-11	338.51	677.01	0.00E+00	3.97E-09	7.94E-09		
Pm-147	2.4405E-02	338.51	677.01	0.00E+00	8.26E+00	1.65E+01		
Pu-238	1.5358E-01	338.51	677.01	0.00E+00	5.20E+01	1.04E+02		
Pu-239	6.9502E-04	338.51	677.01	0.00E+00	2.35E-01	4.71E-01		
Pu-240	3.7631E-04	338.51	677.01	0.00E+00	1.27E-01	2.55E-01		
Pu-241	1.3433E-01	338.51	677.01	0.00E+00	4.55E+01	9.09E+01		
Pu-242	3.0911E-06	338.51	677.01	0.00E+00	1.05E-03	2.09E-03		
Ra-226	5.5079E-11	338.51	677.01	0.00E+00	1.86E-08	3.73E-08		
Ra-228	1.3335E-14	338.51	677.01	0.00E+00	4.51E-12	9.03E-12		
Ru-106	7.3390E-06	338.51	677.01	0.00E+00	2.48E-03	4.97E-03		
Se-79	1.2339E-05	338.51	677.01	0.00E+00	4.18E-03	8.35E-03		
Sn-126	1.0194E-05	338.51	677.01	0.00E+00	3.45E-03	6.90E-03		
Sr-90	1.9064E+00	338.51	677.01	0.00E+00	6.45E+02	1.29E+03		
Tc-99	3.8056E-04	338.51	677.01	0.00E+00	1.29E-01	2.58E-01		
Th-229	4.9198E-12	338.51	677.01	0.00E+00	1.67E-09	3.33E-09		
Th-230	1.0547E-08	338.51	677.01	0.00E+00	3.57E-06	7.14E-06		
Th-232	2.0705E-14	338.51	677.01	0.00E+00	7.01E-12	1.40E-11		
Th-208	4.8827E-08	338.51	677.01	0.00E+00	1.65E-05	3.31E-05		
U-232	1.3414E-07	338.51	677.01	0.00E+00	4.54E-05	9.08E-05		
U-233	3.7679E-09	338.51	677.01	0.00E+00	1.28E-06	2.55E-06		
U-234	5.2047E-05	338.51	677.01	0.00E+00	1.76E-02	3.52E-02		
U-235	2.8661E-06	338.51	0.00	1.59E-03	5.19E-04	1.59E-03		
U-236	1.6701E-05	338.51	677.01	0.00E+00	5.85E-03	1.17E-02		
U-238	9.4194E-09	338.51	0.00	1.86E-05	1.54E-05	1.86E-05		
Y-90	1.9070E+00	338.51	677.01	0.00E+00	6.46E+02	1.29E+03		
Other Radionuclides					6.59E+02	1.32E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.79E+00	1.86E+01
Tot:	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000949	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		338.51
Bounding:		677.01

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:	0.98	
Bounding:	1.96	

Estimated EOL HM/Given EOL HM

1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 683
Fuel Units & Descr: 105 - ASSEMBLY
Heavy Metal Mass: BOL=19.688kg; EOL=13.388kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
2.92

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	5,802.95	11,605.90	0.00E+00	1.82E-08	3.64E-08	Avg. MeV	
Am-241	8.0194E-03	5,802.95	11,605.90	0.00E+00	4.65E+01	9.31E+01	0.0150	1.227E+15
Am-242m	1.3694E-06	5,802.95	11,605.90	0.00E+00	7.95E-03	1.59E-02	0.0250	2.529E+14
Am-243	3.7096E-05	5,802.95	11,605.90	0.00E+00	2.15E-01	4.31E-01	0.0375	2.247E+14
C-14	2.6484E-08	5,802.95	11,605.90	0.00E+00	1.54E-04	3.07E-04	0.0575	2.379E+14
Cl-38	4.4441E-31	5,802.95	11,605.90	0.00E+00	2.58E-27	5.16E-27	0.0850	1.440E+14
Cm-243	5.7029E-06	5,802.95	11,605.90	0.00E+00	3.31E-02	6.62E-02	0.1250	1.020E+14
Cm-244	4.6555E-03	5,802.95	11,605.90	0.00E+00	2.70E+01	5.40E+01	0.2250	1.240E+14
Co-60	4.8663E-05	5,802.95	11,605.90	0.00E+00	2.82E-01	5.65E-01	0.3750	5.364E+13
Cs-134	1.0638E-02	5,802.95	11,605.90	0.00E+00	6.17E+01	1.23E+02	0.5750	8.879E+14
Cs-135	4.2564E-06	5,802.95	11,605.90	0.00E+00	2.47E-02	4.94E-02	0.8500	2.325E+13
Cs-137	2.0358E+00	5,802.95	11,605.90	0.00E+00	1.18E+04	2.36E+04	1.2500	1.491E+13
Eu-154	5.1956E-02	5,802.95	11,605.90	0.00E+00	3.01E+02	6.03E+02	1.7500	5.745E+11
Eu-155	1.4295E-02	5,802.95	11,605.90	0.00E+00	8.30E+01	1.66E+02	2.2500	3.674E+07
Fe-55	1.3560E-03	5,802.95	11,605.90	0.00E+00	7.87E+00	1.57E+01	2.7500	2.149E+07
H-3	4.6258E-03	5,802.95	11,605.90	0.00E+00	2.68E+01	5.37E+01	3.5000	9.083E+05
I-129	8.6403E-07	5,802.95	11,605.90	0.00E+00	3.85E-03	7.71E-03	5.0000	3.492E+05
Kr-85	1.0808E-01	5,802.95	11,605.90	0.00E+00	6.27E+02	1.25E+03	7.0000	4.008E+04
Np-237	3.1537E-05	5,802.95	11,605.90	0.00E+00	1.83E-01	3.66E-01	11.0000	4.593E+03
Pa-231	9.7023E-10	5,802.95	11,605.90	0.00E+00	5.63E-08	1.13E-07		
Pb-210	1.1731E-11	5,802.95	11,605.90	0.00E+00	6.81E-08	1.36E-07		
Pm-147	2.4405E-02	5,802.95	11,605.90	0.00E+00	1.42E+02	2.83E+02		
Pu-238	1.5358E-01	5,802.95	11,605.90	0.00E+00	8.91E+02	1.78E+03		
Pu-239	8.9502E-04	5,802.95	11,605.90	0.00E+00	4.03E+00	8.07E+00		
Pu-240	3.7631E-04	5,802.95	11,605.90	0.00E+00	2.18E+00	4.37E+00		
Pu-241	1.3433E-01	5,802.95	11,605.90	0.00E+00	7.79E+02	1.56E+03		
Pu-242	3.0911E-08	5,802.95	11,605.90	0.00E+00	1.79E-02	3.59E-02		
Ra-226	5.5079E-11	5,802.95	11,605.90	0.00E+00	3.20E-07	6.39E-07		
Ra-228	1.3335E-14	5,802.95	11,605.90	0.00E+00	7.74E-11	1.55E-10		
Ru-106	7.3390E-06	5,802.95	11,605.90	0.00E+00	4.26E-02	8.52E-02		
Se-79	1.2339E-05	5,802.95	11,605.90	0.00E+00	7.16E-02	1.43E-01		
Sn-126	1.0194E-05	5,802.95	11,605.90	0.00E+00	5.92E-02	1.18E-01		
Sr-90	1.9064E+00	5,802.95	11,605.90	0.00E+00	1.11E+04	2.21E+04		
Tc-99	3.8056E-04	5,802.95	11,605.90	0.00E+00	2.21E+00	4.42E+00		
Th-229	4.9198E-12	5,802.95	11,605.90	0.00E+00	2.85E-08	5.71E-08		
Th-230	1.0547E-08	5,802.95	11,605.90	0.00E+00	6.12E-05	1.22E-04		
Th-232	2.0705E-14	5,802.95	11,605.90	0.00E+00	1.20E-10	2.40E-10		
Ti-208	4.8827E-08	5,802.95	11,605.90	0.00E+00	2.83E-04	5.67E-04		
U-232	1.3414E-07	5,802.95	11,605.90	0.00E+00	7.78E-04	1.56E-03		
U-233	3.7679E-09	5,802.95	11,605.90	0.00E+00	2.19E-05	4.37E-05		
U-234	5.2047E-05	5,802.95	11,605.90	0.00E+00	3.02E-01	6.04E-01		
U-235	2.8681E-06	5,802.95	0.00	3.40E-02	1.74E-02	3.40E-02		
U-236	1.6701E-05	5,802.95	11,605.90	0.00E+00	9.69E-02	1.94E-01		
U-238	-9.4194E-09	5,802.95	0.00	1.32E-03	1.27E-03	1.32E-03		
Y-90	1.9070E+00	5,802.95	11,605.90	0.00E+00	1.11E+04	2.21E+04		
Other Radionuclides					1.13E+04	2.26E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	80	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		5,802.95
Bounding:		11,605.90

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	
Bounding:	1.35	

Estimated EOL HM/Given EOL HM
1.01

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 685
Fuel Units & Descr: 130 - ASSEMBLY
Heavy Metal Mass: BOL=27.625kg; EOL=18.785kg
ROO Storage Site: SRS

Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
16"x10"
3.61

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	8,142.55	16,285.10	0.00E+00	2.55E-06	5.11E-06	Avg. MeV	
Am-241	8.0194E-03	8,142.55	16,285.10	0.00E+00	6.53E+01	1.31E+02	0.0150	1.722E+15
Am-242m	1.3694E-06	8,142.55	16,285.10	0.00E+00	1.12E-02	2.23E-02	0.0250	3.549E+14
Am-243	3.7096E-05	8,142.55	16,285.10	0.00E+00	3.02E-01	6.04E-01	0.0375	3.153E+14
C-14	2.6464E-08	8,142.55	16,285.10	0.00E+00	2.15E-04	4.31E-04	0.0575	3.338E+14
Cl-36	4.4441E-31	8,142.55	16,285.10	0.00E+00	3.62E-27	7.24E-27	0.0850	2.021E+14
Cm-243	5.7029E-06	8,142.55	16,285.10	0.00E+00	4.64E-02	9.29E-02	0.1250	1.431E+14
Cm-244	4.8555E-03	8,142.55	16,285.10	0.00E+00	3.79E+01	7.58E+01	0.2250	1.739E+14
Co-60	4.8663E-05	8,142.55	16,285.10	0.00E+00	3.96E-01	7.92E-01	0.3750	7.527E+13
Cs-134	1.0638E-02	8,142.55	16,285.10	0.00E+00	8.66E+01	1.73E+02	0.5750	1.246E+15
Cs-135	4.2564E-06	8,142.55	16,285.10	0.00E+00	3.47E-02	6.93E-02	0.8500	3.263E+13
Cs-137	2.0358E+00	8,142.55	16,285.10	0.00E+00	1.86E+04	3.72E+04	1.2500	2.092E+13
Eu-154	5.1956E-02	8,142.55	16,285.10	0.00E+00	4.23E+02	8.46E+02	1.7500	8.061E+11
Eu-155	1.4295E-02	8,142.55	16,285.10	0.00E+00	1.16E+02	2.33E+02	2.2500	5.155E+07
Fe-55	1.3560E-03	8,142.55	16,285.10	0.00E+00	1.10E+01	2.21E+01	2.7500	3.016E+07
H-3	4.6258E-03	8,142.55	16,285.10	0.00E+00	3.77E+01	7.53E+01	3.5000	1.274E+06
I-129	6.6403E-07	8,142.55	16,285.10	0.00E+00	5.41E-03	1.08E-02	5.0000	4.900E+06
Kr-85	1.0608E-01	8,142.55	16,285.10	0.00E+00	8.80E+02	1.76E+03	7.0000	5.624E+04
Np-237	3.1537E-05	8,142.55	16,285.10	0.00E+00	2.57E-01	5.14E-01	11.0000	6.445E+03
Pa-231	9.7023E-10	8,142.55	16,285.10	0.00E+00	7.90E-06	1.58E-05		
Pb-210	1.1731E-11	8,142.55	16,285.10	0.00E+00	9.55E-08	1.91E-07		
Pm-147	2.4405E-02	8,142.55	16,285.10	0.00E+00	1.99E+02	3.97E+02		
Pu-238	1.5358E-01	8,142.55	16,285.10	0.00E+00	1.25E+03	2.50E+03		
Pu-239	6.9502E-04	8,142.55	16,285.10	0.00E+00	5.66E+00	1.13E+01		
Pu-240	3.7631E-04	8,142.55	16,285.10	0.00E+00	3.06E+00	6.13E+00		
Pu-241	1.3433E-01	8,142.55	16,285.10	0.00E+00	1.09E+03	2.19E+03		
Pu-242	3.0911E-06	8,142.55	16,285.10	0.00E+00	2.52E-02	5.03E-02		
Ra-226	5.5079E-11	8,142.55	16,285.10	0.00E+00	4.48E-07	8.97E-07		
Ra-228	1.3335E-14	8,142.55	16,285.10	0.00E+00	1.09E-10	2.17E-10		
Ru-106	7.3390E-06	8,142.55	16,285.10	0.00E+00	5.98E-02	1.20E-01		
Se-79	1.2339E-05	8,142.55	16,285.10	0.00E+00	1.00E-01	2.01E-01		
Sn-126	1.0194E-05	8,142.55	16,285.10	0.00E+00	8.30E-02	1.66E-01		
Sr-90	1.9064E+00	8,142.55	16,285.10	0.00E+00	1.55E+04	3.10E+04		
Tc-99	3.8066E-04	8,142.55	16,285.10	0.00E+00	3.10E+00	6.20E+00		
Th-229	4.9198E-12	8,142.55	16,285.10	0.00E+00	4.01E-08	8.01E-08		
Th-230	1.0547E-08	8,142.55	16,285.10	0.00E+00	8.59E-05	1.72E-04		
Th-232	2.0705E-14	8,142.55	16,285.10	0.00E+00	1.69E-10	3.37E-10		
Ti-208	4.8827E-08	8,142.55	16,285.10	0.00E+00	3.98E-04	7.95E-04		
U-232	1.3414E-07	8,142.55	16,285.10	0.00E+00	1.09E-03	2.18E-03		
U-233	3.7678E-09	8,142.55	16,285.10	0.00E+00	3.07E-05	6.14E-05		
U-234	5.2047E-05	8,142.55	16,285.10	0.00E+00	4.24E-01	8.48E-01		
U-235	-2.8661E-06	8,142.55	0.00	4.78E-02	2.44E-02	4.78E-02		
U-236	1.6701E-05	8,142.55	16,285.10	0.00E+00	1.36E-01	2.72E-01		
U-238	-9.4194E-09	8,142.55	0.00	1.86E-03	1.78E-03	1.86E-03		
Y-80	1.9070E+00	8,142.55	16,285.10	0.00E+00	1.55E+04	3.11E+04		
Other Radionuclides					1.59E+04	3.17E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	80	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		8,142.55
Bounding:		16,285.10

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	
Bounding:	1.35	

Estimated EOL HM/Given EOL HM
1.01

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionucleide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GORE (18 SERIES)
 SNF ID #: 745
 Fuel ID #: 745
 Fuel Unit #: 8 - 18 ROD ASSEMBLY
 Heavy Metal Mass: BOL=50.541kg EOL=59.564kg
 ROD Storage Site: NREL

Fuel decay start date: 1980
 Estimate as of: 2030
 Template: Padlock (Light Wack, SST, 60 to 100%, U)
 Template BOL Heavy Metal Mass (MT): 6.01
 Template Decay Time: 63 years

Estimated
 Canister Used:
 18" T17
 2.88

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionucleide	CHWID From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	4.5940E-08	638.77	1.277.54	0.00E+00	2.83E-05	5.87E-05	Avg. May
Am-241	1.471E-04	638.77	1.277.54	0.00E+00	7.33E-02	1.47E-01	0.0190
Am-242m	7.4210E-09	638.77	1.277.54	0.00E+00	4.74E-08	9.48E-08	0.0250
Am-243	9.8238E-10	638.77	1.277.54	0.00E+00	8.23E-07	1.28E-06	0.0075
C-14	2.2828E-04	638.77	1.277.54	0.00E+00	1.48E-01	2.83E-01	0.0075
C-38	1.2280E-06	638.77	1.277.54	0.00E+00	7.83E-04	1.57E-03	0.0090
Co-243	1.2000E-10	638.77	1.277.54	0.00E+00	4.70E-07	9.40E-07	0.1250
Co-244	7.3577E-10	638.77	1.277.54	0.00E+00	8.77E-01	1.75E-00	0.5750
Co-60	1.3732E-03	638.77	1.277.54	0.00E+00	8.12E-08	1.62E-07	0.8500
Co-134	1.2709E-10	638.77	1.277.54	0.00E+00	1.94E-02	3.87E-02	0.8500
Co-135	3.0316E-05	638.77	1.277.54	0.00E+00	4.64E-02	9.27E-02	1.2500
Co-137	7.2579E-01	638.77	1.277.54	0.00E+00	3.82E-02	7.63E-02	1.7500
Eu-154	5.9750E-05	638.77	1.277.54	0.00E+00	6.79E-03	1.38E-02	2.2500
Eu-155	1.0577E-05	638.77	1.277.54	0.00E+00	2.68E-04	5.32E-04	2.7500
Fe-55	4.1631E-07	638.77	1.277.54	0.00E+00	2.98E-01	5.95E-01	3.5000
H-3	4.6722E-04	638.77	1.277.54	0.00E+00	4.68E-04	9.35E-04	5.0000
H-129	7.3195E-07	638.77	1.277.54	0.00E+00	3.80E-04	7.59E-04	7.0000
K-40	5.9418E-03	638.77	1.277.54	0.00E+00	7.35E-04	1.47E-03	11.0000
Np-237	1.1499E-06	638.77	1.277.54	0.00E+00	4.53E-05	9.06E-05	
Pa-231	7.0899E-08	638.77	1.277.54	0.00E+00	1.43E-09	2.86E-09	
Pb-210	2.2383E-12	638.77	1.277.54	0.00E+00	2.70E-04	5.40E-04	
Pm-147	4.2296E-07	638.77	1.277.54	0.00E+00	1.49E-01	2.98E-01	
Pu-238	2.3235E-04	638.77	1.277.54	0.00E+00	4.26E-01	8.52E-01	
Pu-239	6.6722E-04	638.77	1.277.54	0.00E+00	5.53E-02	1.11E-01	
Pu-240	8.6566E-05	638.77	1.277.54	0.00E+00	1.09E-01	2.18E-01	
Pu-241	1.6858E-04	638.77	1.277.54	0.00E+00	1.28E-08	2.52E-08	
Pu-242	1.9717E-09	638.77	1.277.54	0.00E+00	2.92E-09	5.84E-09	
Ra-226	4.5740E-12	638.77	1.277.54	0.00E+00	5.33E-09	1.07E-08	
Ra-228	8.3511E-12	638.77	1.277.54	0.00E+00	1.31E-16	2.62E-16	
Ru-106	2.0516E-19	638.77	1.277.54	0.00E+00	8.44E-03	1.69E-02	
Sa-78	1.3220E-05	638.77	1.277.54	0.00E+00	7.34E-03	1.47E-02	
Sr-128	1.1489E-05	638.77	1.277.54	0.00E+00	4.27E+02	8.54E+02	
Sr-90	6.6972E-01	638.77	1.277.54	0.00E+00	2.98E-01	5.96E-01	
Tc-99	4.6639E-04	638.77	1.277.54	0.00E+00	1.52E-08	3.03E-08	
Th-229	2.3727E-11	638.77	1.277.54	0.00E+00	1.75E-07	3.49E-07	
Th-230	2.7354E-10	638.77	1.277.54	0.00E+00	5.34E-09	1.07E-08	
Th-232	8.3594E-12	638.77	1.277.54	0.00E+00	1.04E-05	2.07E-05	
Th-234	1.8228E-08	638.77	1.277.54	0.00E+00	2.81E-05	5.62E-05	
U-232	4.3960E-08	638.77	1.277.54	0.00E+00	2.13E-08	4.26E-08	
U-233	3.3344E-09	638.77	1.277.54	0.00E+00	2.60E-04	5.21E-04	
U-235	4.0749E-07	638.77	1.277.54	0.00E+00	1.19E-01	2.37E-01	
U-236	2.7761E-06	638.77	1.277.54	0.00E+00	1.03E-02	2.07E-02	
U-238	1.6190E-05	638.77	1.277.54	0.00E+00	1.58E-03	3.15E-03	
U-238	2.8547E-09	638.77	1.277.54	0.00E+00	4.27E+02	8.55E+02	
Y-90	6.6868E-01	638.77	1.277.54	0.00E+00	5.80E+02	1.16E+03	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
Total	8.20E+08	1.04E+01
Total		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	HASTELLOY	SST
BOL HMI Constituents:	U	U
BOL Enrichment %:	92.20234775	60 to 100

Basis for Parameter Differences:
 The Template was used for the following reasons:
 The fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd/g)	From SFD	Estimated
Nominal:		638.77
Bounding:		1,277.54

Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.45	

Estimated EOL HMI/Given EOL HMI
 1.00

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/GM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GORE (1Z SERIES)
SNF ID #: 916
Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=1.067kg; EOL=1.018kg
ROD Storage Site: INEEL

*Fuel decay start date: 1960
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"
0.06

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources
Radionuclide	C/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 Avg. MeV Total Photons/sec (bounding)
Ac-227	4.5940E-08	46.19	92.39	0.00E+00	2.12E-06	4.24E-06	0.0150
Am-241	1.1471E-04	46.19	92.39	0.00E+00	5.30E-03	1.06E-02	0.0250
Am-242m	7.4210E-09	46.19	92.39	0.00E+00	3.43E-07	6.86E-07	0.0375
Am-243	9.8236E-10	46.19	92.39	0.00E+00	4.54E-08	9.08E-08	0.0575
C-14	2.2628E-04	46.19	92.39	0.00E+00	1.06E-02	2.12E-02	0.0850
Cl-36	1.2260E-06	46.19	92.39	0.00E+00	5.66E-05	1.13E-04	0.1250
Cm-243	1.2000E-10	46.19	92.39	0.00E+00	5.54E-09	1.11E-08	0.2250
Cm-244	7.3577E-10	46.19	92.39	0.00E+00	3.40E-08	6.80E-08	0.3750
Co-60	1.3732E-03	46.19	92.39	0.00E+00	6.34E-02	1.27E-01	0.5750
Cs-134	1.2709E-10	46.19	92.39	0.00E+00	5.87E-09	1.17E-08	0.8500
Cs-135	3.0316E-05	46.19	92.39	0.00E+00	1.40E-03	2.80E-03	1.2500
Cs-137	7.2579E-01	46.19	92.39	0.00E+00	3.35E+01	6.71E+01	1.7500
Eu-154	5.9750E-05	46.19	92.39	0.00E+00	2.76E-03	5.52E-03	2.2500
Eu-155	1.0577E-05	46.19	92.39	0.00E+00	4.89E-04	9.77E-04	2.7500
Fe-55	4.1631E-07	46.19	92.39	0.00E+00	1.92E-05	3.85E-05	3.5000
H-3	4.6722E-04	46.19	92.39	0.00E+00	2.16E-02	4.32E-02	5.0000
I-129	7.3195E-07	46.19	92.39	0.00E+00	3.38E-05	6.76E-05	7.0000
Kr-85	5.9418E-03	46.19	92.39	0.00E+00	2.74E-01	5.49E-01	11.0000
Np-237	1.1499E-06	46.19	92.39	0.00E+00	5.31E-05	1.06E-04	
Pa-231	7.0899E-08	46.19	92.39	0.00E+00	3.28E-06	6.55E-06	
Pb-210	2.2363E-12	46.19	92.39	0.00E+00	1.03E-10	2.07E-10	
Pm-147	4.2296E-07	46.19	92.39	0.00E+00	1.95E-05	3.91E-05	
Pu-238	2.3295E-04	46.19	92.39	0.00E+00	1.08E-02	2.15E-02	
Pu-239	6.6722E-04	46.19	92.39	0.00E+00	3.08E-02	6.16E-02	
Pu-240	8.6556E-05	46.19	92.39	0.00E+00	4.00E-03	8.00E-03	
Pu-241	1.6889E-04	46.19	92.39	0.00E+00	7.80E-03	1.56E-02	
Pu-242	1.9717E-09	46.19	92.39	0.00E+00	9.11E-08	1.82E-07	
Ra-226	4.5740E-12	46.19	92.39	0.00E+00	2.11E-10	4.23E-10	
Ra-228	8.3511E-12	46.19	92.39	0.00E+00	3.86E-10	7.72E-10	
Ru-106	2.0516E-19	46.19	92.39	0.00E+00	9.48E-18	1.90E-17	
Se-79	1.3220E-05	46.19	92.39	0.00E+00	6.11E-04	1.22E-03	
Sn-126	1.1489E-06	46.19	92.39	0.00E+00	5.31E-04	1.06E-03	
Sr-90	6.6872E-01	46.19	92.39	0.00E+00	3.09E+01	6.18E+01	
Tc-99	4.6639E-04	46.19	92.39	0.00E+00	2.15E-02	4.31E-02	
Th-229	2.3727E-11	46.19	92.39	0.00E+00	1.10E-09	2.19E-09	
Th-230	2.7354E-10	46.19	92.39	0.00E+00	1.26E-08	2.53E-08	
Th-232	8.3594E-12	46.19	92.39	0.00E+00	3.86E-10	7.72E-10	
Th-208	1.6228E-08	46.19	92.39	0.00E+00	7.50E-07	1.50E-06	
U-232	4.3960E-08	46.19	92.39	0.00E+00	2.03E-06	4.06E-06	
U-233	3.3344E-09	46.19	92.39	0.00E+00	1.54E-07	3.08E-07	
U-234	4.0749E-07	46.19	92.39	0.00E+00	1.88E-05	3.76E-05	
U-235	-2.7761E-06	46.19	0.00	2.16E-03	2.03E-03	2.16E-03	
U-236	1.6190E-05	46.19	92.39	0.00E+00	7.48E-04	1.50E-03	
U-238	-2.8547E-09	46.19	0.00	2.27E-05	2.26E-05	2.27E-05	
Y-90	6.8889E-01	46.19	92.39	0.00E+00	3.09E+01	6.18E+01	
Other Radionuclides					4.20E+01	8.39E+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	
	93.671	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		46.19	
Bounding:		92.39	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:	0.93		
Bounding:	1.86		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GENTR
SNF ID #: 97
Fuel Units & Descr: 16 - STACKED DISKS
Heavy Metal Mass: BOL=3.992kg; EOL=3.964kg
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"
0.44

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	7.58	15.15	0.00E+00	1.10E-09	2.20E-09	Avg. MeV	
Am-241	1.1190E-03	7.58	15.15	0.00E+00	8.48E-03	1.70E-02	0.0150	2.923E+12
Am-242m	4.5425E-07	7.58	15.15	0.00E+00	3.44E-06	6.88E-06	0.0250	6.298E+11
Am-243	1.4921E-06	7.58	15.15	0.00E+00	1.13E-05	2.26E-05	0.0375	5.812E+11
C-14	5.7244E-09	7.58	15.15	0.00E+00	4.34E-08	8.67E-08	0.0575	5.714E+11
Cl-36	1.3124E-32	7.58	15.15	0.00E+00	9.94E-32	1.99E-31	0.0850	3.643E+11
Cm-243	2.3676E-07	7.58	15.15	0.00E+00	1.79E-06	3.59E-06	0.1250	3.155E+11
Cm-244	5.2042E-05	7.58	15.15	0.00E+00	3.94E-04	7.89E-04	0.2250	3.089E+11
Co-60	3.8208E-05	7.58	15.15	0.00E+00	2.89E-04	5.79E-04	0.3750	1.495E+11
Cs-134	4.8693E-01	7.58	15.15	0.00E+00	3.69E+00	7.38E+00	0.5750	2.053E+12
Cs-135	3.4477E-06	7.58	15.15	0.00E+00	2.61E-05	5.22E-05	0.8500	2.875E+11
Cs-137	2.8731E+00	7.58	15.15	0.00E+00	2.18E+01	4.35E+01	1.2500	5.349E+10
Eu-154	8.2053E-02	7.58	15.15	0.00E+00	6.22E-01	1.24E+00	1.7500	2.243E+09
Eu-155	3.9134E-02	7.58	15.15	0.00E+00	2.96E-01	5.93E-01	2.2500	4.705E+08
Fe-55	6.7429E-03	7.58	15.15	0.00E+00	5.11E-02	1.02E-01	2.7500	2.707E+07
H-3	1.0599E-02	7.58	15.15	0.00E+00	8.03E-02	1.61E-01	3.5000	3.002E+06
I-129	7.5300E-07	7.58	15.15	0.00E+00	5.70E-06	1.14E-05	5.0000	9.270E+00
Kr-85	2.8505E-01	7.58	15.15	0.00E+00	2.17E+00	4.33E+00	7.0000	1.034E+00
Np-237	9.5479E-08	7.58	15.15	0.00E+00	7.23E-05	1.45E-04	11.0000	1.165E-01
Pa-231	8.9297E-10	7.58	15.15	0.00E+00	6.77E-09	1.35E-08		
Pb-210	3.7609E-12	7.58	15.15	0.00E+00	2.85E-11	5.70E-11		
Pm-147	2.5452E+00	7.58	15.15	0.00E+00	1.93E+01	3.88E+01		
Pu-238	2.0550E-02	7.58	15.15	0.00E+00	1.56E-01	3.11E-01		
Pu-239	4.2838E-04	7.58	15.15	0.00E+00	3.25E-03	6.49E-03		
Pu-240	2.4401E-04	7.58	15.15	0.00E+00	1.85E-03	3.70E-03		
Pu-241	6.8764E-02	7.58	15.15	0.00E+00	5.21E-01	1.04E+00		
Pu-242	3.6329E-07	7.58	15.15	0.00E+00	2.75E-06	5.50E-06		
Ra-226	3.8045E-11	7.58	15.15	0.00E+00	2.88E-10	5.76E-10		
Ra-228	2.9902E-15	7.58	15.15	0.00E+00	2.27E-14	4.53E-14		
Ru-106	1.9055E-01	7.58	15.15	0.00E+00	1.44E+00	2.89E+00		
Se-79	1.2936E-05	7.58	15.15	0.00E+00	9.80E-05	1.96E-04		
Sn-126	1.1574E-05	7.58	15.15	0.00E+00	8.77E-05	1.75E-04		
Sr-90	2.7505E+00	7.58	15.15	0.00E+00	2.08E+01	4.17E+01		
Tc-99	4.2239E-04	7.58	15.15	0.00E+00	3.20E-03	6.40E-03		
Th-229	1.8848E-12	7.58	15.15	0.00E+00	1.43E-11	2.86E-11		
Th-230	1.7042E-08	7.58	15.15	0.00E+00	1.29E-07	2.58E-07		
Th-232	7.8132E-15	7.58	15.15	0.00E+00	5.92E-14	1.18E-13		
Ti-208	4.4063E-08	7.58	15.15	0.00E+00	3.34E-07	6.68E-07		
U-232	1.3151E-07	7.58	15.15	0.00E+00	9.96E-07	1.99E-06		
U-233	1.9584E-09	7.58	15.15	0.00E+00	1.48E-08	2.96E-08		
U-234	1.8371E-04	7.58	15.15	0.00E+00	1.39E-03	2.78E-03		
U-235	-2.7235E-06	7.58	0.00	8.10E-03	8.08E-03	8.10E-03		
U-236	1.5493E-05	7.58	15.15	0.00E+00	1.17E-04	2.35E-04		
U-238	-4.2851E-09	7.58	0.00	8.13E-05	8.13E-05	8.13E-05		
Y-90	2.7505E+00	7.58	15.15	0.00E+00	2.08E+01	4.17E+01		
Other Radionuclides					3.90E+01	7.79E+01		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							3.84E-01	7.58E-01
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.93787575	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		7.58
Bounding:		15.15

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:	0.01	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM
1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GRR (UALX HEU) GREECE
SNF ID #: 440
Fuel Units & Descr: 108 - MTR TYPE
Heavy Metal Mass: BOL=18.76kg; EOL=14.72kg
ROD Storage Site: SRS

Fuel decay start date: 1993
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:
16"x10"
3.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	3,825.20	7,650.40	0.00E+00	7.68E-06	1.54E-05	Avg. MeV	
Am-241	2.5251E-03	3,825.20	7,650.40	0.00E+00	9.66E+00	1.93E+01	0.0150	5.635E+14
Am-242m	3.9624E-07	3,825.20	7,650.40	0.00E+00	1.52E-03	3.03E-03	0.0250	1.170E+14
Am-243	1.4880E-06	3,825.20	7,650.40	0.00E+00	5.69E-03	1.14E-02	0.0375	1.017E+14
C-14	5.7053E-09	3,825.20	7,650.40	0.00E+00	2.18E-05	4.36E-05	0.0575	1.095E+14
Cl-36	1.3124E-32	3,825.20	7,650.40	0.00E+00	5.02E-29	1.00E-28	0.0850	6.596E+13
Cm-243	1.1419E-07	3,825.20	7,650.40	0.00E+00	4.37E-04	8.74E-04	0.1250	4.357E+13
Cm-244	1.6522E-05	3,825.20	7,650.40	0.00E+00	6.32E-02	1.26E-01	0.2250	5.694E+13
Co-60	7.4047E-07	3,825.20	7,650.40	0.00E+00	2.83E-03	5.66E-03	0.3750	2.477E+13
Cs-134	2.0455E-05	3,825.20	7,650.40	0.00E+00	7.82E-02	1.56E-01	0.5750	4.094E+14
Cs-135	3.4477E-06	3,825.20	7,650.40	0.00E+00	1.32E-02	2.64E-02	0.8500	5.001E+12
Cs-137	1.4365E+00	3,825.20	7,650.40	0.00E+00	5.50E+03	1.10E+04	1.2500	2.419E+12
Eu-154	7.3230E-03	3,825.20	7,650.40	0.00E+00	2.80E+01	5.60E+01	1.7500	1.361E+11
Eu-155	5.9259E-04	3,825.20	7,650.40	0.00E+00	2.27E+00	4.53E+00	2.2500	1.138E+07
Fe-55	2.2791E-06	3,825.20	7,650.40	0.00E+00	8.72E-03	1.74E-02	2.7500	1.086E+07
H-3	1.9698E-03	3,825.20	7,650.40	0.00E+00	7.53E+00	1.51E+01	3.5000	6.295E+03
I-129	7.5300E-07	3,825.20	7,650.40	0.00E+00	2.88E-03	5.76E-03	5.0000	2.572E+03
Kr-85	4.1176E-02	3,825.20	7,650.40	0.00E+00	1.58E+02	3.15E+02	7.0000	2.815E+02
Np-237	9.5752E-06	3,825.20	7,650.40	0.00E+00	3.66E-02	7.33E-02	11.0000	3.139E+01
Pa-231	3.9379E-09	3,825.20	7,650.40	0.00E+00	1.51E-05	3.01E-05		
Pb-210	3.3115E-10	3,825.20	7,650.40	0.00E+00	1.27E-06	2.53E-06		
Pm-147	9.2402E-04	3,825.20	7,650.40	0.00E+00	3.53E+00	7.07E+00		
Pu-238	1.6217E-02	3,825.20	7,650.40	0.00E+00	6.20E+01	1.24E+02		
Pu-239	4.2810E-04	3,825.20	7,650.40	0.00E+00	1.64E+00	3.28E+00		
Pu-240	2.4333E-04	3,825.20	7,650.40	0.00E+00	9.31E-01	1.86E+00		
Pu-241	1.6242E-02	3,825.20	7,650.40	0.00E+00	6.21E+01	1.24E+02		
Pu-242	3.6329E-07	3,825.20	7,650.40	0.00E+00	1.39E-03	2.78E-03		
Ra-226	9.0114E-10	3,825.20	7,650.40	0.00E+00	3.45E-06	6.89E-06		
Ra-228	3.1019E-14	3,825.20	7,650.40	0.00E+00	1.19E-10	2.37E-10		
Ru-106	2.1225E-10	3,825.20	7,650.40	0.00E+00	8.12E-07	1.62E-06		
Se-79	1.2930E-05	3,825.20	7,650.40	0.00E+00	4.95E-02	9.89E-02		
Sn-126	1.1571E-05	3,825.20	7,650.40	0.00E+00	4.43E-02	8.85E-02		
Sr-90	1.3472E+00	3,825.20	7,650.40	0.00E+00	5.15E+03	1.03E+04		
Tc-99	4.2239E-04	3,825.20	7,650.40	0.00E+00	1.62E+00	3.23E+00		
Th-229	1.2407E-11	3,825.20	7,650.40	0.00E+00	4.75E-08	9.49E-08		
Th-230	6.3497E-08	3,825.20	7,650.40	0.00E+00	3.19E-04	6.39E-04		
Th-232	3.6371E-14	3,825.20	7,650.40	0.00E+00	1.47E-10	2.94E-10		
Ti-208	4.0414E-08	3,825.20	7,650.40	0.00E+00	1.55E-04	3.09E-04		
U-232	1.0948E-07	3,825.20	7,650.40	0.00E+00	4.19E-04	8.38E-04		
U-233	3.6275E-09	3,825.20	7,650.40	0.00E+00	1.39E-05	2.78E-05		
U-234	1.8562E-04	3,825.20	7,650.40	0.00E+00	7.10E-01	1.42E+00		
U-235	-2.7235E-06	3,825.20	0.00	3.73E-02	2.69E-02	3.73E-02		
U-236	1.5493E-05	3,825.20	7,650.40	0.00E+00	5.93E-02	1.19E-01		
U-238	-4.2851E-09	3,825.20	0.00	5.08E-04	4.92E-04	5.08E-04		
Y-90	1.3475E+00	3,825.20	7,650.40	0.00E+00	5.15E+03	1.03E+04		
Other Radionuclides					5.23E+03	1.05E+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 %:	91.93720219	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		3,825.20	
Bounding:		7,650.40	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:	0.85		
Bounding:	1.30		1.02

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GRR (JALX HEU) GREECE
SNF ID #: 1069
Fuel Units & Descr: 46 - MTR TYPE
Heavy Metal Mass: BOL=7.99kg; EOL=6.27kg
ROD Storage Site: SRS

*Fuel decay start date: 1993
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"
1.28

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	1,629.25	3,258.50	0.00E+00	3.27E-08	6.54E-08	Avg. MeV	
Am-241	2.5251E-03	1,629.25	3,258.50	0.00E+00	4.11E+00	8.23E+00	0.0150	2.400E+14
Am-242m	3.9624E-07	1,629.25	3,258.50	0.00E+00	6.46E-04	1.29E-03	0.0250	4.983E+13
Am-243	1.4880E-06	1,629.25	3,258.50	0.00E+00	2.42E-03	4.85E-03	0.0375	4.332E+13
C-14	5.7053E-09	1,629.25	3,258.50	0.00E+00	9.30E-08	1.86E-06	0.0575	4.682E+13
Cl-36	1.3124E-32	1,629.25	3,258.50	0.00E+00	2.14E-29	4.28E-29	0.0850	2.809E+13
Cm-243	1.1419E-07	1,629.25	3,258.50	0.00E+00	1.86E-04	3.72E-04	0.1250	1.858E+13
Cm-244	1.6522E-05	1,629.25	3,258.50	0.00E+00	2.69E-02	5.38E-02	0.2250	2.425E+13
Co-60	7.4047E-07	1,629.25	3,258.50	0.00E+00	1.21E-03	2.41E-03	0.3750	1.055E+13
Cs-134	2.0455E-05	1,629.25	3,258.50	0.00E+00	3.33E-02	6.67E-02	0.5750	1.744E+14
Cs-135	3.4477E-06	1,629.25	3,258.50	0.00E+00	5.62E-03	1.12E-02	0.8500	2.130E+12
Cs-137	1.4365E+00	1,629.25	3,258.50	0.00E+00	2.34E+03	4.68E+03	1.2500	1.030E+12
Eu-154	7.3230E-03	1,629.25	3,258.50	0.00E+00	1.19E+01	2.39E+01	1.7500	5.798E+10
Eu-155	5.9259E-04	1,629.25	3,258.50	0.00E+00	9.65E-01	1.93E+00	2.2500	4.848E+06
Fe-55	2.2791E-06	1,629.25	3,258.50	0.00E+00	3.71E-03	7.43E-03	2.7500	4.627E+06
H-3	1.9698E-03	1,629.25	3,258.50	0.00E+00	3.21E+00	6.42E+00	3.5000	2.681E+03
I-129	7.5300E-07	1,629.25	3,258.50	0.00E+00	1.23E-03	2.45E-03	5.0000	1.096E+03
Kr-85	4.1176E-02	1,629.25	3,258.50	0.00E+00	6.71E+01	1.34E+02	7.0000	1.199E+02
Np-237	9.5752E-06	1,629.25	3,258.50	0.00E+00	1.56E-02	3.12E-02	11.0000	1.337E+01
Pa-231	3.9379E-09	1,629.25	3,258.50	0.00E+00	6.42E-06	1.28E-05		
Pb-210	3.3115E-10	1,629.25	3,258.50	0.00E+00	5.40E-07	1.08E-06		
Pm-147	9.2402E-04	1,629.25	3,258.50	0.00E+00	1.51E+00	3.01E+00		
Pu-238	1.6217E-02	1,629.25	3,258.50	0.00E+00	2.64E+01	5.28E+01		
Pu-239	4.2810E-04	1,629.25	3,258.50	0.00E+00	6.97E-01	1.39E+00		
Pu-240	2.4333E-04	1,629.25	3,258.50	0.00E+00	3.96E-01	7.93E-01		
Pu-241	1.6242E-02	1,629.25	3,258.50	0.00E+00	2.65E+01	5.29E+01		
Pu-242	3.6329E-07	1,629.25	3,258.50	0.00E+00	5.92E-04	1.18E-03		
Ra-226	9.0114E-10	1,629.25	3,258.50	0.00E+00	1.47E-06	2.94E-06		
Ra-228	3.1019E-14	1,629.25	3,258.50	0.00E+00	5.05E-11	1.01E-10		
Ru-106	2.1225E-10	1,629.25	3,258.50	0.00E+00	3.46E-07	6.92E-07		
Sa-79	1.2930E-06	1,629.25	3,258.50	0.00E+00	2.11E-02	4.21E-02		
Sn-126	1.1571E-05	1,629.25	3,258.50	0.00E+00	1.89E-02	3.77E-02		
Sr-90	1.3472E+00	1,629.25	3,258.50	0.00E+00	2.19E+03	4.39E+03		
Tc-99	4.2239E-04	1,629.25	3,258.50	0.00E+00	6.88E-01	1.38E+00		
Th-229	1.2407E-11	1,629.25	3,258.50	0.00E+00	2.02E-08	4.04E-08		
Th-230	8.3497E-08	1,629.25	3,258.50	0.00E+00	1.36E-04	2.72E-04		
Th-232	3.8371E-14	1,629.25	3,258.50	0.00E+00	6.25E-11	1.25E-10		
Ti-208	4.0414E-06	1,629.25	3,258.50	0.00E+00	6.58E-05	1.32E-04		
U-232	1.0948E-07	1,629.25	3,258.50	0.00E+00	1.78E-04	3.57E-04		
U-233	3.6275E-09	1,629.25	3,258.50	0.00E+00	5.91E-08	1.18E-06		
U-234	1.8562E-04	1,629.25	3,258.50	0.00E+00	3.02E-01	6.05E-01		
U-235	-2.7235E-06	1,629.25	0.00	1.59E-02	1.14E-02	1.59E-02		
U-238	1.5493E-05	1,629.25	3,258.50	0.00E+00	2.52E-02	5.05E-02		
U-238	-4.2851E-09	1,629.25	0.00	2.17E-04	2.10E-04	2.17E-04		
Y-90	1.3475E+00	1,629.25	3,258.50	0.00E+00	2.20E+03	4.39E+03		
Other Radionuclides					2.23E+03	4.46E+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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	91.93720219	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		1,629.25	
Bounding:		3,258.50	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.65		
Bounding:	1.30		1.02

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GTRR
 SIF ID #: 87
 Fuel Units & Descr: 25 - ASSEMBLY
 Heavy Metal Mass: BOL=5.05kg; EOL=4.67kg
 ROD Storage Size: SRS

Fuel decay start date: 1996
 Estimates as of: 2000
 Template: HFRM (Heavy Water, Alum., 40 to 100%, U)
 Template BOL Heavy Metal Mass (kg): 164.6
 Template Decay Time: 0.000377 25 years

Estimated
 Centister usage:
 18 x 10⁶
 0.69

Radionuclide	Can/Wd From Template	Nominal Fuel Burning (MWd) ²	Bounding Fuel Burning (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Gamma Sources
Ac-227	6.450E-10	634.24	1.068.48	0.00E+00	2.91E-07	5.83E-07	Avg. 80eV	Total Photons/sec (Bouding)
Am-241	9.2294E-03	634.24	1.068.48	0.00E+00	4.83E+00	9.86E+00	0.0160	1.002E+14
Am-242m	1.3300E-06	634.24	1.068.48	0.00E+00	7.15E-04	1.43E-03	0.0260	2.062E+13
Am-243	3.7084E-05	634.24	1.068.48	0.00E+00	1.88E-02	3.96E-02	0.0375	1.820E+13
C-14	2.6452E-08	634.24	1.068.48	0.00E+00	1.41E-05	2.83E-05	0.0575	1.940E+13
C-36	4.4441E-31	634.24	1.068.48	0.00E+00	2.37E-29	4.75E-28	0.0850	1.160E+12
Cm-243	5.0498E-06	634.24	1.068.48	0.00E+00	2.70E-03	5.40E-03	0.1260	8.110E+12
Cm-244	3.8461E-03	634.24	1.068.48	0.00E+00	2.05E+00	4.11E+00	0.2250	1.000E+13
Co-60	2.8225E-05	634.24	1.068.48	0.00E+00	1.35E-02	2.70E-02	0.5750	4.807E+12
Co-134	1.9830E-03	634.24	1.068.48	0.00E+00	1.06E+00	2.12E+00	0.5750	7.240E+13
Co-135	4.2564E-06	634.24	1.068.48	0.00E+00	2.27E-03	4.55E-03	0.8500	1.428E+12
Co-137	1.8141E+00	634.24	1.068.48	0.00E+00	9.69E+02	1.94E+03	1.2500	9.625E+11
Eu-154	3.4733E-02	634.24	1.068.48	0.00E+00	1.88E+01	3.71E+01	1.7500	3.864E+11
Eu-155	7.1081E-03	634.24	1.068.48	0.00E+00	3.80E+00	7.59E+00	2.2500	2.147E+06
Fe-55	3.5790E-04	634.24	1.068.48	0.00E+00	1.91E-01	3.82E-01	2.7500	1.946E+06
H-3	3.4945E-03	634.24	1.068.48	0.00E+00	1.87E+00	3.73E+00	3.6000	6.337E+04
I-129	6.6403E-07	634.24	1.068.48	0.00E+00	3.55E-04	7.10E-04	5.0000	2.686E+04
K-45	7.8230E-02	634.24	1.068.48	0.00E+00	4.18E+01	8.36E+01	7.0000	3.081E+03
Np-237	3.1567E-05	634.24	1.068.48	0.00E+00	1.89E-02	3.77E-02	11.0000	3.529E+02
Pb-231	1.3372E-09	634.24	1.068.48	0.00E+00	7.14E-07	1.43E-06		
Pm-147	3.0644E-11	634.24	1.068.48	0.00E+00	1.64E-08	3.27E-08		
Pu-238	1.5188E-03	634.24	1.068.48	0.00E+00	3.48E+00	6.97E+00		
Pu-239	1.4769E-01	634.24	1.068.48	0.00E+00	7.89E+01	1.58E+02		
Pu-240	6.9502E-04	634.24	1.068.48	0.00E+00	3.71E-01	7.43E-01		
Pu-241	3.7828E-04	634.24	1.068.48	0.00E+00	2.03E-01	4.06E-01		
Pu-242	1.0665E-01	634.24	1.068.48	0.00E+00	5.64E+01	1.13E+02		
Pu-242	3.0911E-06	634.24	1.068.48	0.00E+00	1.85E-03	3.90E-03		
Ra-226	1.081E-10	634.24	1.068.48	0.00E+00	6.82E-08	1.36E-07		
Ra-228	2.1185E-14	634.24	1.068.48	0.00E+00	1.13E-11	2.26E-11		
Ru-106	2.3621E-07	634.24	1.068.48	0.00E+00	1.29E-04	2.58E-04		
Sa-78	1.2339E-06	634.24	1.068.48	0.00E+00	6.59E-03	1.32E-02		
Sr-126	1.0194E-05	634.24	1.068.48	0.00E+00	6.45E-03	1.29E-02		
Sr-90	1.6932E+00	634.24	1.068.48	0.00E+00	9.06E+02	1.81E+03		
Tc-99	3.8066E-04	634.24	1.068.48	0.00E+00	2.03E-01	4.07E-01		
Th-229	9.1282E-12	634.24	1.068.48	0.00E+00	4.88E-09	9.76E-09		
Th-230	1.5407E-08	634.24	1.068.48	0.00E+00	8.23E-06	1.65E-05		
Th-232	2.8307E-14	634.24	1.068.48	0.00E+00	1.55E-11	3.09E-11		
Th-232	4.7272E-08	634.24	1.068.48	0.00E+00	2.53E-05	5.06E-05		
U-232	1.2655E-07	634.24	1.068.48	0.00E+00	6.87E-05	1.37E-04		
U-233	6.1470E-09	634.24	1.068.48	0.00E+00	2.75E-06	5.50E-06		
U-234	6.8069E-05	634.24	1.068.48	0.00E+00	3.00E-02	6.00E-02		
U-235	2.8661E-06	634.24	0.00	1.02E-02	8.63E-03	1.02E-02		
U-236	1.6701E-05	634.24	1.068.48	0.00E+00	8.82E-03	1.78E-02		
U-238	4.4184E-03	634.24	0.00	1.19E-04	1.19E-04	1.19E-04		
Y-90	1.6932E+00	634.24	1.068.48	0.00E+00	9.06E+02	1.81E+03		
Other Radionuclides					9.27E+02	1.85E+03		

II. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:		
Reactor Moderator:	From SFD	Used			
Fuel Cladding:	HEAVY WATER	HEAVY WATER			
BOL HM Constituents:	ALUM	ALUM			
BOL Enrichment %:	U	U			
	83.08300693	40 to 100			

Burnup Summary (MWd) ²			Basis for burnup used in estimate:		
From SFD	Estimated				
Nominal:	634.24	Nominal burnup calculated from the heavy metal mass destroyed.			
Bouding:	1.068.48	Bouding burnup assumed to be twice nominal burnup.			

Checks			Estimated EOL HM/Chen EOL HM		
Burnup Multiplier	0.24	Estimated Burnup/ Given Burnup			
Bouding:	0.48				

*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/HM).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: H. B. ROBINSON
SNF ID #: 98
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.547kg; EOL=0.52kg
ROD Storage Site: INEEL

Fuel decay start date: 1966
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"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	2.5200E-06	25.85	51.70	0.00E+00	6.51E-05	1.30E-04	0.0150
Am-241	8.6432E+00	25.85	51.70	0.00E+00	2.23E+02	4.47E+02	0.0250
Am-242m	1.5728E-02	25.85	51.70	0.00E+00	4.07E-01	8.13E-01	0.0375
Am-243	1.6288E-02	25.85	51.70	0.00E+00	4.21E-01	8.42E-01	0.0575
C-14	1.2068E-01	25.85	51.70	0.00E+00	3.12E+00	6.24E+00	0.0850
Cl-36	2.2849E-03	25.85	51.70	0.00E+00	5.91E-02	1.18E-01	0.1250
Cm-243	6.0144E-04	25.85	51.70	0.00E+00	1.55E-02	3.11E-02	0.2250
Cm-244	9.4880E-02	25.85	51.70	0.00E+00	2.45E+00	4.91E+00	0.3750
Co-60	3.9052E+00	25.85	51.70	0.00E+00	1.01E+02	2.02E+02	0.5750
Cs-134	2.2139E-06	25.85	51.70	0.00E+00	5.72E-05	1.14E-04	0.8500
Cs-135	4.3976E-04	25.85	51.70	0.00E+00	1.14E-02	2.27E-02	1.2500
Cs-137	1.4887E+01	25.85	51.70	0.00E+00	3.85E+02	7.70E+02	1.7500
Eu-154	3.7342E-01	25.85	51.70	0.00E+00	9.65E+00	1.93E+01	2.2500
Eu-155	8.4893E-03	25.85	51.70	0.00E+00	2.19E-01	4.39E-01	2.7500
Fe-55	5.3750E-03	25.85	51.70	0.00E+00	1.39E-01	2.78E-01	3.5000
H-3	1.0472E-01	25.85	51.70	0.00E+00	2.71E+00	5.41E+00	5.0000
I-129	1.0818E-05	25.85	51.70	0.00E+00	2.74E-04	5.49E-04	7.0000
Kr-85	2.2717E-01	25.85	51.70	0.00E+00	5.87E+00	1.17E+01	11.0000
Np-237	1.6400E-04	25.85	51.70	0.00E+00	4.24E-03	8.48E-03	
Pa-231	2.8588E-06	25.85	51.70	0.00E+00	7.42E-05	1.48E-04	
Pb-210	4.7312E-08	25.85	51.70	0.00E+00	1.22E-06	2.45E-06	
Pm-147	3.2198E-04	25.85	51.70	0.00E+00	8.32E-03	1.66E-02	
Pu-238	-1.1924E+00	25.85	0.00	7.03E+01	3.95E+01	7.03E+01	
Pu-239	-4.8600E-02	25.85	0.00	8.51E+00	7.25E+00	8.51E+00	
Pu-240	-3.0127E-01	25.85	0.00	1.09E+01	3.08E+00	1.09E+01	
Pu-241	-1.2917E+02	25.85	0.00	2.80E+03	0.00E+00	2.80E+03	
Pu-242	-1.1381E-04	25.85	0.00	4.70E-02	4.41E-02	4.70E-02	
Ra-226	1.0760E-07	25.85	51.70	0.00E+00	2.78E-06	5.56E-06	
Ra-228	6.0160E-07	25.85	51.70	0.00E+00	1.56E-05	3.11E-05	
Ru-106	1.3388E-13	25.85	51.70	0.00E+00	3.46E-12	6.92E-12	
Sa-79	1.9179E-04	25.85	51.70	0.00E+00	4.96E-03	9.92E-03	
Sn-126	1.6669E-04	25.85	51.70	0.00E+00	4.31E-03	8.62E-03	
Sr-90	1.3859E+01	25.85	51.70	0.00E+00	3.58E+02	7.17E+02	
Tc-99	6.7678E-03	25.85	51.70	0.00E+00	1.75E-01	3.50E-01	
Th-229	2.2592E-06	25.85	51.70	0.00E+00	5.84E-05	1.17E-04	
Th-230	7.5955E-06	25.85	51.70	0.00E+00	1.96E-04	3.93E-04	
Th-232	6.0208E-07	25.85	51.70	0.00E+00	1.56E-05	3.11E-05	
Ti-208	7.5795E-05	25.85	51.70	0.00E+00	1.96E-03	3.92E-03	
U-232	2.0521E-04	25.85	51.70	0.00E+00	5.30E-03	1.06E-02	
U-233	3.6128E-04	25.85	51.70	0.00E+00	9.34E-03	1.87E-02	
U-234	1.2788E-02	25.85	51.70	0.00E+00	3.31E-01	6.61E-01	
U-235	5.7486E-04	25.85	51.70	2.35E-04	1.51E-02	3.00E-02	
U-236	2.3485E-04	25.85	51.70	0.00E+00	6.07E-03	1.21E-02	
U-238	1.1581E-04	25.85	51.70	2.93E-05	3.02E-03	6.02E-03	
Y-90	1.3861E+01	25.85	51.70	0.00E+00	3.58E+02	7.17E+02	
Other Radionuclides					1.33E+03	2.66E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator:	From SFD	Used	Basis for Parameter Differences:
Fuel Cladding:	LIGHT WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	ZIRC	SST/Inconel	
BOL Enrichment %:	Pu and U	U, Th, & Pu	
	2.897	0 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		25.85	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	16.42	51.70	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.41		31.56
Bounding:	2.82	3.15	

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFBR
SNF ID #: 706
Fuel Units & Descr: 1050 - 18 CURVED PLATES
Heavy Metal Mass: BOL=394.8kg; EOL=282.24kg
ROD Storage Site: SRS

Fuel decay start date: 1982
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: 35 years

Estimated
Canister usage:
18"x10"
29.17

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.5869E-10	103,679.35	207,358.71	0.00E+00	9.94E-05	1.99E-04	Avg. MeV	
Am-241	1.0109E-02	103,679.35	207,358.71	0.00E+00	1.05E+03	2.10E+03	0.0150	1.532E+16
Am-242m	1.2789E-06	103,679.35	207,358.71	0.00E+00	1.33E-01	2.65E-01	0.0250	3.147E+15
Am-243	3.7047E-05	103,679.35	207,358.71	0.00E+00	3.84E+00	7.68E+00	0.0375	2.758E+15
C-14	2.6416E-08	103,679.35	207,358.71	0.00E+00	2.74E-03	5.48E-03	0.0675	2.967E+15
Cl-36	4.4441E-31	103,679.35	207,358.71	0.00E+00	4.61E-26	9.22E-26	0.0650	1.776E+15
Co-243	3.9605E-06	103,679.35	207,358.71	0.00E+00	4.11E-01	8.21E-01	0.1250	1.198E+15
Co-244	2.6227E-03	103,679.35	207,358.71	0.00E+00	2.72E+02	5.44E+02	0.2250	1.534E+15
Co-60	6.7740E-06	103,679.35	207,358.71	0.00E+00	7.02E-01	1.40E+00	0.3750	8.660E+14
Cs-134	6.8894E-05	103,679.35	207,358.71	0.00E+00	7.14E+00	1.43E+01	0.5750	1.112E+16
Cs-135	4.2564E-06	103,679.35	207,358.71	0.00E+00	4.41E-01	8.83E-01	0.8500	1.648E+14
Cs-137	1.4399E+00	103,679.35	207,358.71	0.00E+00	1.49E+05	2.99E+05	1.2500	9.844E+13
Eu-154	1.5522E-02	103,679.35	207,358.71	0.00E+00	1.61E+03	3.22E+03	1.7500	4.657E+12
Eu-155	1.7588E-03	103,679.35	207,358.71	0.00E+00	1.82E+02	3.65E+02	2.2500	3.224E+08
Fe-55	2.4933E-05	103,679.35	207,358.71	0.00E+00	2.59E+00	5.17E+00	2.7500	3.241E+08
H-3	1.9945E-03	103,679.35	207,358.71	0.00E+00	2.07E+02	4.14E+02	3.5000	8.616E+06
I-129	6.6403E-07	103,679.35	207,358.71	0.00E+00	6.88E-02	1.38E-01	5.0000	3.861E+06
Kr-85	4.1002E-02	103,679.35	207,358.71	0.00E+00	4.25E+03	8.50E+03	7.0000	4.192E+05
Np-237	3.1610E-05	103,679.35	207,358.71	0.00E+00	3.28E+00	6.55E+00	11.0000	4.797E+04
Pa-231	1.8876E-09	103,679.35	207,358.71	0.00E+00	1.96E-04	3.91E-04		
Pb-210	8.3840E-11	103,679.35	207,358.71	0.00E+00	8.69E-06	1.74E-05		
Pm-147	4.6501E-04	103,679.35	207,358.71	0.00E+00	4.82E+01	9.64E+01		
Pu-238	1.3645E-01	103,679.35	207,358.71	0.00E+00	1.41E+04	2.83E+04		
Pu-239	6.9502E-04	103,679.35	207,358.71	0.00E+00	7.21E+01	1.44E+02		
Pu-240	3.8183E-04	103,679.35	207,358.71	0.00E+00	3.96E+01	7.92E+01		
Pu-241	6.5310E-02	103,679.35	207,358.71	0.00E+00	6.77E+03	1.35E+04		
Pu-242	3.0911E-06	103,679.35	207,358.71	0.00E+00	3.20E-01	6.41E-01		
Ra-226	2.3512E-10	103,679.35	207,358.71	0.00E+00	2.44E-05	4.88E-05		
Ra-228	3.3366E-14	103,679.35	207,358.71	0.00E+00	3.46E-09	6.92E-09		
Ru-106	2.4490E-10	103,679.35	207,358.71	0.00E+00	2.54E-05	5.08E-05		
Se-79	1.2333E-05	103,679.35	207,358.71	0.00E+00	1.28E+00	2.56E+00		
Sn-126	1.0194E-05	103,679.35	207,358.71	0.00E+00	1.06E+00	2.11E+00		
Sr-90	1.3348E+00	103,679.35	207,358.71	0.00E+00	1.38E+05	2.77E+05		
Tc-99	3.8066E-04	103,679.35	207,358.71	0.00E+00	3.95E+01	7.89E+01		
Th-229	1.7868E-11	103,679.35	207,358.71	0.00E+00	1.85E-06	3.70E-06		
Th-230	2.3348E-08	103,679.35	207,358.71	0.00E+00	2.42E-03	4.84E-03		
Th-232	4.1288E-14	103,679.35	207,358.71	0.00E+00	4.28E-09	8.56E-09		
Ti-208	4.3190E-08	103,679.35	207,358.71	0.00E+00	4.48E-03	8.96E-03		
U-232	1.1707E-07	103,679.35	207,358.71	0.00E+00	1.21E-02	2.43E-02		
U-233	7.2175E-09	103,679.35	207,358.71	0.00E+00	7.48E-04	1.50E-03		
U-234	6.1543E-05	103,679.35	207,358.71	0.00E+00	6.38E+00	1.28E+01		
U-235	-2.8661E-06	103,679.35	0.00	7.94E-01	4.97E-01	7.94E-01		
U-236	1.6701E-05	103,679.35	207,358.71	0.00E+00	1.73E+00	3.46E+00		
U-238	-9.4194E-09	103,679.35	0.00	9.18E-03	8.20E-03	9.18E-03		
Y-90	1.3348E+00	103,679.35	207,358.71	0.00E+00	1.38E+05	2.77E+05		
Other Radionuclides								
							1.43E+05	2.86E+05

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.08510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		103,679.35
Bounding:		207,358.71

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:	0.80	
Bounding:	1.20	

Estimated EOL HM/Given EOL HM
1.01

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (HWR)
SNF ID #: 103
Fuel Units & Descr: 442 - 171 CURVED PLATES
Heavy Metal Mass: BOL=1234.506kg; EOL=623.667kg
ROD Storage Site: SRS

Fuel decay start date: 1986
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"
147.33

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	389,072.50	778,145.01	0.00E+00	7.81E-04	1.56E-03	Avg. MeV	
Am-241	2.5251E-03	389,072.50	778,145.01	0.00E+00	9.82E+02	1.96E+03	0.0150	5.731E+16
Am-242m	3.9624E-07	389,072.50	778,145.01	0.00E+00	1.54E-01	3.08E-01	0.0250	1.190E+16
Am-243	1.4880E-08	389,072.50	778,145.01	0.00E+00	5.79E-01	1.16E+00	0.0375	1.034E+16
C-14	5.7053E-09	389,072.50	778,145.01	0.00E+00	2.22E-03	4.44E-03	0.0575	1.113E+16
Cl-36	1.3124E-32	389,072.50	778,145.01	0.00E+00	5.11E-27	1.02E-26	0.0850	6.709E+15
Cm-243	1.1419E-07	389,072.50	778,145.01	0.00E+00	4.44E-02	8.89E-02	0.1250	4.431E+15
Cm-244	1.6522E-05	389,072.50	778,145.01	0.00E+00	6.43E+00	1.29E+01	0.2250	5.791E+15
Co-60	7.4047E-07	389,072.50	778,145.01	0.00E+00	2.88E-01	5.76E-01	0.3750	2.520E+15
Cs-134	2.0455E-05	389,072.50	778,145.01	0.00E+00	7.96E+00	1.59E+01	0.5750	4.184E+16
Cs-135	3.4477E-06	389,072.50	778,145.01	0.00E+00	1.34E+00	2.68E+00	0.8500	5.086E+14
Cs-137	1.4365E+00	389,072.50	778,145.01	0.00E+00	5.59E+05	1.12E+06	1.2500	2.460E+14
Eu-154	7.3230E-03	389,072.50	778,145.01	0.00E+00	2.85E+03	5.70E+03	1.7500	1.385E+13
Eu-155	5.9259E-04	389,072.50	778,145.01	0.00E+00	2.31E+02	4.61E+02	2.2500	1.158E+09
Fe-55	2.2791E-06	389,072.50	778,145.01	0.00E+00	8.87E-01	1.77E+00	2.7500	1.105E+09
H-3	1.9698E-03	389,072.50	778,145.01	0.00E+00	7.66E+02	1.53E+03	3.5000	6.402E+05
I-129	7.5300E-07	389,072.50	778,145.01	0.00E+00	2.93E-01	5.86E-01	5.0000	2.616E+05
Kr-85	4.1176E-02	389,072.50	778,145.01	0.00E+00	1.60E+04	3.20E+04	7.0000	2.862E+04
Np-237	9.5752E-08	389,072.50	778,145.01	0.00E+00	3.73E+00	7.45E+00	11.0000	3.192E+03
Pa-231	3.9379E-09	389,072.50	778,145.01	0.00E+00	1.53E-03	3.06E-03		
Pb-210	3.3115E-10	389,072.50	778,145.01	0.00E+00	1.29E-04	2.58E-04		
Pm-147	9.2402E-04	389,072.50	778,145.01	0.00E+00	3.60E+02	7.19E+02		
Pu-238	1.6217E-02	389,072.50	778,145.01	0.00E+00	6.31E+03	1.26E+04		
Pu-239	4.2810E-04	389,072.50	778,145.01	0.00E+00	1.67E+02	3.33E+02		
Pu-240	2.4333E-04	389,072.50	778,145.01	0.00E+00	9.47E+01	1.89E+02		
Pu-241	1.6242E-02	389,072.50	778,145.01	0.00E+00	6.32E+03	1.26E+04		
Pu-242	3.6329E-07	389,072.50	778,145.01	0.00E+00	1.41E-01	2.83E-01		
Ra-226	9.0114E-10	389,072.50	778,145.01	0.00E+00	3.51E-04	7.01E-04		
Ra-228	3.1019E-14	389,072.50	778,145.01	0.00E+00	1.21E-08	2.41E-08		
Ru-106	2.1225E-10	389,072.50	778,145.01	0.00E+00	8.26E-05	1.65E-04		
Se-79	1.2930E-05	389,072.50	778,145.01	0.00E+00	5.03E+00	1.01E+01		
Sn-126	1.1571E-05	389,072.50	778,145.01	0.00E+00	4.50E+00	9.00E+00		
Sr-90	1.3472E+00	389,072.50	778,145.01	0.00E+00	5.24E+05	1.05E+06		
Tc-99	4.2239E-04	389,072.50	778,145.01	0.00E+00	1.64E+02	3.29E+02		
Th-229	1.2407E-11	389,072.50	778,145.01	0.00E+00	4.83E-06	9.65E-06		
Th-230	8.3497E-08	389,072.50	778,145.01	0.00E+00	3.25E-02	6.50E-02		
Th-232	3.8371E-14	389,072.50	778,145.01	0.00E+00	1.49E-08	2.99E-08		
Th-208	4.0414E-08	389,072.50	778,145.01	0.00E+00	1.57E-02	3.14E-02		
U-232	1.0948E-07	389,072.50	778,145.01	0.00E+00	4.26E-02	8.52E-02		
U-233	3.6275E-09	389,072.50	778,145.01	0.00E+00	1.41E-03	2.82E-03		
U-234	1.8562E-04	389,072.50	778,145.01	0.00E+00	7.22E+01	1.44E+02		
U-235	-2.7235E-06	389,072.50	0.00	2.48E+00	1.42E+00	2.48E+00		
U-238	1.5493E-05	389,072.50	778,145.01	0.00E+00	6.03E+00	1.21E+01		
U-238	-4.2851E-09	389,072.50	0.00	2.92E-02	2.76E-02	2.92E-02		
Y-90	1.3475E+00	389,072.50	778,145.01	0.00E+00	5.24E+05	1.05E+06		
Other Radionuclides					5.32E+05	1.06E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.954	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	283,936.38	389,072.50	
Bounding:		778,145.01	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:	1.00	1.37	
Bounding:	2.00		1.03

^a Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^b Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (INNER)
 SNF ID #: 1063
 Fuel Units & Descr: 54 - 171 CURVED PLATES
 Heavy Metal Mass: BOL=148.446kg; EOL=115.285kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1986
 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"
 18.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	34,142.58	68,285.16	0.00E+00	6.85E-05	1.37E-04	Avg. MeV	
Am-241	2.5251E-03	34,142.58	68,285.16	0.00E+00	8.62E+01	1.72E+02	0.0150	5.029E+15
Am-242m	3.9624E-07	34,142.58	68,285.16	0.00E+00	1.35E-02	2.71E-02	0.0250	1.044E+15
Am-243	1.4880E-06	34,142.58	68,285.16	0.00E+00	5.08E-02	1.02E-01	0.0375	9.077E+14
C-14	5.7053E-09	34,142.58	68,285.16	0.00E+00	1.85E-04	3.90E-04	0.0575	9.771E+14
Cl-36	1.3124E-32	34,142.58	68,285.16	0.00E+00	4.48E-28	8.96E-28	0.0850	5.887E+14
Cm-243	1.1419E-07	34,142.58	68,285.16	0.00E+00	3.90E-03	7.80E-03	0.1250	3.889E+14
Cm-244	1.6522E-05	34,142.58	68,285.16	0.00E+00	5.64E-01	1.13E+00	0.2250	5.082E+14
Co-60	7.4047E-07	34,142.58	68,285.16	0.00E+00	2.53E-02	5.06E-02	0.3750	2.211E+14
Cs-134	2.0455E-05	34,142.58	68,285.16	0.00E+00	6.98E-01	1.40E+00	0.5750	3.854E+15
Cs-135	3.4477E-06	34,142.58	68,285.16	0.00E+00	1.18E-01	2.35E-01	0.8500	4.464E+13
Cs-137	1.4365E+00	34,142.58	68,285.16	0.00E+00	4.90E+04	9.81E+04	1.2500	2.159E+13
Eu-154	7.3230E-03	34,142.58	68,285.16	0.00E+00	2.50E+02	5.00E+02	1.7500	1.215E+12
Eu-155	5.9259E-04	34,142.58	68,285.16	0.00E+00	2.02E+01	4.05E+01	2.2500	1.016E+08
Fe-55	2.2791E-06	34,142.58	68,285.16	0.00E+00	7.78E-02	1.56E-01	2.7500	9.897E+07
H-3	1.9698E-03	34,142.58	68,285.16	0.00E+00	6.73E+01	1.35E+02	3.5000	5.618E+04
I-129	7.5300E-07	34,142.58	68,285.16	0.00E+00	2.57E-02	5.14E-02	5.0000	2.296E+04
Kr-85	4.1176E-02	34,142.58	68,285.16	0.00E+00	1.41E+03	2.81E+03	7.0000	2.512E+03
Np-237	9.5752E-06	34,142.58	68,285.16	0.00E+00	3.27E-01	6.54E-01	11.0000	2.801E+02
Pa-231	3.8379E-09	34,142.58	68,285.16	0.00E+00	1.34E-04	2.69E-04		
Pb-210	3.3115E-10	34,142.58	68,285.16	0.00E+00	1.13E-05	2.26E-05		
Pm-147	9.2402E-04	34,142.58	68,285.16	0.00E+00	3.15E+01	6.31E+01		
Pu-238	1.6217E-02	34,142.58	68,285.16	0.00E+00	5.54E+02	1.11E+03		
Pu-239	4.2810E-04	34,142.58	68,285.16	0.00E+00	1.46E+01	2.92E+01		
Pu-240	2.4333E-04	34,142.58	68,285.16	0.00E+00	8.31E+00	1.66E+01		
Pu-241	1.6242E-02	34,142.58	68,285.16	0.00E+00	5.55E+02	1.11E+03		
Pu-242	3.6329E-07	34,142.58	68,285.16	0.00E+00	1.24E-02	2.48E-02		
Ra-226	9.0114E-10	34,142.58	68,285.16	0.00E+00	3.08E-05	6.15E-05		
Ra-228	3.1019E-14	34,142.58	68,285.16	0.00E+00	1.06E-09	2.12E-09		
Ru-106	2.1225E-10	34,142.58	68,285.16	0.00E+00	7.25E-06	1.45E-05		
Se-79	1.2930E-05	34,142.58	68,285.16	0.00E+00	4.41E-01	8.83E-01		
Sn-126	1.1571E-05	34,142.58	68,285.16	0.00E+00	3.95E-01	7.90E-01		
Sr-90	1.3472E+00	34,142.58	68,285.16	0.00E+00	4.60E+04	9.20E+04		
Tc-99	4.2239E-04	34,142.58	68,285.16	0.00E+00	1.44E+01	2.88E+01		
Th-229	1.2407E-11	34,142.58	68,285.16	0.00E+00	4.24E-07	8.47E-07		
Th-230	8.3497E-08	34,142.58	68,285.16	0.00E+00	2.85E-03	5.70E-03		
Th-232	3.6371E-14	34,142.58	68,285.16	0.00E+00	1.31E-09	2.62E-09		
Ti-208	4.0414E-08	34,142.58	68,285.16	0.00E+00	1.38E-03	2.76E-03		
U-232	1.0948E-07	34,142.58	68,285.16	0.00E+00	3.74E-03	7.48E-03	Thermal Power	
U-233	3.6275E-09	34,142.58	68,285.16	0.00E+00	1.24E-04	2.48E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8562E-04	34,142.58	68,285.16	0.00E+00	6.34E+00	1.27E+01	8.71E+02	1.14E+03
U-235	-2.7235E-06	34,142.58	0.00	2.99E-01	2.06E-01	2.99E-01	Total	Total
U-236	1.5493E-05	34,142.58	68,285.16	0.00E+00	5.29E-01	1.06E+00		
U-238	-4.2851E-09	34,142.58	0.00	3.42E-03	3.28E-03	3.42E-03		
Y-90	1.3475E+00	34,142.58	68,285.16	0.00E+00	4.60E+04	9.20E+04		
Other Radionuclides					4.67E+04	9.34E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.141	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	34,142.58	31,404.49
Bounding:		68,285.16

Basis for burnup used in estimate:
 Nominal burnup taken directly from SFD (converted to MWd).
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	0.92
Bounding:	1.46	

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: HFIR (OUTER)
SNF ID #: 707
Fuel Units & Descr: 54 - 369 CURVED PLATES
Heavy Metal Mass: BOL=388.687kg; EOL=322.364kg
ROD Storage Site: SRS

Fuel decay start date: 1986
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:
24"x10"
18.00

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	89,397.92	178,795.84	0.00E+00	1.79E-04	3.59E-04	Avg. MeV	
Am-241	2.5251E-03	89,397.92	178,795.84	0.00E+00	2.26E+02	4.51E+02	0.0150	1.317E+16
Am-242m	3.9624E-07	89,397.92	178,795.84	0.00E+00	3.54E-02	7.08E-02	0.0250	2.734E+15
Am-243	1.4880E-06	89,397.92	178,795.84	0.00E+00	1.33E-01	2.66E-01	0.0375	2.377E+15
C-14	5.7053E-09	89,397.92	178,795.84	0.00E+00	5.10E-04	1.02E-03	0.0575	2.558E+15
Cl-36	1.3124E-32	89,397.92	178,795.84	0.00E+00	1.17E-27	2.35E-27	0.0850	1.541E+15
Cm-243	1.1419E-07	89,397.92	178,795.84	0.00E+00	1.02E-02	2.04E-02	0.1250	1.018E+15
Cm-244	1.6522E-05	89,397.92	178,795.84	0.00E+00	1.48E+00	2.95E+00	0.2250	1.331E+15
Co-60	7.4047E-07	89,397.92	178,795.84	0.00E+00	6.62E-02	1.32E-01	0.3750	5.789E+14
Ca-134	2.0455E-05	89,397.92	178,795.84	0.00E+00	1.83E+00	3.66E+00	0.5750	9.568E+15
Ca-135	3.4477E-06	89,397.92	178,795.84	0.00E+00	3.08E-01	6.16E-01	0.8500	1.169E+14
Ca-137	1.4365E+00	89,397.92	178,795.84	0.00E+00	1.28E+05	2.57E+05	1.2500	5.653E+13
Eu-154	7.3230E-03	89,397.92	178,795.84	0.00E+00	6.55E+02	1.31E+03	1.7500	3.181E+12
Eu-155	5.9259E-04	89,397.92	178,795.84	0.00E+00	5.30E+01	1.06E+02	2.2500	2.660E+08
Fe-55	2.2791E-06	89,397.92	178,795.84	0.00E+00	2.04E-01	4.08E-01	2.7500	2.539E+08
H-3	1.9698E-03	89,397.92	178,795.84	0.00E+00	1.76E+02	3.52E+02	3.5000	1.471E+05
I-129	7.5300E-07	89,397.92	178,795.84	0.00E+00	6.73E-02	1.35E-01	5.0000	6.011E+04
Kr-85	4.1176E-02	89,397.92	178,795.84	0.00E+00	3.68E+03	7.36E+03	7.0000	6.578E+03
Np-237	9.5752E-06	89,397.92	178,795.84	0.00E+00	8.56E-01	1.71E+00	11.0000	7.334E+02
Pa-231	3.9379E-09	89,397.92	178,795.84	0.00E+00	3.52E-04	7.04E-04		
Pb-210	3.3115E-10	89,397.92	178,795.84	0.00E+00	2.96E-05	5.92E-05		
Pm-147	9.2402E-04	89,397.92	178,795.84	0.00E+00	8.26E+01	1.65E+02		
Pu-238	1.6217E-02	89,397.92	178,795.84	0.00E+00	1.45E+03	2.90E+03		
Pu-239	4.2810E-04	89,397.92	178,795.84	0.00E+00	3.83E+01	7.65E+01		
Pu-240	2.4333E-04	89,397.92	178,795.84	0.00E+00	2.18E+01	4.35E+01		
Pu-241	1.6242E-02	89,397.92	178,795.84	0.00E+00	1.45E+03	2.90E+03		
Pu-242	3.6329E-07	89,397.92	178,795.84	0.00E+00	3.25E-02	6.50E-02		
Ra-226	9.0114E-10	89,397.92	178,795.84	0.00E+00	8.06E-05	1.61E-04		
Ra-228	3.1019E-14	89,397.92	178,795.84	0.00E+00	2.77E-09	5.55E-09		
Ru-106	2.1225E-10	89,397.92	178,795.84	0.00E+00	1.90E-05	3.80E-05		
Se-79	1.2930E-05	89,397.92	178,795.84	0.00E+00	1.16E+00	2.31E+00		
Sn-126	1.1571E-05	89,397.92	178,795.84	0.00E+00	1.03E+00	2.07E+00		
Sr-90	1.3472E+00	89,397.92	178,795.84	0.00E+00	1.20E+05	2.41E+05		
Tc-99	4.2239E-04	89,397.92	178,795.84	0.00E+00	3.78E+01	7.55E+01		
Th-229	1.2407E-11	89,397.92	178,795.84	0.00E+00	1.11E-08	2.22E-08		
Th-230	8.3497E-08	89,397.92	178,795.84	0.00E+00	7.46E-03	1.49E-02		
Th-232	3.8371E-14	89,397.92	178,795.84	0.00E+00	3.43E-09	6.86E-09		
Th-208	4.0414E-08	89,397.92	178,795.84	0.00E+00	3.61E-03	7.23E-03		
U-232	1.0948E-07	89,397.92	178,795.84	0.00E+00	9.79E-03	1.96E-02		
U-233	3.6275E-09	89,397.92	178,795.84	0.00E+00	3.24E-04	6.49E-04		
U-234	1.8562E-04	89,397.92	178,795.84	0.00E+00	1.66E+01	3.32E+01		
U-235	-2.7235E-06	89,397.92	0.00	7.82E-01	5.39E-01	7.82E-01		
U-236	1.5493E-05	89,397.92	178,795.84	0.00E+00	1.39E+00	2.77E+00		
U-238	-4.2851E-09	89,397.92	0.00	8.96E-03	8.58E-03	8.96E-03		
Y-90	1.3475E+00	89,397.92	178,795.84	0.00E+00	1.20E+05	2.41E+05		
Other Radionuclides					1.22E+05	2.45E+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:	ALUM	ALUM	
BOL Enrichment %:	93.141	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	89,397.92	62,808.98	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		178,795.84	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.73	0.70	0.93
Bounding:	1.46		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

Fuel and Template Information
 Fuel Name: FFR (OUTER)
 SNF ID #: 1084
 Fuel Units & Descr: 442 - 369 CURVED PLATES
 Heavy Metal Mass: BOL-232.38kg EOL-2303.174kg
 ROD Storage Site: SRS

Estimated
 Fuel decay start date: 1986
 Estimates as of: 2000
 Template: ATR (Light Water, Ann. 60 to 100%, U)
 Template BOL Heavy Metal Mass (MT): 367.2
 Template Decay Time: 0.0016689
 35 years

Estimated
 Canister Usage:
 247.10
 147.33

II. Estimates	m	%	%	b	%	%	Gamma Sources	Total
							Photon Energy Group	Photon/sec (Bouding)
Radionuclide	CUMUL From Template	Nominal Fuel Burnup (MWd/MT)	Bounding Fuel Burnup (MWd)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Photon/sec (Bouding)
Ac-227	2.0058E-09	879,986.15	1,759,972.29	0.00E+00	1.77E-03	3.53E-03	Avg. Moly	1.29E+17
Am-241	2.5251E-03	879,986.15	1,759,972.29	0.00E+00	2.22E+03	4.44E+03	0.0150	2.69E+16
Am-242m	3.9624E-07	879,986.15	1,759,972.29	0.00E+00	3.49E-01	6.97E-01	0.0250	2.34E+16
Am-243	1.4890E-06	879,986.15	1,759,972.29	0.00E+00	1.31E+00	2.62E+00	0.0375	2.34E+16
C-14	5.7053E-04	879,986.15	1,759,972.29	0.00E+00	5.02E-03	1.00E-02	0.0575	2.51E+16
Ci-36	1.3124E-02	879,986.15	1,759,972.29	0.00E+00	1.15E-26	2.31E-26	0.0650	1.517E+16
Cm-243	1.1419E-07	879,986.15	1,759,972.29	0.00E+00	1.00E-01	2.01E-01	0.1250	1.300E+16
Cm-244	1.6522E-05	879,986.15	1,759,972.29	0.00E+00	1.45E-01	2.91E-01	0.2250	1.300E+16
Ce-134	7.4047E-07	879,986.15	1,759,972.29	0.00E+00	8.52E-01	3.60E+01	0.5750	5.699E+15
Ce-135	2.0455E-05	879,986.15	1,759,972.29	0.00E+00	3.03E+00	6.07E+00	0.8500	9.419E+15
Ce-137	1.4355E+00	879,986.15	1,759,972.29	0.00E+00	1.26E+06	2.53E+06	1.2500	5.564E+14
Eu-154	7.2630E-09	879,986.15	1,759,972.29	0.00E+00	6.44E-03	1.29E-04	1.7500	3.132E+13
Eu-155	5.8259E-04	879,986.15	1,759,972.29	0.00E+00	5.21E+02	1.04E+03	2.2500	2.618E+09
Fe-55	2.2791E-06	879,986.15	1,759,972.29	0.00E+00	2.01E+00	4.01E+00	2.7500	2.682E+09
H-3	1.9698E-03	879,986.15	1,759,972.29	0.00E+00	1.73E+03	3.47E+03	3.5000	1.448E+08
I-129	7.5300E-07	879,986.15	1,759,972.29	0.00E+00	6.63E-01	1.33E+00	5.0000	5.817E+05
K-45	4.1176E-02	879,986.15	1,759,972.29	0.00E+00	3.82E+04	7.25E+04	7.0000	6.471E+04
Mo-237	9.5732E-06	879,986.15	1,759,972.29	0.00E+00	8.43E+00	1.69E+01	11.0000	7.219E+03
Pa-231	3.8379E-09	879,986.15	1,759,972.29	0.00E+00	3.47E-03	6.93E-03		
Pb-210	3.3151E-10	879,986.15	1,759,972.29	0.00E+00	2.91E-04	5.83E-04		
Pm-147	8.2402E-04	879,986.15	1,759,972.29	0.00E+00	8.13E-02	1.63E-03		
Pu-238	1.8217E-02	879,986.15	1,759,972.29	0.00E+00	1.43E+04	2.85E+04		
Pu-239	4.2810E-04	879,986.15	1,759,972.29	0.00E+00	3.77E+02	7.53E+02		
Pu-240	2.4333E-04	879,986.15	1,759,972.29	0.00E+00	2.14E+02	4.28E+02		
Pu-241	1.8242E-02	879,986.15	1,759,972.29	0.00E+00	1.43E+04	2.85E+04		
Pu-242	3.6329E-07	879,986.15	1,759,972.29	0.00E+00	3.20E-01	6.39E-01		
Pa-228	8.0144E-10	879,986.15	1,759,972.29	0.00E+00	7.83E-04	1.59E-03		
Pa-229	3.1019E-14	879,986.15	1,759,972.29	0.00E+00	2.73E-08	5.46E-08		
Ra-226	2.1225E-10	879,986.15	1,759,972.29	0.00E+00	1.87E-04	3.74E-04		
Sr-128	1.571E-05	879,986.15	1,759,972.29	0.00E+00	1.02E+01	2.04E+01		
Sr-90	1.3472E+00	879,986.15	1,759,972.29	0.00E+00	1.19E+06	2.37E+06		
Tc-99	4.2239E-04	879,986.15	1,759,972.29	0.00E+00	3.72E-02	7.43E-02		
Th-229	1.2407E-11	879,986.15	1,759,972.29	0.00E+00	1.09E-05	2.18E-05		
Th-230	8.3497E-08	879,986.15	1,759,972.29	0.00E+00	7.35E-02	1.47E-01		
Th-232	3.8371E-14	879,986.15	1,759,972.29	0.00E+00	3.39E-08	6.75E-08		
U-232	1.0948E-07	879,986.15	1,759,972.29	0.00E+00	9.63E-02	1.93E-01		
U-233	3.6275E-09	879,986.15	1,759,972.29	0.00E+00	3.19E-03	6.38E-03		
U-234	1.8582E-04	879,986.15	1,759,972.29	0.00E+00	1.63E-02	3.27E+02		
U-235	2.7236E-06	879,986.15	1,759,972.29	0.00E+00	4.10E+00	8.19E+00		
U-236	1.5463E-05	879,986.15	1,759,972.29	0.00E+00	1.36E+01	2.73E+01		
U-238	4.2851E+09	879,986.15	1,759,972.29	0.00E+00	7.65E+02	1.53E+03		
Y-90	1.3475E+00	879,986.15	1,759,972.29	0.00E+00	1.19E+06	2.37E+06		

Thermal Power	
Nominal Heat Output (Watts)	2.05E+04
Bounding Heat Output (Watts)	2.05E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	
Reactor Moderator:	From SFD
Fuel Cladding:	Used
BOL HML Constituents:	U
BOL Enrichment %:	60 to 100

Basic for Parameter Differences:

Burnup Summary (MWd)	
Month:	From SFD
Bounding:	Estimated

Basic for Burnup used in estimate:

Nominal burnup calculated from BOL heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks	
Nonfatal:	Burnup Multiplier
Bounding:	Estimated Burnup/ Given Burnup

Estimated BOL HML/Given BOL HML

Reactor shutdown, core removal, storage, shipping or other date confirming fuel fractionation caused 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/HMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HIFAR (UALX-HEU) AUSTRALIA
SNF ID #: 680
Fuel Units & Descr: 240 - 12 CURVED PLATES
Heavy Metal Mass: BOL=45.192kg; EOL=33.624kg
ROD Storage Site: SRS

Fuel decay start date: 1998
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: 25 years

Estimated
Canister usage:
18"x10"
6.67

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	5.4520E-10	10,655.32	21,310.64	0.00E+00	5.81E-08	1.16E-05	Avg. MeV	
Am-241	9.2284E-03	10,655.32	21,310.64	0.00E+00	9.83E+01	1.97E+02	0.0150	1.998E+16
Am-242m	1.3390E-06	10,655.32	21,310.64	0.00E+00	1.43E-02	2.85E-02	0.0250	4.112E+14
Am-243	3.7084E-05	10,655.32	21,310.64	0.00E+00	3.95E-01	7.90E-01	0.0375	3.631E+14
C-14	2.6452E-08	10,655.32	21,310.64	0.00E+00	2.82E-04	5.64E-04	0.0575	3.872E+14
Cl-36	4.4441E-31	10,655.32	21,310.64	0.00E+00	4.74E-27	9.47E-27	0.0850	2.331E+14
Cm-243	5.0498E-06	10,655.32	21,310.64	0.00E+00	5.38E-02	1.08E-01	0.1250	1.817E+14
Cm-244	3.8451E-03	10,655.32	21,310.64	0.00E+00	4.10E+01	8.19E+01	0.2250	2.012E+14
Co-60	2.5225E-05	10,655.32	21,310.64	0.00E+00	2.69E-01	5.38E-01	0.3750	8.710E+13
Cs-134	1.9830E-03	10,655.32	21,310.64	0.00E+00	2.11E+01	4.23E+01	0.5750	1.444E+15
Cs-135	4.2564E-06	10,655.32	21,310.64	0.00E+00	4.54E-02	9.07E-02	0.8500	2.844E+13
Cs-137	1.8141E+00	10,655.32	21,310.64	0.00E+00	1.93E+04	3.87E+04	1.2500	1.920E+13
Eu-154	3.4733E-02	10,655.32	21,310.64	0.00E+00	3.70E+02	7.40E+02	1.7500	7.945E+11
Eu-155	7.1081E-03	10,655.32	21,310.64	0.00E+00	7.57E+01	1.51E+02	2.2500	4.283E+07
Fe-55	3.5790E-04	10,655.32	21,310.64	0.00E+00	3.81E+00	7.63E+00	2.7500	3.682E+07
H-3	3.4945E-03	10,655.32	21,310.64	0.00E+00	3.72E+01	7.45E+01	3.5000	1.284E+06
I-129	6.6403E-07	10,655.32	21,310.64	0.00E+00	7.08E-03	1.42E-02	5.0000	5.358E+05
Kr-85	7.8250E-02	10,655.32	21,310.64	0.00E+00	8.34E+02	1.67E+03	7.0000	8.148E+04
Np-237	3.1567E-05	10,655.32	21,310.64	0.00E+00	3.36E-01	6.73E-01	11.0000	7.039E+03
Pa-231	1.3372E-09	10,655.32	21,310.64	0.00E+00	1.42E-05	2.85E-05		
Pb-210	3.0644E-11	10,655.32	21,310.64	0.00E+00	3.27E-07	6.53E-07		
Pm-147	6.5188E-03	10,655.32	21,310.64	0.00E+00	6.95E+01	1.39E+02		
Pu-238	1.4769E-01	10,655.32	21,310.64	0.00E+00	1.57E+03	3.15E+03		
Pu-239	6.9502E-04	10,655.32	21,310.64	0.00E+00	7.41E+00	1.48E+01		
Pu-240	3.7928E-04	10,655.32	21,310.64	0.00E+00	4.04E+00	8.08E+00		
Pu-241	1.0565E-01	10,655.32	21,310.64	0.00E+00	1.13E+03	2.25E+03		
Pu-242	3.0911E-08	10,655.32	21,310.64	0.00E+00	3.29E-02	6.59E-02		
Ra-226	1.1081E-10	10,655.32	21,310.64	0.00E+00	1.18E-06	2.36E-06		
Ra-228	2.1185E-14	10,655.32	21,310.64	0.00E+00	2.26E-10	4.51E-10		
Ru-106	2.3621E-07	10,655.32	21,310.64	0.00E+00	2.52E-03	5.03E-03		
Se-79	1.2339E-05	10,655.32	21,310.64	0.00E+00	1.31E-01	2.63E-01		
Sn-126	1.0194E-05	10,655.32	21,310.64	0.00E+00	1.09E-01	2.17E-01		
Sr-90	1.6932E+00	10,655.32	21,310.64	0.00E+00	1.80E+04	3.61E+04		
Tc-99	3.8056E-04	10,655.32	21,310.64	0.00E+00	4.05E+00	8.11E+00		
Th-229	9.1252E-12	10,655.32	21,310.64	0.00E+00	9.72E-08	1.94E-07		
Th-230	1.5407E-08	10,655.32	21,310.64	0.00E+00	1.64E-04	3.28E-04		
Th-232	2.8937E-14	10,655.32	21,310.64	0.00E+00	3.08E-10	6.17E-10		
Th-234	4.7272E-08	10,655.32	21,310.64	0.00E+00	5.04E-04	1.01E-03		
U-232	1.2855E-07	10,655.32	21,310.64	0.00E+00	1.37E-03	2.74E-03		
U-233	5.1470E-09	10,655.32	21,310.64	0.00E+00	5.48E-05	1.10E-04		
U-234	5.6069E-05	10,655.32	21,310.64	0.00E+00	5.97E-01	1.19E+00		
U-235	2.8661E-08	10,655.32	0.00	7.80E-02	4.74E-02	7.80E-02		
U-236	1.6701E-05	10,655.32	21,310.64	0.00E+00	1.78E-01	3.56E-01		
U-238	9.4194E-09	10,655.32	0.00	3.06E-03	2.96E-03	3.06E-03		
Y-90	1.6932E+00	10,655.32	21,310.64	0.00E+00	1.80E+04	3.61E+04		
Other Radionuclides					1.85E+04	3.70E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.75E+03	5.53E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	79.8255621	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		10,655.32	
		21,310.64	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.54	1.08	
			1.01

¹Reactor shutdowns, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HOR (NETHERLANDS)
SNF ID #: 713
Fuel Units & Descr: 33 - ASSEMBLY
Heavy Metal Mass: BOL=6.55kg; EOL=4.01kg
WOD Storage Site: SRS

Fuel decay start date: 1968
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"
1.38

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	2,406.38	4,812.75	0.00E+00	4.83E-06	9.66E-06	Avg. MeV	
Am-241	2.5251E-03	2,406.38	4,812.75	0.00E+00	6.08E+00	1.22E+01	0.0150	3.545E+14
Am-242m	3.9624E-07	2,406.38	4,812.75	0.00E+00	9.54E-04	1.91E-03	0.0250	7.360E+13
Am-243	1.4880E-06	2,406.38	4,812.75	0.00E+00	3.58E-03	7.16E-03	0.0375	6.398E+13
C-14	5.7053E-09	2,406.38	4,812.75	0.00E+00	1.37E-05	2.75E-05	0.0575	6.886E+13
Cl-36	1.3124E-32	2,406.38	4,812.75	0.00E+00	3.18E-29	6.32E-29	0.0850	4.149E+13
Cm-243	1.1419E-07	2,406.38	4,812.75	0.00E+00	2.75E-04	5.50E-04	0.1250	2.741E+13
Cm-244	1.6522E-05	2,406.38	4,812.75	0.00E+00	3.98E-02	7.95E-02	0.2250	3.582E+13
Co-60	7.4047E-07	2,406.38	4,812.75	0.00E+00	1.78E-03	3.56E-03	0.3750	1.558E+13
Cs-134	2.0455E-05	2,406.38	4,812.75	0.00E+00	4.92E-02	9.84E-02	0.5750	2.575E+14
Cs-137	3.4477E-06	2,406.38	4,812.75	0.00E+00	8.30E-03	1.66E-02	0.8500	3.146E+12
Cs-135	1.4365E+00	2,406.38	4,812.75	0.00E+00	3.46E+03	6.91E+03	1.2500	1.522E+12
Eu-154	7.3290E-03	2,406.38	4,812.75	0.00E+00	1.76E+01	3.52E+01	1.7500	8.564E+10
Eu-155	5.9259E-04	2,406.38	4,812.75	0.00E+00	1.43E+00	2.85E+00	2.2500	7.160E+06
Fe-55	2.2791E-06	2,406.38	4,812.75	0.00E+00	5.48E-03	1.10E-02	2.7500	6.834E+06
H-3	1.9688E-03	2,406.38	4,812.75	0.00E+00	4.74E+00	9.48E+00	3.5000	3.959E+03
I-129	7.5300E-07	2,406.38	4,812.75	0.00E+00	1.81E-03	3.62E-03	5.0000	1.618E+03
Kr-85	4.1176E-02	2,406.38	4,812.75	0.00E+00	9.91E+01	1.98E+02	7.0000	1.770E+02
Np-237	9.5752E-06	2,406.38	4,812.75	0.00E+00	2.30E-02	4.61E-02	11.0000	1.974E+01
Pa-231	3.9379E-09	2,406.38	4,812.75	0.00E+00	9.48E-06	1.90E-05		
Pb-210	3.3115E-10	2,406.38	4,812.75	0.00E+00	7.97E-07	1.59E-06		
Pm-147	9.2402E-04	2,406.38	4,812.75	0.00E+00	2.22E+00	4.45E+00		
Pu-238	1.6217E-02	2,406.38	4,812.75	0.00E+00	3.90E+01	7.80E+01		
Pu-239	4.2810E-04	2,406.38	4,812.75	0.00E+00	1.03E+00	2.06E+00		
Pu-240	2.4333E-04	2,406.38	4,812.75	0.00E+00	5.86E-01	1.17E+00		
Pu-241	1.6242E-02	2,406.38	4,812.75	0.00E+00	3.91E+01	7.82E+01		
Pu-242	3.6329E-07	2,406.38	4,812.75	0.00E+00	8.74E-04	1.75E-03		
Ra-226	9.0114E-10	2,406.38	4,812.75	0.00E+00	2.17E-06	4.34E-06		
Ra-228	3.1019E-14	2,406.38	4,812.75	0.00E+00	7.46E-11	1.49E-10		
Ru-106	2.1225E-10	2,406.38	4,812.75	0.00E+00	5.11E-07	1.02E-06		
Se-79	1.2930E-05	2,406.38	4,812.75	0.00E+00	3.11E-02	6.22E-02		
Sn-126	1.1571E-05	2,406.38	4,812.75	0.00E+00	2.78E-02	5.57E-02		
Sr-90	1.3472E+00	2,406.38	4,812.75	0.00E+00	3.24E+03	6.48E+03		
Tc-99	4.2239E-04	2,406.38	4,812.75	0.00E+00	1.02E+00	2.03E+00		
Th-229	1.2407E-11	2,406.38	4,812.75	0.00E+00	2.99E-08	5.97E-08		
Th-230	8.3497E-08	2,406.38	4,812.75	0.00E+00	2.01E-04	4.02E-04		
Th-232	3.6371E-14	2,406.38	4,812.75	0.00E+00	9.23E-11	1.85E-10		
Ti-208	4.0414E-08	2,406.38	4,812.75	0.00E+00	9.73E-05	1.95E-04		
U-232	1.0948E-07	2,406.38	4,812.75	0.00E+00	2.63E-04	5.27E-04		
U-233	3.6275E-09	2,406.38	4,812.75	0.00E+00	8.73E-06	1.75E-05		
U-234	1.8562E-04	2,406.38	4,812.75	0.00E+00	4.47E-01	8.93E-01		
U-235	-2.7235E-06	2,406.38	0.00	1.32E-02	6.63E-03	1.32E-02		
U-236	1.5493E-05	2,406.38	4,812.75	0.00E+00	3.73E-02	7.46E-02		
U-238	-4.2851E-09	2,406.38	0.00	1.51E-04	1.41E-04	1.51E-04		
Y-90	1.3475E+00	2,406.38	4,812.75	0.00E+00	3.24E+03	6.49E+03		
Other Radionuclides					3.29E+03	6.59E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.13062871	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		2,406.38
Bounding:		4,812.75

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.17	
Bounding:	2.33	

Estimated EOL HM/Given EOL HM

1.04

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HTRE (ANP)
SNF ID #: 105
Fuel Units & Descr: 13 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=4.55kg, EOL=4.03kg
ROD Storage Site: INEEL

Fuel decay start date: 1961
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"
0.36

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5940E-08	482.62	965.24	0.00E+00	2.22E-05	4.43E-05	Avg. MeV	
Am-241	1.1471E-04	482.62	965.24	0.00E+00	5.54E-02	1.11E-01	0.0150	3.523E+13
Am-242m	7.4210E-09	482.62	965.24	0.00E+00	3.58E-06	7.16E-06	0.0250	7.320E+12
Am-243	9.8236E-10	482.62	965.24	0.00E+00	4.74E-07	9.48E-07	0.0375	6.361E+12
C-14	2.2928E-04	482.62	965.24	0.00E+00	1.11E-01	2.21E-01	0.0675	6.826E+12
Ci-36	1.2260E-06	482.62	965.24	0.00E+00	5.92E-04	1.18E-03	0.0850	4.123E+12
Cm-243	1.2000E-10	482.62	965.24	0.00E+00	5.79E-08	1.16E-07	0.1250	2.673E+12
Cm-244	7.3577E-10	482.62	965.24	0.00E+00	3.55E-07	7.10E-07	0.2250	3.553E+12
Co-60	1.3732E-03	482.62	965.24	0.00E+00	6.63E-01	1.33E+00	0.3750	1.550E+12
Cs-134	1.2709E-10	482.62	965.24	0.00E+00	6.13E-08	1.23E-07	0.5750	2.807E+13
Cs-135	3.0316E-05	482.62	965.24	0.00E+00	1.46E-02	2.93E-02	0.8500	2.532E+11
Cs-137	7.2579E-01	482.62	965.24	0.00E+00	3.50E+02	7.01E+02	1.2500	1.833E+11
Eu-154	5.9750E-05	482.62	965.24	0.00E+00	2.88E-02	5.77E-02	1.7500	6.513E+09
Eu-155	1.0577E-05	482.62	965.24	0.00E+00	5.10E-03	1.02E-02	2.2500	1.232E+06
Fe-55	4.1631E-07	482.62	965.24	0.00E+00	2.01E-04	4.02E-04	2.7500	5.517E+06
H-3	4.6722E-04	482.62	965.24	0.00E+00	2.25E-01	4.51E-01	3.5000	5.624E+01
I-129	7.3195E-07	482.62	965.24	0.00E+00	3.53E-04	7.07E-04	5.0000	2.323E+01
Kr-85	5.9418E-03	482.62	965.24	0.00E+00	2.87E+00	5.74E+00	7.0000	2.568E+00
Np-237	1.1499E-06	482.62	965.24	0.00E+00	5.55E-04	1.11E-03	11.0000	2.884E-01
Pa-231	7.0899E-08	482.62	965.24	0.00E+00	3.42E-05	6.84E-05		
Pb-210	2.2363E-12	482.62	965.24	0.00E+00	1.08E-09	2.16E-09		
Pm-147	4.2296E-07	482.62	965.24	0.00E+00	2.04E-04	4.08E-04		
Pu-238	2.3295E-04	482.62	965.24	0.00E+00	1.12E-01	2.25E-01		
Pu-239	6.6722E-04	482.62	965.24	0.00E+00	3.22E-01	6.44E-01		
Pu-240	8.6556E-05	482.62	965.24	0.00E+00	4.18E-02	8.35E-02		
Pu-241	1.6889E-04	482.62	965.24	0.00E+00	8.15E-02	1.63E-01		
Pu-242	1.9717E-09	482.62	965.24	0.00E+00	9.52E-07	1.90E-06		
Ra-226	4.5740E-12	482.62	965.24	0.00E+00	2.21E-09	4.42E-09		
Ra-228	8.3511E-12	482.62	965.24	0.00E+00	4.03E-09	8.06E-09		
Ru-106	2.0516E-19	482.62	965.24	0.00E+00	9.90E-17	1.98E-16		
Se-79	1.3220E-05	482.62	965.24	0.00E+00	6.38E-03	1.28E-02		
Sm-126	1.1489E-05	482.62	965.24	0.00E+00	5.54E-03	1.11E-02		
Sr-90	6.6872E-01	482.62	965.24	0.00E+00	3.23E+02	6.45E+02		
Tc-99	4.6639E-04	482.62	965.24	0.00E+00	2.25E-01	4.50E-01		
Th-229	2.3727E-11	482.62	965.24	0.00E+00	1.15E-08	2.29E-08		
Th-230	2.7354E-10	482.62	965.24	0.00E+00	1.32E-07	2.64E-07		
Th-232	8.3594E-12	482.62	965.24	0.00E+00	4.03E-09	8.07E-09		
Th-208	1.6228E-08	482.62	965.24	0.00E+00	7.83E-06	1.57E-05		
U-232	4.3960E-06	482.62	965.24	0.00E+00	2.12E-05	4.24E-05		
U-233	3.3344E-09	482.62	965.24	0.00E+00	1.61E-06	3.22E-06		
U-234	4.0749E-07	482.62	965.24	0.00E+00	1.97E-04	3.93E-04		
U-235	-2.7761E-06	482.62	0.00	9.16E-03	7.82E-03	9.16E-03		
U-236	1.6190E-05	482.62	965.24	0.00E+00	7.81E-03	1.56E-02		
U-238	-2.8547E-09	482.62	0.00	1.05E-04	1.03E-04	1.05E-04		
Y-90	6.6889E-01	482.62	965.24	0.00E+00	3.23E+02	6.46E+02		
Other Radionuclides					4.38E+02	8.77E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.93E+09	7.86E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
Fuel Cladding:	NICHROME	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.15	80 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD 482.62	Estimated 482.62	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:	965.24	965.24	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 2.27	Estimated Burnup/ Given Burnup	1.00
Bounding:	4.55		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SEMT-2 (UMO)
SNF ID #: 118
Fuel Units & Descr: 7 - TUBE
Heavy Metal Mass: BOL= : EOL=8.108kg
ROD Storage SRe: INEEL

Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x10"
0.16

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	7.7980E-09	7,772.05	7,772.05	0.00E+00	6.06E-05	6.06E-05	Avg. MeV	
Am-241	2.3560E-02	7,772.05	7,772.05	0.00E+00	1.83E+02	1.83E+02	0.0150	2.660E+14
Am-242m	3.0880E-06	7,772.05	7,772.05	0.00E+00	2.40E-02	2.40E-02	0.0250	5.494E+13
Am-243	2.0520E-06	7,772.05	7,772.05	0.00E+00	1.59E-02	1.59E-02	0.0375	4.837E+13
C-14	1.1222E-03	7,772.05	7,772.05	0.00E+00	8.72E+00	8.72E+00	0.0575	5.357E+13
Cl-36	8.3760E-11	7,772.05	7,772.05	0.00E+00	6.51E-07	6.51E-07	0.0850	3.082E+13
Cm-243	2.4260E-07	7,772.05	7,772.05	0.00E+00	1.89E-03	1.89E-03	0.1250	2.003E+13
Cm-244	3.3140E-06	7,772.05	7,772.05	0.00E+00	2.58E-02	2.58E-02	0.2250	2.653E+13
Co-60	1.2454E-03	7,772.05	7,772.05	0.00E+00	9.68E+00	9.68E+00	0.3750	1.155E+13
Cs-134	3.3040E-10	7,772.05	7,772.05	0.00E+00	2.57E-06	2.57E-06	0.5750	2.066E+14
Cs-135	7.9140E-06	7,772.05	7,772.05	0.00E+00	6.15E-02	6.15E-02	0.8500	1.974E+12
Cs-137	7.1580E-01	7,772.05	7,772.05	0.00E+00	5.56E+03	5.56E+03	1.2500	1.426E+12
Eu-154	6.0500E-04	7,772.05	7,772.05	0.00E+00	4.70E+00	4.70E+00	1.7500	5.100E+10
Eu-155	9.4860E-06	7,772.05	7,772.05	0.00E+00	7.37E-02	7.37E-02	2.2500	9.178E+06
Fe-55	1.9322E-08	7,772.05	7,772.05	0.00E+00	1.50E-04	1.50E-04	2.7500	9.536E+06
H-3	4.4180E-03	7,772.05	7,772.05	0.00E+00	3.43E+01	3.43E+01	3.5000	3.886E+04
I-129	7.5020E-07	7,772.05	7,772.05	0.00E+00	5.83E-03	5.83E-03	5.0000	1.531E+04
Kr-85	5.4940E-03	7,772.05	7,772.05	0.00E+00	4.27E+01	4.27E+01	7.0000	1.834E+03
Np-237	5.8040E-06	7,772.05	7,772.05	0.00E+00	4.51E-02	4.51E-02	11.0000	2.080E+02
Pa-231	1.1096E-08	7,772.05	7,772.05	0.00E+00	8.62E-05	8.62E-05		
Pb-210	1.4712E-08	7,772.05	7,772.05	0.00E+00	1.14E-04	1.14E-04		
Pm-147	3.5920E-07	7,772.05	7,772.05	0.00E+00	2.79E-03	2.79E-03		
Pu-238	5.0700E-03	7,772.05	7,772.05	0.00E+00	3.94E+01	3.94E+01		
Pu-239	1.8728E-02	7,772.05	7,772.05	0.00E+00	1.46E+02	1.46E+02		
Pu-240	8.3280E-03	7,772.05	7,772.05	0.00E+00	6.47E+01	6.47E+01		
Pu-241	3.4460E-02	7,772.05	7,772.05	0.00E+00	2.68E+02	2.68E+02		
Pu-242	2.0380E-06	7,772.05	7,772.05	0.00E+00	1.58E-02	1.58E-02		
Ra-226	2.9640E-06	7,772.05	7,772.05	0.00E+00	2.30E-04	2.30E-04		
Ra-228	1.1922E-09	7,772.05	7,772.05	0.00E+00	9.27E-06	9.27E-06		
Ru-106	3.5780E-19	7,772.05	7,772.05	0.00E+00	2.78E-15	2.78E-15		
Se-79	1.2520E-05	7,772.05	7,772.05	0.00E+00	9.73E-02	9.73E-02		
Sn-126	1.2050E-05	7,772.05	7,772.05	0.00E+00	9.37E-02	9.37E-02		
Sr-90	6.1880E-01	7,772.05	7,772.05	0.00E+00	4.81E+03	4.81E+03		
Tc-99	4.4120E-04	7,772.05	7,772.05	0.00E+00	3.43E+00	3.43E+00		
Th-229	6.9280E-09	7,772.05	7,772.05	0.00E+00	5.38E-05	5.38E-05		
Th-230	1.7084E-06	7,772.05	7,772.05	0.00E+00	1.33E-02	1.33E-02		
Th-232	1.1926E-09	7,772.05	7,772.05	0.00E+00	9.27E-06	9.27E-06		
Tl-208	3.4740E-08	7,772.05	7,772.05	0.00E+00	2.70E-04	2.70E-04		
U-232	9.2940E-08	7,772.05	7,772.05	0.00E+00	7.22E-04	7.22E-04		
U-233	9.1680E-07	7,772.05	7,772.05	0.00E+00	7.13E-03	7.13E-03		
U-234	2.3440E-03	7,772.05	7,772.05	0.00E+00	1.82E+01	1.82E+01		
U-235	2.3296E-06	7,772.05	0.00	1.75E-03	0.00E+00	1.75E-03		
U-236	2.6620E-05	7,772.05	7,772.05	0.00E+00	2.07E-01	2.07E-01		
U-238	1.3291E-07	7,772.05	0.00	5.13E-03	4.09E-03	5.13E-03		
Y-90	6.1900E-01	7,772.05	7,772.05	0.00E+00	4.81E+03	4.81E+03		
Other Radionuclides					5.32E+03	5.32E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons:
Fuel Cladding:	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		7,772.05	Nominal burnup set equal to bounding burnup.
Bounding:		7,772.05	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	32.83		2.59
Bounding:	32.83		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR DRIVER (U-ZR) HEU

SNF ID #: 117

Fuel Units & Descr: 76 - TUBE

Heavy Metal Mass: BOL = EOL-36.13kg

ROD Storage Site: NEEL

Fuel decay start date:

1964

Estimates as of: 2030

Template: HFBR (Heavy Water, Zirc. 0 to 5% U)

*Template Burnup (MWd/g):

0.0034251

Template BOL Heavy Metal Mass (BTT):

5

Template Decay Time:

65 years

Estimated
Canister usage:

18*15

3.45

II. Estimated

Radionuclide	GMWD From Template	Nominal Fuel Burnup (MWd/g)	Bounding Fuel Burnup (MWd/g)	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	%	Gamma Sources
Ac-227	7.790E-09	34.632.91	34.632.91	0.00E+00	2.70E-04	2.70E-04	2.70E-04	Photon Energy Group Avg. MeV
Am-241	2.360E-02	34.632.91	34.632.91	0.00E+00	8.16E+02	8.16E+02	8.16E+02	1.185E+15
Am-242m	3.080E-06	34.632.91	34.632.91	0.00E+00	1.07E-01	1.07E-01	1.07E-01	2.449E+14
Am-243	2.052E-08	34.632.91	34.632.91	0.00E+00	7.11E-02	7.11E-02	7.11E-02	0.0375
C-14	1.122E-03	34.632.91	34.632.91	0.00E+00	3.89E+01	3.89E+01	3.89E+01	2.155E+14
Cl-38	8.376E-11	34.632.91	34.632.91	0.00E+00	2.90E-08	2.90E-08	2.90E-08	0.0575
Cm-243	2.426E-07	34.632.91	34.632.91	0.00E+00	8.40E-03	8.40E-03	8.40E-03	2.387E+14
Cm-244	3.314E-06	34.632.91	34.632.91	0.00E+00	1.15E-01	1.15E-01	1.15E-01	0.0650
Co-60	1.245E-03	34.632.91	34.632.91	0.00E+00	4.31E+01	4.31E+01	4.31E+01	8.826E+13
Co-134	3.304E-10	34.632.91	34.632.91	0.00E+00	1.14E-05	1.14E-05	1.14E-05	0.2250
Co-137	7.159E-01	34.632.91	34.632.91	0.00E+00	2.74E-01	2.74E-01	2.74E-01	0.3750
Eu-154	6.050E-04	34.632.91	34.632.91	0.00E+00	2.10E+01	2.10E+01	2.10E+01	5.148E+13
Eu-155	9.489E-08	34.632.91	34.632.91	0.00E+00	3.29E-01	3.29E-01	3.29E-01	0.5750
Fe-55	1.932E-08	34.632.91	34.632.91	0.00E+00	6.69E-04	6.69E-04	6.69E-04	9.208E+14
H-3	4.178E-03	34.632.91	34.632.91	0.00E+00	1.53E+02	1.53E+02	1.53E+02	0.8500
Kr-85	5.494E-03	34.632.91	34.632.91	0.00E+00	2.48E+04	2.48E+04	2.48E+04	1.2500
Np-237	5.804E-08	34.632.91	34.632.91	0.00E+00	2.01E-01	2.01E-01	2.01E-01	6.359E+12
Pb-210	1.109E-08	34.632.91	34.632.91	0.00E+00	2.10E+01	2.10E+01	2.10E+01	1.7500
Pb-213	1.471E-06	34.632.91	34.632.91	0.00E+00	5.10E-04	5.10E-04	5.10E-04	2.273E+11
Pb-214	3.592E-07	34.632.91	34.632.91	0.00E+00	1.24E-02	1.24E-02	1.24E-02	2.2500
Pb-217	5.070E-03	34.632.91	34.632.91	0.00E+00	1.76E+02	1.76E+02	1.76E+02	2.7500
Pu-238	1.872E-02	34.632.91	34.632.91	0.00E+00	6.49E+02	6.49E+02	6.49E+02	4.248E+07
Pu-239	6.328E-03	34.632.91	34.632.91	0.00E+00	2.88E+02	2.88E+02	2.88E+02	3.5000
Pu-240	3.446E-02	34.632.91	34.632.91	0.00E+00	1.19E+03	1.19E+03	1.19E+03	7.267E+04
Pu-241	2.038E-07	34.632.91	34.632.91	0.00E+00	7.06E-02	7.06E-02	7.06E-02	5.0000
Pu-242	2.984E-08	34.632.91	34.632.91	0.00E+00	1.03E-03	1.03E-03	1.03E-03	7.0000
Ra-226	1.922E-09	34.632.91	34.632.91	0.00E+00	1.03E-03	1.03E-03	1.03E-03	11.0000
Ra-228	3.578E-19	34.632.91	34.632.91	0.00E+00	1.24E-14	1.24E-14	1.24E-14	
Se-78	1.252E-05	34.632.91	34.632.91	0.00E+00	4.34E-01	4.34E-01	4.34E-01	
Sm-126	1.205E-05	34.632.91	34.632.91	0.00E+00	4.17E-01	4.17E-01	4.17E-01	
Sr-90	6.188E-01	34.632.91	34.632.91	0.00E+00	2.14E+04	2.14E+04	2.14E+04	
Tc-99	4.412E-04	34.632.91	34.632.91	0.00E+00	1.53E+01	1.53E+01	1.53E+01	
Th-229	6.928E-09	34.632.91	34.632.91	0.00E+00	2.40E-04	2.40E-04	2.40E-04	
Th-230	1.708E-06	34.632.91	34.632.91	0.00E+00	5.92E-02	5.92E-02	5.92E-02	
Th-232	1.928E-09	34.632.91	34.632.91	0.00E+00	4.13E-05	4.13E-05	4.13E-05	
Th-234	3.474E-08	34.632.91	34.632.91	0.00E+00	1.20E-03	1.20E-03	1.20E-03	
U-232	9.294E-08	34.632.91	34.632.91	0.00E+00	3.22E-03	3.22E-03	3.22E-03	
U-233	1.680E-07	34.632.91	34.632.91	0.00E+00	3.18E-02	3.18E-02	3.18E-02	
U-234	2.344E-03	34.632.91	34.632.91	0.00E+00	8.12E+01	8.12E+01	8.12E+01	
U-235	2.329E-08	34.632.91	34.632.91	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
U-236	2.682E-05	34.632.91	34.632.91	0.00E+00	9.22E-01	9.22E-01	9.22E-01	
U-238	1.320E-07	34.632.91	34.632.91	0.00E+00	1.82E-02	1.82E-02	1.82E-02	
Y-90	6.180E-01	34.632.91	34.632.91	0.00E+00	2.14E+04	2.14E+04	2.14E+04	
Other Radionuclides					2.37E+04	2.37E+04	2.37E+04	

Thermal Power	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
	3.29E+02	3.29E+02
Total		

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 HMI Constituents:	U	U
BOL Enrichment %:	0 to 5	0 to 5

Basis for Parameter Differences:

The Template was used for the following reasons:
The fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd/g)	From SFD	Estimated
Nominal:	34.632.91	34.632.91
Bounding:	34.632.91	34.632.91

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was into EOL.

Checks	Estimated Burnup/ Given Burnup	Estimated EOL HMI/Given EOL HMI
Nominal:	32.83	2.59
Bounding:	32.83	

*Reactor shutdown, core removal, storage, shipping or other data 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/GMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR ETWO (U METAL) LEU
SNF ID #: 867
Fuel Units & Descr: 6 - TUBE
Heavy Metal Mass: BOL = 45.456kg
ROD Storage Site: INEEL

Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup (MWd): 6
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x15"
0.27

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 Avg. MeV Total Photons/sec (bounding)
Ac-227	7.7980E-09	43,572.00	43,572.00	0.00E+00	3.40E-04	3.40E-04	0.0150 1.491E+15
Am-241	2.3560E-02	43,572.00	43,572.00	0.00E+00	1.03E+03	1.03E+03	0.0250 3.080E+14
Am-242m	3.0880E-06	43,572.00	43,572.00	0.00E+00	1.35E-01	1.35E-01	0.0375 2.712E+14
Am-243	2.0520E-06	43,572.00	43,572.00	0.00E+00	8.94E-02	8.94E-02	0.0575 3.003E+14
C-14	1.1222E-03	43,572.00	43,572.00	0.00E+00	4.89E+01	4.89E+01	0.0850 1.728E+14
Cl-36	8.3760E-11	43,572.00	43,572.00	0.00E+00	3.65E-06	3.65E-06	0.1250 1.123E+14
Cm-243	2.4260E-07	43,572.00	43,572.00	0.00E+00	1.06E-02	1.06E-02	0.2250 1.487E+14
Cm-244	3.3140E-06	43,572.00	43,572.00	0.00E+00	1.44E-01	1.44E-01	0.3750 6.477E+13
Co-60	1.2454E-03	43,572.00	43,572.00	0.00E+00	5.43E+01	5.43E+01	0.5750 1.159E+15
Cs-134	3.3040E-10	43,572.00	43,572.00	0.00E+00	1.44E-05	1.44E-05	0.8500 1.107E+13
Cs-135	7.9140E-06	43,572.00	43,572.00	0.00E+00	3.45E-01	3.45E-01	1.2500 7.997E+12
Cs-137	7.1580E-01	43,572.00	43,572.00	0.00E+00	3.12E+04	3.12E+04	1.7500 2.859E+11
Eu-154	6.0500E-04	43,572.00	43,572.00	0.00E+00	2.64E+01	2.64E+01	2.2500 5.145E+07
Eu-155	9.4860E-06	43,572.00	43,572.00	0.00E+00	4.13E-01	4.13E-01	2.7500 5.346E+07
Fe-55	1.9322E-08	43,572.00	43,572.00	0.00E+00	8.42E-04	8.42E-04	3.5000 2.179E+05
H-3	4.4180E-03	43,572.00	43,572.00	0.00E+00	1.93E+02	1.93E+02	5.0000 9.143E+04
I-129	7.5020E-07	43,572.00	43,572.00	0.00E+00	3.27E-02	3.27E-02	7.0000 1.028E+04
Kr-85	5.4940E-03	43,572.00	43,572.00	0.00E+00	2.39E+02	2.39E+02	11.0000 1.166E+03
Np-237	5.8040E-06	43,572.00	43,572.00	0.00E+00	2.53E-01	2.53E-01	
Pa-231	1.1096E-08	43,572.00	43,572.00	0.00E+00	4.83E-04	4.83E-04	
Pb-210	1.4712E-08	43,572.00	43,572.00	0.00E+00	6.41E-04	6.41E-04	
Pm-147	3.5920E-07	43,572.00	43,572.00	0.00E+00	1.57E-02	1.57E-02	
Pu-238	5.0700E-03	43,572.00	43,572.00	0.00E+00	2.21E+02	2.21E+02	
Pu-239	1.8728E-02	43,572.00	43,572.00	0.00E+00	8.16E+02	8.16E+02	
Pu-240	6.3280E-03	43,572.00	43,572.00	0.00E+00	3.63E+02	3.63E+02	
Pu-241	3.4460E-02	43,572.00	43,572.00	0.00E+00	1.50E+03	1.50E+03	
Pu-242	2.0380E-06	43,572.00	43,572.00	0.00E+00	8.88E-02	8.88E-02	
Ra-226	2.9640E-08	43,572.00	43,572.00	0.00E+00	1.29E-03	1.29E-03	
Ra-228	1.1922E-09	43,572.00	43,572.00	0.00E+00	5.19E-05	5.19E-05	
Ru-106	3.5780E-19	43,572.00	43,572.00	0.00E+00	1.56E-14	1.56E-14	
Se-79	1.2520E-05	43,572.00	43,572.00	0.00E+00	5.46E-01	5.46E-01	
Sn-126	1.2050E-05	43,572.00	43,572.00	0.00E+00	5.25E-01	5.25E-01	
Sr-90	6.1880E-01	43,572.00	43,572.00	0.00E+00	2.70E+04	2.70E+04	
Tc-99	4.4120E-04	43,572.00	43,572.00	0.00E+00	1.92E+01	1.92E+01	
Th-229	8.9280E-09	43,572.00	43,572.00	0.00E+00	3.02E-04	3.02E-04	
Th-230	1.7084E-06	43,572.00	43,572.00	0.00E+00	7.44E-02	7.44E-02	
Th-232	1.1926E-09	43,572.00	43,572.00	0.00E+00	5.20E-05	5.20E-05	
Ti-208	3.4740E-08	43,572.00	43,572.00	0.00E+00	1.51E-03	1.51E-03	
U-232	9.2940E-08	43,572.00	43,572.00	0.00E+00	4.05E-03	4.05E-03	
U-233	9.1680E-07	43,572.00	43,572.00	0.00E+00	3.99E-02	3.99E-02	
U-234	2.3440E-03	43,572.00	43,572.00	0.00E+00	1.02E+02	1.02E+02	
U-235	2.3296E-06	43,572.00	0.00	9.83E-03	0.00E+00	9.83E-03	
U-236	2.6620E-05	43,572.00	43,572.00	0.00E+00	1.16E+00	1.16E+00	
U-238	1.3291E-07	43,572.00	0.00	2.87E-02	2.29E-02	2.87E-02	
Y-90	6.1900E-01	43,572.00	43,572.00	0.00E+00	2.70E+04	2.70E+04	
Other Radionuclides					2.98E+04	2.98E+04	

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 %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		43,572.00
Bounding:		43,572.00

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:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM
2.59

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR MT (U METAL-SST) DU
SNF ID #: 113
Fuel Units & Descr: 82 - TUBE
Heavy Metal Mass: BOL= : EOL=92.775kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
²Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x10"
1.15

II. Estimates

Radionuclide	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources	
	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.2380E-09	88,573.24	88,573.24	0.00E+00	8.18E-04	8.18E-04	Avg. MeV	
Am-241	2.2020E-01	88,573.24	88,573.24	0.00E+00	1.95E+04	1.95E+04	0.0150	2.836E+15
Am-242m	8.9860E-05	88,573.24	88,573.24	0.00E+00	7.96E+00	7.96E+00	0.0250	5.483E+14
Am-243	5.2240E-05	88,573.24	88,573.24	0.00E+00	4.63E+00	4.63E+00	0.0375	4.892E+14
C-14	2.2080E-02	88,573.24	88,573.24	0.00E+00	1.96E+03	1.96E+03	0.0575	7.546E+14
Cl-36	4.1880E-04	88,573.24	88,573.24	0.00E+00	3.71E+01	3.71E+01	0.0850	2.925E+14
Cm-243	8.0820E-06	88,573.24	88,573.24	0.00E+00	7.16E-01	7.16E-01	0.1250	1.900E+14
Cm-244	2.3260E-04	88,573.24	88,573.24	0.00E+00	2.06E+01	2.06E+01	0.2250	2.497E+14
Co-60	9.9520E-02	88,573.24	88,573.24	0.00E+00	8.81E+03	8.81E+03	0.3750	1.094E+14
Cs-134	7.2160E-10	88,573.24	88,573.24	0.00E+00	6.39E-05	6.39E-05	0.5750	2.360E+15
Cs-135	3.7460E-06	88,573.24	88,573.24	0.00E+00	3.32E-01	3.32E-01	0.8500	2.002E+13
Cs-137	7.2140E-01	88,573.24	88,573.24	0.00E+00	6.39E+04	6.39E+04	1.2500	6.595E+14
Eu-154	6.2120E-04	88,573.24	88,573.24	0.00E+00	7.27E+01	7.27E+01	1.7500	4.938E+11
Eu-155	1.2284E-05	88,573.24	88,573.24	0.00E+00	1.09E+00	1.09E+00	2.2500	3.511E+09
Fe-55	1.8062E-05	88,573.24	88,573.24	0.00E+00	1.60E+00	1.60E+00	2.7500	3.689E+08
H-3	8.2700E-03	88,573.24	88,573.24	0.00E+00	7.33E+02	7.33E+02	3.5000	1.862E+06
I-129	9.1660E-07	88,573.24	88,573.24	0.00E+00	8.12E-02	8.12E-02	5.0000	7.734E+05
Kr-85	4.6540E-03	88,573.24	88,573.24	0.00E+00	4.12E+02	4.12E+02	7.0000	8.811E+04
Np-237	2.1800E-05	88,573.24	88,573.24	0.00E+00	1.93E+00	1.93E+00	11.0000	9.708E+03
Pa-231	1.2982E-08	88,573.24	88,573.24	0.00E+00	1.15E-03	1.15E-03		
Pb-210	1.3604E-08	88,573.24	88,573.24	0.00E+00	1.20E-03	1.20E-03		
Pm-147	2.8480E-07	88,573.24	88,573.24	0.00E+00	2.52E-02	2.52E-02		
Pu-238	2.8680E-02	88,573.24	88,573.24	0.00E+00	2.54E+03	2.54E+03		
Pu-239	6.5040E-02	88,573.24	88,573.24	0.00E+00	5.76E+03	5.76E+03		
Pu-240	2.6620E-02	88,573.24	88,573.24	0.00E+00	2.36E+03	2.36E+03		
Pu-241	3.2120E-01	88,573.24	88,573.24	0.00E+00	2.84E+04	2.84E+04		
Pu-242	1.6742E-05	88,573.24	88,573.24	0.00E+00	1.48E+00	1.48E+00		
Ra-226	2.7420E-06	88,573.24	88,573.24	0.00E+00	2.43E-03	2.43E-03		
Ra-228	2.0880E-10	88,573.24	88,573.24	0.00E+00	1.85E-05	1.85E-05		
Ru-106	8.1300E-19	88,573.24	88,573.24	0.00E+00	7.20E-14	7.20E-14		
Se-79	2.8480E-05	88,573.24	88,573.24	0.00E+00	2.52E+00	2.52E+00		
Sn-126	1.7790E-05	88,573.24	88,573.24	0.00E+00	1.58E+00	1.58E+00		
Sr-90	5.0780E-01	88,573.24	88,573.24	0.00E+00	4.50E+04	4.50E+04		
Tc-99	4.3360E-04	88,573.24	88,573.24	0.00E+00	3.84E+01	3.84E+01		
Th-229	3.1120E-09	88,573.24	88,573.24	0.00E+00	2.76E-04	2.76E-04		
Th-230	1.5812E-06	88,573.24	88,573.24	0.00E+00	1.40E-01	1.40E-01		
Th-232	2.0900E-10	88,573.24	88,573.24	0.00E+00	1.85E-05	1.85E-05		
Th-208	1.1448E-07	88,573.24	88,573.24	0.00E+00	1.01E-02	1.01E-02		
U-232	3.1000E-07	88,573.24	88,573.24	0.00E+00	2.75E-02	2.75E-02		
U-233	4.1460E-07	88,573.24	88,573.24	0.00E+00	3.67E-02	3.67E-02		
U-234	2.1720E-03	88,573.24	88,573.24	0.00E+00	1.92E+02	1.92E+02		
U-235	-1.7016E-06	88,573.24	0.00	2.01E-02	0.00E+00	2.01E-02		
U-236	2.6100E-05	88,573.24	88,573.24	0.00E+00	2.31E+00	2.31E+00		
U-238	-5.1291E-07	88,573.24	0.00	5.87E-02	1.32E-02	5.87E-02		
Y-90	5.0800E-01	88,573.24	88,573.24	0.00E+00	4.50E+04	4.50E+04		
Other Radionuclides					5.73E+05	5.73E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.97E+03	1.97E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basic for Parameter Differences:
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY 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 %:		0 to 5	

Burnup Summary (MWd) ²			Basic for burnup used in estimates:
Nominal:	From SFD	Estimated	
Bounding:		88,573.24	Nominal burnup set equal to bounding burnup.
		88,573.24	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:	32.70	32.70	2.26

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IRO (UO2) LEU
SNF ID #: 976
Fuel Units & Descr: 2 - TUBE
Heavy Metal Mass: BOL = 5.407kg
ROD Storage Site: INEEL

Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 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	7.7980E-09	5,183.09	5,183.09	0.00E+00	4.04E-05	4.04E-05	Avg. MeV	
Am-241	2.3560E-02	5,183.09	5,183.09	0.00E+00	1.22E+02	1.22E+02	0.0150	1.774E+14
Am-242m	3.0880E-06	5,183.09	5,183.09	0.00E+00	1.60E-02	1.60E-02	0.0250	3.664E+13
Am-243	2.0620E-06	5,183.09	5,183.09	0.00E+00	1.06E-02	1.06E-02	0.0375	3.226E+13
C-14	1.1222E-03	5,183.09	5,183.09	0.00E+00	5.82E+00	5.82E+00	0.0575	3.572E+13
Cl-36	8.3760E-11	5,183.09	5,183.09	0.00E+00	4.34E-07	4.34E-07	0.0850	2.055E+13
Cm-243	2.4260E-07	5,183.09	5,183.09	0.00E+00	1.26E-03	1.26E-03	0.1250	1.356E+13
Cm-244	3.3140E-06	5,183.09	5,183.09	0.00E+00	1.72E-02	1.72E-02	0.2250	1.769E+13
Co-60	1.2454E-03	5,183.09	5,183.09	0.00E+00	6.46E+00	6.46E+00	0.3750	7.705E+12
Cs-134	3.3040E-10	5,183.09	5,183.09	0.00E+00	1.71E-06	1.71E-06	0.5750	1.378E+14
Cs-135	7.9140E-06	5,183.09	5,183.09	0.00E+00	4.10E-02	4.10E-02	0.8500	1.316E+12
Cs-137	7.1580E-01	5,183.09	5,183.09	0.00E+00	3.71E+03	3.71E+03	1.2500	9.513E+11
Eu-154	6.0500E-04	5,183.09	5,183.09	0.00E+00	3.14E+00	3.14E+00	1.7500	3.401E+10
Eu-155	9.4860E-06	5,183.09	5,183.09	0.00E+00	4.92E-02	4.92E-02	2.2500	6.121E+06
Fe-55	1.9322E-08	5,183.09	5,183.09	0.00E+00	1.00E-04	1.00E-04	2.7500	6.360E+06
H-3	4.4180E-03	5,183.09	5,183.09	0.00E+00	2.29E+01	2.29E+01	3.5000	2.592E+04
I-129	7.5020E-07	5,183.09	5,183.09	0.00E+00	3.89E-03	3.89E-03	5.0000	1.089E+04
Kr-85	5.4940E-03	5,183.09	5,183.09	0.00E+00	2.85E+01	2.85E+01	7.0000	1.223E+03
Np-237	5.8040E-06	5,183.09	5,183.09	0.00E+00	3.01E-02	3.01E-02	11.0000	1.397E+02
Pa-231	1.1096E-08	5,183.09	5,183.09	0.00E+00	6.75E-05	6.75E-05		
Pb-210	1.4712E-08	5,183.09	5,183.09	0.00E+00	7.63E-05	7.63E-05		
Pm-147	3.5920E-07	5,183.09	5,183.09	0.00E+00	1.86E-03	1.86E-03		
Pu-238	5.0700E-03	5,183.09	5,183.09	0.00E+00	2.63E+01	2.63E+01		
Pu-239	1.8728E-02	5,183.09	5,183.09	0.00E+00	9.71E+01	9.71E+01		
Pu-240	8.3280E-03	5,183.09	5,183.09	0.00E+00	4.32E+01	4.32E+01		
Pu-241	3.4460E-02	5,183.09	5,183.09	0.00E+00	1.79E+02	1.79E+02		
Pu-242	2.0380E-06	5,183.09	5,183.09	0.00E+00	1.06E-02	1.06E-02		
Ra-226	2.9640E-08	5,183.09	5,183.09	0.00E+00	1.54E-04	1.54E-04		
Ra-228	1.1922E-09	5,183.09	5,183.09	0.00E+00	6.18E-06	6.18E-06		
Ru-106	3.5780E-19	5,183.09	5,183.09	0.00E+00	1.85E-15	1.85E-15		
Se-79	1.2520E-05	5,183.09	5,183.09	0.00E+00	6.49E-02	6.49E-02		
Sn-126	1.2050E-05	5,183.09	5,183.09	0.00E+00	6.25E-02	6.25E-02		
Sr-90	6.1880E-01	5,183.09	5,183.09	0.00E+00	3.21E+03	3.21E+03		
Tc-99	4.4120E-04	5,183.09	5,183.09	0.00E+00	2.29E+00	2.29E+00		
Th-229	6.9280E-09	5,183.09	5,183.09	0.00E+00	3.59E-05	3.59E-05		
Th-230	1.7084E-06	5,183.09	5,183.09	0.00E+00	8.65E-03	8.65E-03		
Th-232	1.1926E-09	5,183.09	5,183.09	0.00E+00	6.18E-06	6.18E-06		
Ti-208	3.4740E-08	5,183.09	5,183.09	0.00E+00	1.80E-04	1.80E-04		
U-232	9.2940E-08	5,183.09	5,183.09	0.00E+00	4.82E-04	4.82E-04		
U-233	9.1680E-07	5,183.09	5,183.09	0.00E+00	4.75E-03	4.75E-03		
U-234	2.3440E-03	5,183.09	5,183.09	0.00E+00	1.21E+01	1.21E+01		
U-235	-2.3296E-06	5,183.09	0.00	1.17E-03	0.00E+00	1.17E-03		
U-236	2.6620E-05	5,183.09	5,183.09	0.00E+00	1.38E-01	1.38E-01		
U-238	-1.3291E-07	5,183.09	0.00	3.42E-03	2.73E-03	3.42E-03		
Y-90	6.1900E-01	5,183.09	5,183.09	0.00E+00	3.21E+03	3.21E+03		
Other Radionuclides					3.55E+03	3.55E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		5,183.09	Nominal burnup set equal to bounding burnup.
		5,183.09	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:	32.83	32.83	2.59

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IS (U-ZR) LEU
SNF ID #: 977
Fuel Units & Descr: 3 - TUBE
Heavy Metal Mass: BOL = 15.778kg
ROD Storage Site: INEEL

Fuel decay start date: 1984
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5% U)
Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x15"
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) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.7980E-09	15,122.23	15,122.23	0.00E+00	1.18E-04	1.18E-04	Avg. MeV	
Am-241	2.3560E-02	15,122.23	15,122.23	0.00E+00	3.56E+02	3.56E+02	0.0150	5.176E+14
Am-242m	3.0880E-06	15,122.23	15,122.23	0.00E+00	4.67E-02	4.67E-02	0.0250	1.069E+14
Am-243	2.0520E-06	15,122.23	15,122.23	0.00E+00	3.10E-02	3.10E-02	0.0375	9.411E+13
C-14	1.1222E-03	15,122.23	15,122.23	0.00E+00	1.70E+01	1.70E+01	0.0575	1.042E+14
Cf-252	8.3760E-11	15,122.23	15,122.23	0.00E+00	1.27E-08	1.27E-08	0.0850	5.996E+13
Cm-243	2.4260E-07	15,122.23	15,122.23	0.00E+00	3.67E-03	3.67E-03	0.1250	3.897E+13
Cm-244	3.3140E-06	15,122.23	15,122.23	0.00E+00	5.01E-02	5.01E-02	0.2250	5.162E+13
Co-60	1.2454E-03	15,122.23	15,122.23	0.00E+00	1.88E+01	1.88E+01	0.3750	2.248E+13
Cs-134	3.3040E-10	15,122.23	15,122.23	0.00E+00	5.00E-08	5.00E-08	0.5750	4.021E+14
Cs-135	7.9140E-08	15,122.23	15,122.23	0.00E+00	1.20E-01	1.20E-01	0.8500	3.841E+12
Cs-137	7.1580E-01	15,122.23	15,122.23	0.00E+00	1.08E+04	1.08E+04	1.2500	2.775E+12
Eu-154	6.0500E-04	15,122.23	15,122.23	0.00E+00	9.15E+00	9.15E+00	1.7500	9.923E+10
Eu-155	9.4800E-06	15,122.23	15,122.23	0.00E+00	1.43E-01	1.43E-01	2.2500	1.766E+07
Fe-55	1.9322E-08	15,122.23	15,122.23	0.00E+00	2.92E-04	2.92E-04	2.7500	1.856E+07
H-3	4.4180E-03	15,122.23	15,122.23	0.00E+00	6.68E+01	6.68E+01	3.5000	7.562E+04
I-129	7.5020E-07	15,122.23	15,122.23	0.00E+00	1.13E-02	1.13E-02	5.0000	3.173E+04
Kr-85	5.4940E-03	15,122.23	15,122.23	0.00E+00	8.31E+01	8.31E+01	7.0000	3.558E+03
Np-237	5.8040E-06	15,122.23	15,122.23	0.00E+00	8.78E-02	8.78E-02	11.0000	4.048E+02
Pa-231	1.1096E-08	15,122.23	15,122.23	0.00E+00	1.68E-04	1.68E-04		
Pb-210	1.4712E-08	15,122.23	15,122.23	0.00E+00	2.22E-04	2.22E-04		
Pm-147	3.5920E-07	15,122.23	15,122.23	0.00E+00	5.43E-03	5.43E-03		
Pu-238	5.0700E-03	15,122.23	15,122.23	0.00E+00	7.67E+01	7.67E+01		
Pu-239	1.8728E-02	15,122.23	15,122.23	0.00E+00	2.83E+02	2.83E+02		
Pu-240	8.3280E-03	15,122.23	15,122.23	0.00E+00	1.26E+02	1.26E+02		
Pu-241	3.4460E-02	15,122.23	15,122.23	0.00E+00	5.21E+02	5.21E+02		
Pu-242	2.0380E-06	15,122.23	15,122.23	0.00E+00	3.08E-02	3.08E-02		
Ra-226	2.9640E-08	15,122.23	15,122.23	0.00E+00	4.48E-04	4.48E-04		
Ra-228	1.1922E-09	15,122.23	15,122.23	0.00E+00	1.80E-05	1.80E-05		
Ru-106	3.5780E-19	15,122.23	15,122.23	0.00E+00	5.41E-15	5.41E-15		
Se-79	1.2520E-05	15,122.23	15,122.23	0.00E+00	1.89E-01	1.89E-01		
Sn-126	1.2050E-06	15,122.23	15,122.23	0.00E+00	1.82E-01	1.82E-01		
Sr-90	6.1880E-01	15,122.23	15,122.23	0.00E+00	9.36E+03	9.36E+03		
Tc-99	4.4120E-04	15,122.23	15,122.23	0.00E+00	6.67E+00	6.67E+00		
Th-229	6.9280E-09	15,122.23	15,122.23	0.00E+00	1.05E-04	1.05E-04		
Th-230	1.7084E-06	15,122.23	15,122.23	0.00E+00	2.58E-02	2.58E-02		
Th-232	1.1926E-09	15,122.23	15,122.23	0.00E+00	1.80E-05	1.80E-05		
Ti-208	3.4740E-08	15,122.23	15,122.23	0.00E+00	5.25E-04	5.25E-04		
U-232	9.2940E-08	15,122.23	15,122.23	0.00E+00	1.41E-03	1.41E-03		
U-233	9.1680E-07	15,122.23	15,122.23	0.00E+00	1.39E-02	1.39E-02		
U-234	2.3440E-03	15,122.23	15,122.23	0.00E+00	3.54E+01	3.54E+01		
U-235	2.3296E-06	15,122.23	0.00	3.41E-03	0.00E+00	3.41E-03		
U-236	2.6620E-05	15,122.23	15,122.23	0.00E+00	4.03E-01	4.03E-01		
U-238	1.3291E-07	15,122.23	0.00	9.97E-03	7.96E-03	9.97E-03		
Y-90	6.1900E-01	15,122.23	15,122.23	0.00E+00	9.36E+03	9.36E+03		
Other Radionuclides					1.04E+04	1.04E+04		

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 %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		15,122.23
Bounding:		15,122.23

Basis for burnup used in estimator:
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:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM
2.59

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR OT (UO2) LEU
SNF ID #: 283

Fuel Units & Descr: 8 - TUBE

Heavy Metal Mass: BOL= : EOL=139.532kg

ROD Storage Site: NEEL

Fuel decay start date: 1963

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: 65 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) 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	1.2581E-09	209.63	209.63	0.00E+00	2.64E-07	2.64E-07	Avg. MeV	
Am-241	1.4761E-01	209.63	209.63	0.00E+00	3.09E+01	3.09E+01	0.0150	5.676E+12
Am-242m	2.5032E-04	209.63	209.63	0.00E+00	5.25E-02	5.25E-02	0.0250	1.127E+12
Am-243	6.2387E-04	209.63	209.63	0.00E+00	1.31E-01	1.31E-01	0.0375	1.054E+12
C-14	4.7739E-05	209.63	209.63	0.00E+00	1.00E-02	1.00E-02	0.0575	1.446E+12
Cl-36	8.0297E-07	209.63	209.63	0.00E+00	1.68E-04	1.68E-04	0.0850	6.166E+11
Cm-243	1.2099E-04	209.63	209.63	0.00E+00	2.54E-02	2.54E-02	0.1250	4.024E+11
Cm-244	1.5560E-02	209.63	209.63	0.00E+00	3.26E+00	3.26E+00	0.2250	5.248E+11
Co-60	4.8580E-05	209.63	209.63	0.00E+00	1.04E-02	1.04E-02	0.3750	2.271E+11
Cs-134	1.7022E-09	209.63	209.63	0.00E+00	3.57E-07	3.57E-07	0.5750	5.405E+12
Cs-135	1.4433E-05	209.63	209.63	0.00E+00	3.03E-03	3.03E-03	0.8500	4.333E+10
Cs-137	6.9929E-01	209.63	209.63	0.00E+00	1.47E+02	1.47E+02	1.2500	2.026E+10
Eu-154	1.8023E-03	209.63	209.63	0.00E+00	3.78E-01	3.78E-01	1.7500	1.165E+09
Eu-155	2.6793E-05	209.63	209.63	0.00E+00	5.62E-03	5.62E-03	2.2500	2.057E+05
Fe-55	1.4580E-08	209.63	209.63	0.00E+00	3.06E-06	3.06E-06	2.7500	1.021E+06
H-3	3.8566E-03	209.63	209.63	0.00E+00	8.08E-01	8.08E-01	3.5000	5.090E+04
I-129	9.8288E-07	209.63	209.63	0.00E+00	2.06E-04	2.06E-04	5.0000	2.174E+04
Kr-85	4.0617E-03	209.63	209.63	0.00E+00	8.51E-01	8.51E-01	7.0000	2.503E+03
Np-237	1.2645E-05	209.63	209.63	0.00E+00	2.65E-03	2.65E-03	11.0000	2.872E+02
Pa-231	1.6376E-09	209.63	209.63	0.00E+00	3.43E-07	3.43E-07		
Pb-210	2.8795E-10	209.63	209.63	0.00E+00	6.04E-08	6.04E-08		
Pm-147	1.3264E-07	209.63	209.63	0.00E+00	2.78E-05	2.78E-05		
Pu-238	5.8882E-02	209.63	209.63	0.00E+00	1.23E+01	1.23E+01		
Pu-239	1.1613E-02	209.63	209.63	0.00E+00	2.43E+00	2.43E+00		
Pu-240	1.5142E-02	209.63	209.63	0.00E+00	3.17E+00	3.17E+00		
Pu-241	2.1269E-01	209.63	209.63	0.00E+00	4.46E+01	4.46E+01		
Pu-242	6.4260E-05	209.63	209.63	0.00E+00	1.35E-02	1.35E-02		
Ra-226	5.8689E-10	209.63	209.63	0.00E+00	1.23E-07	1.23E-07		
Ra-228	5.3036E-12	209.63	209.63	0.00E+00	1.11E-09	1.11E-09		
Ru-106	6.8136E-19	209.63	209.63	0.00E+00	1.43E-16	1.43E-16		
Se-79	1.2372E-05	209.63	209.63	0.00E+00	2.59E-03	2.59E-03		
Sn-126	2.5194E-05	209.63	209.63	0.00E+00	5.28E-03	5.28E-03		
Sr-90	4.4913E-01	209.63	209.63	0.00E+00	9.42E+01	9.42E+01		
Tc-99	3.9357E-04	209.63	209.63	0.00E+00	8.25E-02	8.25E-02		
Th-229	1.9331E-10	209.63	209.63	0.00E+00	4.05E-08	4.05E-08		
Th-230	3.5223E-08	209.63	209.63	0.00E+00	7.38E-06	7.38E-06		
Th-232	5.3065E-12	209.63	209.63	0.00E+00	1.11E-09	1.11E-09		
Th-208	1.3102E-07	209.63	209.63	0.00E+00	2.75E-05	2.75E-05		
U-232	3.5497E-07	209.63	209.63	0.00E+00	7.44E-05	7.44E-05		
U-233	2.6647E-08	209.63	209.63	0.00E+00	5.59E-06	5.59E-06		
U-234	5.5023E-05	209.63	209.63	0.00E+00	1.15E-02	1.15E-02		
U-235	-1.4485E-06	209.63	0.00	9.66E-03	9.36E-03	9.66E-03		
U-236	7.5969E-06	209.63	209.63	0.00E+00	1.59E-03	1.59E-03		
U-238	-2.6129E-07	209.63	0.00	4.54E-02	4.54E-02	4.54E-02		
Y-90	4.4913E-01	209.63	209.63	0.00E+00	9.42E+01	9.42E+01		
Other Radionuclides					1.42E+02	1.42E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		209.63
Bounding:		209.63

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=139.752kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	
Bounding:	0.04	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR RMT & SMT (U METAL) LEU
SNF ID #: 790
Fuel Units & Descr: 10 - TUBE
Heavy Metal Mass: BOL = : EOL=63.746kg
ROD Storage Site: INEEL

Fuel decay start date: 1984
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x15"
0.45

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.7980E-09	61,103.94	61,103.94	0.00E+00	4.76E-04	4.76E-04	Avg. MeV	
Am-241	2.3580E-02	61,103.94	61,103.94	0.00E+00	1.44E+03	1.44E+03	0.0150	2.091E+15
Am-242m	3.0880E-08	61,103.94	61,103.94	0.00E+00	1.89E-01	1.89E-01	0.0250	4.319E+14
Am-243	2.0520E-08	61,103.94	61,103.94	0.00E+00	1.25E-01	1.25E-01	0.0375	3.803E+14
C-14	1.1222E-03	61,103.94	61,103.94	0.00E+00	6.86E+01	6.86E+01	0.0575	4.212E+14
Cl-36	8.3780E-11	61,103.94	61,103.94	0.00E+00	5.12E-06	5.12E-06	0.0850	2.423E+14
Cm-243	2.4260E-07	61,103.94	61,103.94	0.00E+00	1.48E-02	1.48E-02	0.1250	1.575E+14
Cm-244	3.3140E-08	61,103.94	61,103.94	0.00E+00	2.02E-01	2.02E-01	0.2250	2.088E+14
Co-60	1.2454E-03	61,103.94	61,103.94	0.00E+00	7.61E+01	7.61E+01	0.3750	9.083E+13
Cs-134	3.3040E-10	61,103.94	61,103.94	0.00E+00	2.02E-05	2.02E-05	0.5750	1.625E+15
Cs-135	7.9140E-08	61,103.94	61,103.94	0.00E+00	4.84E-01	4.84E-01	0.8500	1.552E+13
Cs-137	7.1580E-01	61,103.94	61,103.94	0.00E+00	4.37E+04	4.37E+04	1.2500	1.121E+13
Eu-154	6.0500E-04	61,103.94	61,103.94	0.00E+00	3.70E+01	3.70E+01	1.7500	4.010E+11
Eu-155	9.4860E-06	61,103.94	61,103.94	0.00E+00	5.80E-01	5.80E-01	2.2500	7.216E+07
Fe-55	1.9322E-08	61,103.94	61,103.94	0.00E+00	1.18E-03	1.18E-03	2.7500	7.498E+07
H-3	4.4180E-03	61,103.94	61,103.94	0.00E+00	2.70E+02	2.70E+02	3.5000	3.055E+06
I-129	7.5020E-07	61,103.94	61,103.94	0.00E+00	4.58E-02	4.58E-02	5.0000	1.282E+06
Kr-85	5.4940E-03	61,103.94	61,103.94	0.00E+00	3.36E+02	3.36E+02	7.0000	1.442E+06
Np-237	5.8040E-06	61,103.94	61,103.94	0.00E+00	3.55E-01	3.55E-01	11.0000	1.636E+03
Pa-231	1.1096E-08	61,103.94	61,103.94	0.00E+00	6.78E-04	6.78E-04		
Pb-210	1.4712E-08	61,103.94	61,103.94	0.00E+00	8.99E-04	8.99E-04		
Pm-147	3.5920E-07	61,103.94	61,103.94	0.00E+00	2.19E-02	2.19E-02		
Pu-238	5.0700E-03	61,103.94	61,103.94	0.00E+00	3.10E+02	3.10E+02		
Pu-239	1.8728E-02	61,103.94	61,103.94	0.00E+00	1.14E+03	1.14E+03		
Pu-240	8.3280E-03	61,103.94	61,103.94	0.00E+00	5.09E+02	5.09E+02		
Pu-241	3.4480E-02	61,103.94	61,103.94	0.00E+00	2.11E+03	2.11E+03		
Pu-242	2.0380E-06	61,103.94	61,103.94	0.00E+00	1.25E-01	1.25E-01		
Ra-226	2.9640E-08	61,103.94	61,103.94	0.00E+00	1.81E-03	1.81E-03		
Ra-228	1.1922E-09	61,103.94	61,103.94	0.00E+00	7.28E-05	7.28E-05		
Ru-106	3.5780E-19	61,103.94	61,103.94	0.00E+00	2.19E-14	2.19E-14		
Se-79	1.2520E-05	61,103.94	61,103.94	0.00E+00	7.65E-01	7.65E-01		
Sn-126	1.2050E-05	61,103.94	61,103.94	0.00E+00	7.36E-01	7.36E-01		
Sr-90	6.1880E-01	61,103.94	61,103.94	0.00E+00	3.78E+04	3.78E+04		
Tc-99	4.4120E-04	61,103.94	61,103.94	0.00E+00	2.70E+01	2.70E+01		
Th-229	6.9280E-09	61,103.94	61,103.94	0.00E+00	4.23E-04	4.23E-04		
Th-230	1.7084E-08	61,103.94	61,103.94	0.00E+00	1.04E-01	1.04E-01		
Th-232	1.1826E-09	61,103.94	61,103.94	0.00E+00	7.29E-05	7.29E-05		
Th-208	3.4740E-08	61,103.94	61,103.94	0.00E+00	2.12E-03	2.12E-03		
U-232	9.2940E-08	61,103.94	61,103.94	0.00E+00	5.68E-03	5.68E-03		
U-233	9.1680E-07	61,103.94	61,103.94	0.00E+00	5.60E-02	5.60E-02		
U-234	2.3440E-03	61,103.94	61,103.94	0.00E+00	1.43E+02	1.43E+02		
U-235	-2.3296E-08	61,103.94	0.00	1.38E-02	0.00E+00	1.38E-02		
U-236	2.6620E-05	61,103.94	61,103.94	0.00E+00	1.63E+00	1.63E+00		
U-238	-1.3291E-07	61,103.94	0.00	4.03E-02	3.22E-02	4.03E-02		
Y-90	6.1900E-01	61,103.94	61,103.94	0.00E+00	3.78E+04	3.78E+04		
Other Radionuclides					4.19E+04	4.19E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated 61,103.94	
Bounding:		61,103.94	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	32.83	32.83	2.59

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SOT (UO2) LEU
SNF ID #: 120
Fuel Units & Descr: 96 - TUBE
Heavy Metal Mass: BOL = : EOL=249.725kg
ROD Storage Site: INEEL

*Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
*Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x10"
1.09

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	7.7980E-09	239,374.53	239,374.53	0.00E+00	1.87E-03	1.87E-03	Avg. MeV	
Am-241	2.3560E-02	239,374.53	239,374.53	0.00E+00	5.64E+03	5.64E+03	0.0150	8.193E+15
Am-242m	3.0880E-06	239,374.53	239,374.53	0.00E+00	7.39E-01	7.39E-01	0.0250	1.692E+15
Am-243	2.0520E-06	239,374.53	239,374.53	0.00E+00	4.91E-01	4.91E-01	0.0375	1.490E+15
C-14	1.1222E-03	239,374.53	239,374.53	0.00E+00	2.69E+02	2.69E+02	0.0575	1.850E+15
Cl-36	6.3760E-11	239,374.53	239,374.53	0.00E+00	2.01E-05	2.01E-05	0.0850	9.492E+14
Cm-243	2.4260E-07	239,374.53	239,374.53	0.00E+00	5.81E-02	5.81E-02	0.1250	6.169E+14
Cm-244	3.3140E-06	239,374.53	239,374.53	0.00E+00	7.93E-01	7.93E-01	0.2250	8.170E+14
Co-60	1.2454E-03	239,374.53	239,374.53	0.00E+00	2.98E+02	2.98E+02	0.3750	3.558E+14
Cs-134	3.3040E-10	239,374.53	239,374.53	0.00E+00	7.91E-05	7.91E-05	0.5750	6.365E+15
Cs-135	7.9140E-06	239,374.53	239,374.53	0.00E+00	1.89E+00	1.89E+00	0.8500	8.080E+13
Cs-137	7.1580E-01	239,374.53	239,374.53	0.00E+00	1.71E+05	1.71E+05	1.2500	4.393E+13
Eu-154	6.0500E-04	239,374.53	239,374.53	0.00E+00	1.45E+02	1.45E+02	1.7500	1.571E+12
Eu-155	9.4860E-06	239,374.53	239,374.53	0.00E+00	2.27E+00	2.27E+00	2.2500	2.827E+08
Fe-55	1.9322E-08	239,374.53	239,374.53	0.00E+00	4.63E-03	4.63E-03	2.7500	2.937E+08
H-3	4.4180E-03	239,374.53	239,374.53	0.00E+00	1.06E+03	1.06E+03	3.5000	1.197E+06
I-129	7.5020E-07	239,374.53	239,374.53	0.00E+00	1.80E-01	1.80E-01	5.0000	5.023E+05
Kr-85	5.4940E-03	239,374.53	239,374.53	0.00E+00	1.32E+03	1.32E+03	7.0000	5.648E+04
Np-237	6.8040E-06	239,374.53	239,374.53	0.00E+00	1.39E+00	1.39E+00	11.0000	6.407E+03
Pa-231	1.1096E-08	239,374.53	239,374.53	0.00E+00	2.66E-03	2.66E-03		
Pb-210	1.4712E-08	239,374.53	239,374.53	0.00E+00	3.52E-03	3.52E-03		
Pm-147	3.5920E-07	239,374.53	239,374.53	0.00E+00	8.60E-02	8.60E-02		
Pu-238	5.0700E-03	239,374.53	239,374.53	0.00E+00	1.21E+03	1.21E+03		
Pu-239	1.8728E-02	239,374.53	239,374.53	0.00E+00	4.48E+03	4.48E+03		
Pu-240	8.3280E-03	239,374.53	239,374.53	0.00E+00	1.99E+03	1.99E+03		
Pu-241	3.4460E-02	239,374.53	239,374.53	0.00E+00	8.25E+03	8.25E+03		
Pu-242	2.0380E-06	239,374.53	239,374.53	0.00E+00	4.88E-01	4.88E-01		
Ra-226	2.9640E-08	239,374.53	239,374.53	0.00E+00	7.10E-03	7.10E-03		
Ra-228	1.1822E-09	239,374.53	239,374.53	0.00E+00	2.85E-04	2.85E-04		
Ru-106	3.5780E-19	239,374.53	239,374.53	0.00E+00	8.56E-14	8.56E-14		
Se-79	1.2520E-05	239,374.53	239,374.53	0.00E+00	3.00E+00	3.00E+00		
Sn-126	1.2050E-05	239,374.53	239,374.53	0.00E+00	2.88E+00	2.88E+00		
Sr-90	6.1880E-01	239,374.53	239,374.53	0.00E+00	1.48E+05	1.48E+05		
Tc-99	4.4120E-04	239,374.53	239,374.53	0.00E+00	1.06E+02	1.06E+02		
Th-229	6.9280E-09	239,374.53	239,374.53	0.00E+00	1.66E-03	1.66E-03		
Th-230	1.7084E-06	239,374.53	239,374.53	0.00E+00	4.09E-01	4.09E-01		
Th-232	1.1926E-09	239,374.53	239,374.53	0.00E+00	2.85E-04	2.85E-04		
Ti-208	3.4740E-08	239,374.53	239,374.53	0.00E+00	8.32E-03	8.32E-03		
U-232	9.2940E-08	239,374.53	239,374.53	0.00E+00	2.22E-02	2.22E-02		
U-233	9.1680E-07	239,374.53	239,374.53	0.00E+00	2.19E-01	2.19E-01		
U-234	2.3440E-03	239,374.53	239,374.53	0.00E+00	5.61E+02	5.61E+02		
U-235	2.3296E-06	239,374.53	0.00	5.40E-02	0.00E+00	5.40E-02		
U-236	2.6620E-05	239,374.53	239,374.53	0.00E+00	6.37E+00	6.37E+00		
U-238	1.3291E-07	239,374.53	0.00	1.58E-01	1.26E-01	1.58E-01		
Y-90	6.1900E-01	239,374.53	239,374.53	0.00E+00	1.48E+05	1.48E+05		
Other Radionuclides					1.64E+05	1.64E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons:
Fuel Cladding:	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		239,374.53	Nominal burnup set equal to bounding burnup.
Bounding:		239,374.53	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	32.83		2.59
Bounding:	32.83		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPR (U-ZR) LEU
SNF ID #: 783
Fuel Units & Descr: 56 - TUBE
Heavy Metal Mass: BOL = : EOL=437.679kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1984
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x15"
2.55

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	7.7980E-09	419,538.84	419,538.84	0.00E+00	3.27E-03	3.27E-03	Avg. MeV	
Am-241	2.3560E-02	419,538.84	419,538.84	0.00E+00	9.88E+03	9.88E+03	0.0150	1.436E+16
Am-242m	3.0880E-08	419,538.84	419,538.84	0.00E+00	1.30E+00	1.30E+00	0.0250	2.965E+15
Am-243	2.0520E-08	419,538.84	419,538.84	0.00E+00	8.61E-01	8.61E-01	0.0375	2.611E+15
C-14	1.1222E-03	419,538.84	419,538.84	0.00E+00	4.71E+02	4.71E+02	0.0575	2.892E+15
Cl-36	8.3760E-11	419,538.84	419,538.84	0.00E+00	3.51E-05	3.51E-05	0.0850	1.664E+15
Cm-243	2.4260E-07	419,538.84	419,538.84	0.00E+00	1.02E-01	1.02E-01	0.1250	1.061E+15
Cm-244	3.3140E-08	419,538.84	419,538.84	0.00E+00	1.39E+00	1.39E+00	0.2250	1.432E+15
Co-60	1.2454E-03	419,538.84	419,538.84	0.00E+00	5.22E+02	5.22E+02	0.3750	6.237E+14
Cs-134	3.3040E-10	419,538.84	419,538.84	0.00E+00	1.39E-04	1.39E-04	0.5750	1.115E+16
Cs-135	7.9140E-06	419,538.84	419,538.84	0.00E+00	3.32E+00	3.32E+00	0.8500	1.066E+14
Cs-137	7.1580E-01	419,538.84	419,538.84	0.00E+00	3.00E+05	3.00E+05	1.2500	7.700E+13
Eu-154	6.0500E-04	419,538.84	419,538.84	0.00E+00	2.54E+02	2.54E+02	1.7500	2.753E+12
Eu-155	9.4860E-08	419,538.84	419,538.84	0.00E+00	3.98E+00	3.98E+00	2.2500	4.954E+08
Fe-55	1.9322E-08	419,538.84	419,538.84	0.00E+00	8.11E-03	8.11E-03	2.7500	5.148E+08
H-3	4.4180E-03	419,538.84	419,538.84	0.00E+00	1.85E+03	1.85E+03	3.5000	2.068E+08
I-129	7.5020E-07	419,538.84	419,538.84	0.00E+00	3.15E-01	3.15E-01	5.0000	8.803E+05
K-85	5.4940E-03	419,538.84	419,538.84	0.00E+00	2.30E+03	2.30E+03	7.0000	9.898E+04
Np-237	5.8040E-08	419,538.84	419,538.84	0.00E+00	2.44E+00	2.44E+00	11.0000	1.123E+04
Pa-231	1.1096E-08	419,538.84	419,538.84	0.00E+00	4.66E-03	4.66E-03		
Pb-210	1.4712E-08	419,538.84	419,538.84	0.00E+00	8.17E-03	8.17E-03		
Pm-147	3.5920E-07	419,538.84	419,538.84	0.00E+00	1.51E-01	1.51E-01		
Pu-238	5.0700E-03	419,538.84	419,538.84	0.00E+00	2.13E+03	2.13E+03		
Pu-239	1.8728E-02	419,538.84	419,538.84	0.00E+00	7.86E+03	7.86E+03		
Pu-240	8.3280E-03	419,538.84	419,538.84	0.00E+00	3.49E+03	3.49E+03		
Pu-241	3.4480E-02	419,538.84	419,538.84	0.00E+00	1.45E+04	1.45E+04		
Pu-242	2.0380E-08	419,538.84	419,538.84	0.00E+00	8.55E-01	8.55E-01		
Ra-226	2.0640E-08	419,538.84	419,538.84	0.00E+00	1.24E-02	1.24E-02		
Ra-228	1.1922E-09	419,538.84	419,538.84	0.00E+00	5.00E-04	5.00E-04		
Ru-106	3.5780E-19	419,538.84	419,538.84	0.00E+00	1.50E-13	1.50E-13		
Se-79	1.2520E-05	419,538.84	419,538.84	0.00E+00	5.25E+00	5.25E+00		
Sn-126	1.2050E-05	419,538.84	419,538.84	0.00E+00	5.06E+00	5.06E+00		
Sr-90	6.1880E-01	419,538.84	419,538.84	0.00E+00	2.60E+05	2.60E+05		
To-99	4.4120E-04	419,538.84	419,538.84	0.00E+00	1.85E+02	1.85E+02		
Th-229	6.9280E-09	419,538.84	419,538.84	0.00E+00	2.91E-03	2.91E-03		
Th-230	1.7084E-08	419,538.84	419,538.84	0.00E+00	7.17E-01	7.17E-01		
Th-232	1.1926E-09	419,538.84	419,538.84	0.00E+00	5.00E-04	5.00E-04		
Th-208	3.4740E-08	419,538.84	419,538.84	0.00E+00	1.46E-02	1.46E-02		
U-232	9.2940E-08	419,538.84	419,538.84	0.00E+00	3.90E-02	3.90E-02		
U-233	9.1680E-07	419,538.84	419,538.84	0.00E+00	3.85E-01	3.85E-01		
U-234	2.3440E-03	419,538.84	419,538.84	0.00E+00	9.83E+02	9.83E+02		
U-235	-2.3296E-08	419,538.84	0.00	9.46E-02	0.00E+00	9.46E-02		
U-236	2.6620E-05	419,538.84	419,538.84	0.00E+00	1.12E+01	1.12E+01		
U-238	-1.3291E-07	419,538.84	0.00	2.77E-01	2.21E-01	2.77E-01		
Y-90	6.1900E-01	419,538.84	419,538.84	0.00E+00	2.60E+05	2.60E+05		
Other Radionuclides					2.87E+05	2.87E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
Nominal:	From SFD 419,538.84	Estimated 419,538.84	
Bounding:			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 32.83	Estimated Burnup/ Given Burnup	
Bounding:	32.83		2.59

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWICR SPRO (UO2) ALUM LEU
 SFR ID #: 115
 Fuel Units & Descr: 3 - TUBE
 Heavy Metal Mass: BOL: : EOL=6.499kg
 ROD Storage Site: SRS

Fuel decay start date: 1964
 Estimates as of: 2030
 Template: HTRB (Heavy Water, Alum., 10 to 20%, U)
 Template BOL Heavy Metal Mass (MT): 15
 Template Decay Time: 65 years

Estimated
 Container Usage:
 18 x10
 0.06

Radionuclide	CI/WD From Template	Nominal Fuel Burnup (MWd/T)	Bounding Fuel Burnup (MWd/T)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Gamma Sources
Ac-227	6.3460E-03	6.176.98	6.176.98	0.00E+00	3.30E-05	3.30E-05	0.0150	2.149E+14
Am-241	2.9433E-02	6.176.98	6.176.98	0.00E+00	1.82E+02	1.82E+02	0.0250	4.444E+13
Am-242m	7.2600E-05	6.176.98	6.176.98	0.00E+00	4.48E-02	4.48E-02	0.0375	3.892E+13
Am-243	6.3740E-06	6.176.98	6.176.98	0.00E+00	3.94E-02	3.94E-02	0.0375	4.278E+13
C-14	2.9460E-08	6.176.98	6.176.98	0.00E+00	1.82E-04	1.82E-04	0.0675	2.492E+13
Ce-136	6.3507E-35	6.176.98	6.176.98	0.00E+00	3.68E-31	3.68E-31	0.0850	2.492E+13
Cm-243	7.3933E-07	6.176.98	6.176.98	0.00E+00	4.57E-03	4.57E-03	0.1250	1.620E+13
Cm-244	1.9660E-05	6.176.98	6.176.98	0.00E+00	1.27E-01	1.27E-01	0.2250	2.147E+13
Co-60	4.3897E-08	6.176.98	6.176.98	0.00E+00	2.71E-04	2.71E-04	0.3750	9.351E+12
Co-134	6.7507E-10	6.176.98	6.176.98	0.00E+00	3.55E-06	3.55E-06	0.5750	1.642E+14
Co-136	4.8607E-06	6.176.98	6.176.98	0.00E+00	3.00E-02	3.00E-02	0.6500	1.575E+12
Cs-137	7.1533E-01	6.176.98	6.176.98	0.00E+00	4.42E+03	4.42E+03	1.2500	5.675E+11
Eu-154	5.5553E-04	6.176.98	6.176.98	0.00E+00	3.43E+00	3.43E+00	1.7500	4.105E+10
Eu-155	7.5800E-06	6.176.98	6.176.98	0.00E+00	4.68E-02	4.68E-02	2.2500	4.340E+08
Fe-55	6.7333E-04	6.176.98	6.176.98	0.00E+00	6.39E-05	6.39E-05	2.7500	1.105E+06
H-3	3.7131E-04	6.176.98	6.176.98	0.00E+00	2.30E+00	2.30E+00	3.5000	2.271E+04
H-129	7.1600E-07	6.176.98	6.176.98	0.00E+00	4.42E-03	4.42E-03	6.0000	8.492E+03
Kr-85	5.5783E-03	6.176.98	6.176.98	0.00E+00	3.45E+01	3.45E+01	7.0000	1.06E+05
Mo-237	4.2207E-06	6.176.98	6.176.98	0.00E+00	2.67E-02	2.67E-02	11.0000	1.204E+02
Pa-231	8.3333E-09	6.176.98	6.176.98	0.00E+00	5.15E-05	5.15E-05		
Pb-210	2.4613E-12	6.176.98	6.176.98	0.00E+00	1.52E-08	1.52E-08		
Pm-147	3.1790E-07	6.176.98	6.176.98	0.00E+00	1.96E-03	1.96E-03		
Pu-238	3.6753E-03	6.176.98	6.176.98	0.00E+00	2.38E+01	2.38E+01		
Pu-239	1.0300E-02	6.176.98	6.176.98	0.00E+00	6.36E+01	6.36E+01		
Pu-240	5.3820E-03	6.176.98	6.176.98	0.00E+00	3.33E+01	3.33E+01		
Pu-241	4.3063E-02	6.176.98	6.176.98	0.00E+00	2.66E+02	2.66E+02		
Pu-242	3.0713E-06	6.176.98	6.176.98	0.00E+00	1.90E-02	1.90E-02		
Pu-246	8.6127E-12	6.176.98	6.176.98	0.00E+00	3.59E-08	3.59E-08		
Ra-226	4.5447E-14	6.176.98	6.176.98	0.00E+00	2.81E-10	2.81E-10		
Ru-106	3.0860E-19	6.176.98	6.176.98	0.00E+00	1.91E-15	1.91E-15		
Sr-79	1.2533E-05	6.176.98	6.176.98	0.00E+00	7.74E-02	7.74E-02		
Sr-126	1.1383E-06	6.176.98	6.176.98	0.00E+00	7.04E-02	7.04E-02		
Sr-90	4.3033E-01	6.176.98	6.176.98	0.00E+00	3.69E+03	3.69E+03		
Tc-99	4.3627E-04	6.176.98	6.176.98	0.00E+00	2.69E+00	2.69E+00		
Th-229	5.2893E-12	6.176.98	6.176.98	0.00E+00	3.27E-08	3.27E-08		
Th-230	4.6820E-10	6.176.98	6.176.98	0.00E+00	2.86E-06	2.86E-06		
Th-232	5.1647E-14	6.176.98	6.176.98	0.00E+00	3.19E-10	3.19E-10		
Th-234	4.9873E-09	6.176.98	6.176.98	0.00E+00	3.08E-05	3.08E-05		
U-232	1.3513E-08	6.176.98	6.176.98	0.00E+00	8.35E-05	8.35E-05		
U-233	1.3827E-09	6.176.98	6.176.98	0.00E+00	8.60E-06	8.60E-06		
U-234	1.1380E-06	6.176.98	6.176.98	0.00E+00	7.03E-03	7.03E-03		
U-235	-2.5336E-06	6.176.98	6.176.98	0.00E+00	4.21E-03	4.21E-03		
U-236	1.3007E-05	6.176.98	6.176.98	0.00E+00	8.03E-02	8.03E-02		
U-238	-1.4207E-06	6.176.98	6.176.98	0.00E+00	3.67E-03	3.67E-03		
Y-90	6.3033E-01	6.176.98	6.176.98	0.00E+00	3.69E+03	3.69E+03		
Other Radionuclides					4.21E+03	4.21E+03		

II. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator:	From SFD	Used
Fuel Cladding:	HEAVY WATER	HEAVY WATER
BOL HML Constituents:	ALUM	ALUM
BOL Enrichment %:	U	U

Basis for Parameter Differences:
 The Template was used for the following reasons:
 The fuel matches on all parameters except enrichment (enrichment).

Burnup Summary (MWd/T)

From SFD	Estimated
Nominal:	6.176.98
Bounding:	6.176.98

Basis for Burnup used in estimate:
 Nominal Burnup set equal to bounding burnup.
 Bounding Burnup estimated by assuming BOL heavy metal mass was like EOL.

Checks

Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.85
Bounding:	10.85

Estimated EOL HML/Given EOL HML
 2.01

Reactor shutdown, core removal, storage, shipping or other data 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/HML).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (UO2) SST LEU
SNF ID #: 978
Fuel Units & Descr: 5 - TUBE
Heavy Metal Mass: BOL= : EOL=89.362kg
ROD Storage Site: INEEL

Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
Template Burnup (MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x10"
0.06

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^b	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.2380E-09	85,315.00	85,315.00	0.00E+00	7.88E-04	7.88E-04	Avg. MeV	
Am-241	2.2020E-01	85,315.00	85,315.00	0.00E+00	1.88E+04	1.88E+04	0.0150	2.731E+15
Am-242m	8.9860E-05	85,315.00	85,315.00	0.00E+00	7.67E+00	7.67E+00	0.0250	5.281E+14
Am-243	5.2240E-05	85,315.00	85,315.00	0.00E+00	4.46E+00	4.46E+00	0.0375	4.712E+14
C-14	2.2080E-02	85,315.00	85,315.00	0.00E+00	1.88E+03	1.88E+03	0.0575	7.268E+14
Cl-36	4.1880E-04	85,315.00	85,315.00	0.00E+00	3.57E+01	3.57E+01	0.0850	2.818E+14
Cm-243	8.0820E-06	85,315.00	85,315.00	0.00E+00	6.90E-01	6.90E-01	0.1250	1.830E+14
Cm-244	2.3260E-04	85,315.00	85,315.00	0.00E+00	1.98E+01	1.98E+01	0.2250	2.405E+14
Co-60	9.9520E-02	85,315.00	85,315.00	0.00E+00	8.49E+03	8.49E+03	0.3750	1.044E+14
Cs-134	7.2180E-10	85,315.00	85,315.00	0.00E+00	6.16E-05	6.16E-05	0.5750	2.274E+15
Cs-135	3.7480E-06	85,315.00	85,315.00	0.00E+00	3.20E-01	3.20E-01	0.8500	1.928E+13
Cs-137	7.2140E-01	85,315.00	85,315.00	0.00E+00	6.15E+04	6.15E+04	1.2500	6.352E+14
Eu-154	8.2120E-04	85,315.00	85,315.00	0.00E+00	7.01E+01	7.01E+01	1.7500	4.757E+11
Eu-155	1.2284E-05	85,315.00	85,315.00	0.00E+00	1.05E+00	1.05E+00	2.2500	3.381E+09
Fe-55	1.8062E-05	85,315.00	85,315.00	0.00E+00	1.54E+00	1.54E+00	2.7500	3.553E+08
H-3	8.2700E-03	85,315.00	85,315.00	0.00E+00	7.06E+02	7.06E+02	3.5000	1.794E+08
I-129	9.1660E-07	85,315.00	85,315.00	0.00E+00	7.82E-02	7.82E-02	5.0000	7.450E+05
Kr-85	4.6540E-03	85,315.00	85,315.00	0.00E+00	3.97E+02	3.97E+02	7.0000	8.295E+04
Np-237	2.1800E-05	85,315.00	85,315.00	0.00E+00	1.86E+00	1.86E+00	11.0000	9.351E+03
Pa-231	1.2982E-08	85,315.00	85,315.00	0.00E+00	1.11E-03	1.11E-03		
Pb-210	1.3604E-08	85,315.00	85,315.00	0.00E+00	1.16E-03	1.16E-03		
Pm-147	2.8480E-07	85,315.00	85,315.00	0.00E+00	2.43E-02	2.43E-02		
Pu-238	2.8680E-02	85,315.00	85,315.00	0.00E+00	2.45E+03	2.45E+03		
Pu-239	6.5040E-02	85,315.00	85,315.00	0.00E+00	5.55E+03	5.55E+03		
Pu-240	2.6620E-02	85,315.00	85,315.00	0.00E+00	2.27E+03	2.27E+03		
Pu-241	3.2120E-01	85,315.00	85,315.00	0.00E+00	2.74E+04	2.74E+04		
Pu-242	1.6742E-05	85,315.00	85,315.00	0.00E+00	1.43E+00	1.43E+00		
Ra-226	2.7420E-08	85,315.00	85,315.00	0.00E+00	2.34E-03	2.34E-03		
Ra-228	2.0880E-10	85,315.00	85,315.00	0.00E+00	1.78E-05	1.78E-05		
Ru-106	8.1300E-19	85,315.00	85,315.00	0.00E+00	6.94E-14	6.94E-14		
Se-79	2.8480E-05	85,315.00	85,315.00	0.00E+00	2.43E+00	2.43E+00		
Sn-126	1.7790E-05	85,315.00	85,315.00	0.00E+00	1.52E+00	1.52E+00		
Sr-90	5.0780E-01	85,315.00	85,315.00	0.00E+00	4.33E+04	4.33E+04		
Tc-99	4.3380E-04	85,315.00	85,315.00	0.00E+00	3.70E+01	3.70E+01		
Th-229	3.1120E-09	85,315.00	85,315.00	0.00E+00	2.66E-04	2.66E-04		
Th-230	1.5812E-08	85,315.00	85,315.00	0.00E+00	1.35E-01	1.35E-01		
Th-232	2.0900E-10	85,315.00	85,315.00	0.00E+00	1.78E-05	1.78E-05		
Th-208	1.1448E-07	85,315.00	85,315.00	0.00E+00	9.77E-03	9.77E-03		
U-232	3.1000E-07	85,315.00	85,315.00	0.00E+00	2.64E-02	2.64E-02		
U-233	4.1460E-07	85,315.00	85,315.00	0.00E+00	3.54E-02	3.54E-02		
U-234	2.1720E-03	85,315.00	85,315.00	0.00E+00	1.85E+02	1.85E+02		
U-235	-1.7016E-08	85,315.00	0.00	1.93E-02	0.00E+00	1.93E-02		
U-236	2.6100E-05	85,315.00	85,315.00	0.00E+00	2.23E+00	2.23E+00		
U-238	-5.1291E-07	85,315.00	0.00	5.65E-02	1.27E-02	5.65E-02		
Y-90	5.0800E-01	85,315.00	85,315.00	0.00E+00	4.33E+04	4.33E+04		
Other Radionuclides					5.52E+05	5.52E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.90E+03	1.90E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd)			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:		85,315.00	

Checks			Estimated EOL HM/Given EOL HM 2.28
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	32.70	32.70	

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (UO2) ZR LEU
 SNF ID #: 772
 Fuel Units & Descr: 48 - TUBE
 Heavy Metal Mass: BOL= : EOL=180.922kg
 ROD Storage Site: INEEL

Fuel decay start date: 1984
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Zirc., 0 to 5% U)
 Template Burnup (MWd): 5
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 65 years

Estimated
 Canister usage:
 18"x10"
 0.55

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	CIMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.7980E-09	173,423.00	173,423.00	0.00E+00	1.35E-03	1.35E-03	Avg. MeV	
Am-241	2.3560E-02	173,423.00	173,423.00	0.00E+00	4.09E+03	4.09E+03	0.0150	5.936E+15
Am-242m	3.0880E-06	173,423.00	173,423.00	0.00E+00	5.36E-01	5.36E-01	0.0250	1.226E+15
Am-243	2.0520E-06	173,423.00	173,423.00	0.00E+00	3.56E-01	3.56E-01	0.0375	1.079E+15
C-14	1.1222E-03	173,423.00	173,423.00	0.00E+00	1.95E+02	1.95E+02	0.0575	1.195E+15
Cf-252	8.3760E-11	173,423.00	173,423.00	0.00E+00	1.45E-05	1.45E-05	0.0850	5.877E+14
Cm-243	2.4260E-07	173,423.00	173,423.00	0.00E+00	4.21E-02	4.21E-02	0.1250	4.470E+14
Cm-244	3.3140E-06	173,423.00	173,423.00	0.00E+00	5.75E-01	5.75E-01	0.2250	5.919E+14
Co-60	1.2454E-03	173,423.00	173,423.00	0.00E+00	2.16E+02	2.16E+02	0.3750	2.578E+14
Cs-134	3.3040E-10	173,423.00	173,423.00	0.00E+00	5.73E-05	5.73E-05	0.5750	4.611E+15
Cs-135	7.9140E-06	173,423.00	173,423.00	0.00E+00	1.37E+00	1.37E+00	0.8500	4.405E+13
Cs-137	7.1580E-01	173,423.00	173,423.00	0.00E+00	1.24E+05	1.24E+05	1.2500	3.183E+13
Eu-154	6.0500E-04	173,423.00	173,423.00	0.00E+00	1.05E+02	1.05E+02	1.7500	1.138E+12
Eu-155	9.4860E-06	173,423.00	173,423.00	0.00E+00	1.65E+00	1.65E+00	2.2500	2.048E+08
Fe-55	1.9322E-08	173,423.00	173,423.00	0.00E+00	3.35E-03	3.35E-03	2.7500	2.128E+08
H-3	4.4180E-03	173,423.00	173,423.00	0.00E+00	7.66E+02	7.66E+02	3.5000	8.672E+05
I-129	7.5020E-07	173,423.00	173,423.00	0.00E+00	1.30E-01	1.30E-01	5.0000	3.639E+05
Kr-85	5.4940E-03	173,423.00	173,423.00	0.00E+00	9.53E+02	9.53E+02	7.0000	4.082E+04
Np-237	5.8040E-06	173,423.00	173,423.00	0.00E+00	1.01E+00	1.01E+00	11.0000	4.842E+03
Pa-231	1.1096E-08	173,423.00	173,423.00	0.00E+00	1.92E-03	1.92E-03		
Pb-210	1.4712E-08	173,423.00	173,423.00	0.00E+00	2.55E-03	2.55E-03		
Pm-147	3.5920E-07	173,423.00	173,423.00	0.00E+00	6.23E-02	6.23E-02		
Pu-238	5.0700E-03	173,423.00	173,423.00	0.00E+00	8.79E+02	8.79E+02		
Pu-239	1.8728E-02	173,423.00	173,423.00	0.00E+00	3.25E+03	3.25E+03		
Pu-240	8.3280E-03	173,423.00	173,423.00	0.00E+00	1.44E+03	1.44E+03		
Pu-241	3.4460E-02	173,423.00	173,423.00	0.00E+00	5.98E+03	5.98E+03		
Pu-242	2.0380E-06	173,423.00	173,423.00	0.00E+00	3.53E-01	3.53E-01		
Ra-226	2.9640E-08	173,423.00	173,423.00	0.00E+00	5.14E-03	5.14E-03		
Ra-228	1.1922E-09	173,423.00	173,423.00	0.00E+00	2.07E-04	2.07E-04		
Ru-106	3.5780E-19	173,423.00	173,423.00	0.00E+00	6.21E-14	6.21E-14		
Se-79	1.2520E-06	173,423.00	173,423.00	0.00E+00	2.17E+00	2.17E+00		
Sn-126	1.2050E-05	173,423.00	173,423.00	0.00E+00	2.09E+00	2.09E+00		
Sr-90	6.1880E-01	173,423.00	173,423.00	0.00E+00	1.07E+05	1.07E+05		
Tc-99	4.4120E-04	173,423.00	173,423.00	0.00E+00	7.65E-01	7.65E-01		
Th-229	6.9280E-09	173,423.00	173,423.00	0.00E+00	1.20E-03	1.20E-03		
Th-230	1.7084E-06	173,423.00	173,423.00	0.00E+00	2.96E-01	2.96E-01		
Th-232	1.1926E-09	173,423.00	173,423.00	0.00E+00	2.07E-04	2.07E-04		
Ti-208	3.4740E-08	173,423.00	173,423.00	0.00E+00	6.02E-03	6.02E-03		
U-232	9.2940E-08	173,423.00	173,423.00	0.00E+00	1.61E-02	1.61E-02		
U-233	9.1680E-07	173,423.00	173,423.00	0.00E+00	1.59E-01	1.59E-01		
U-234	2.3440E-03	173,423.00	173,423.00	0.00E+00	4.07E+02	4.07E+02		
U-235	-2.3296E-06	173,423.00	0.00	3.91E-02	0.00E+00	3.91E-02		
U-236	2.6620E-05	173,423.00	173,423.00	0.00E+00	4.62E+00	4.62E+00		
U-238	-1.3291E-07	173,423.00	0.00	1.14E-01	9.13E-02	1.14E-01		
Y-90	6.1900E-01	173,423.00	173,423.00	0.00E+00	1.07E+05	1.07E+05		
Other Radionuclides					1.19E+05	1.19E+05		

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 %:		0 to 5

Basis for Parameter Differences:

This Template was used for the following reasons:
 This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		173,423.00
Bounding:		173,423.00

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:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM
 2.59

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TFEN (U-ZR) LEU
SNF ID #: 880
Fuel Units & Descr: 11 - TUBE
Heavy Metal Mass: BOL = ; EOL=162.082kg
ROD Storage Site: INEEL

Fuel decay start date: 1984
Estimates as of: 2030
Template: HFBR (Heavy Water, Zinc, 0 to 5% U)
Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated
Canister usage:
18"x15"
0.50

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CUMWd 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	7.7980E-09	155,363.95	155,363.95	0.00E+00	1.21E-03	1.21E-03	Avg. MeV	
Am-241	2.3560E-02	155,363.95	155,363.95	0.00E+00	3.66E+03	3.66E+03	0.0150	5.318E+15
Am-242m	3.0880E-06	155,363.95	155,363.95	0.00E+00	4.80E-01	4.80E-01	0.0250	1.098E+15
Am-243	2.0520E-06	155,363.95	155,363.95	0.00E+00	3.19E-01	3.19E-01	0.0375	9.669E+14
C-14	1.1222E-03	155,363.95	155,363.95	0.00E+00	1.74E+02	1.74E+02	0.0575	1.071E+15
Cf-252	8.3760E-11	155,363.95	155,363.95	0.00E+00	1.30E-05	1.30E-05	0.0850	6.160E+14
Cm-243	2.4280E-07	155,363.95	155,363.95	0.00E+00	3.77E-02	3.77E-02	0.1250	4.004E+14
Cm-244	3.3140E-06	155,363.95	155,363.95	0.00E+00	5.15E-01	5.15E-01	0.2250	5.303E+14
Co-60	1.2454E-03	155,363.95	155,363.95	0.00E+00	1.93E+02	1.93E+02	0.3750	2.310E+14
Cs-134	3.3040E-10	155,363.95	155,363.95	0.00E+00	5.13E-05	5.13E-05	0.5750	4.131E+15
Cs-135	7.9140E-08	155,363.95	155,363.95	0.00E+00	1.23E+00	1.23E+00	0.8500	3.948E+13
Cs-137	7.1580E-01	155,363.95	155,363.95	0.00E+00	1.11E+05	1.11E+05	1.2500	2.851E+13
Eu-154	6.0500E-04	155,363.95	155,363.95	0.00E+00	9.40E+01	9.40E+01	1.7500	1.019E+12
Eu-155	9.4860E-06	155,363.95	155,363.95	0.00E+00	1.47E+00	1.47E+00	2.2500	1.835E+08
Fe-55	1.9322E-08	155,363.95	155,363.95	0.00E+00	3.00E-03	3.00E-03	2.7500	1.906E+08
H-3	4.4180E-03	155,363.95	155,363.95	0.00E+00	6.86E+02	6.86E+02	3.5000	7.769E+06
I-129	7.5020E-07	155,363.95	155,363.95	0.00E+00	1.17E-01	1.17E-01	5.0000	3.260E+05
Kr-85	5.4940E-03	155,363.95	155,363.95	0.00E+00	8.54E+02	8.54E+02	7.0000	3.665E+04
Np-237	5.8040E-06	155,363.95	155,363.95	0.00E+00	9.02E-01	9.02E-01	11.0000	4.159E+03
Pa-231	1.1096E-08	155,363.95	155,363.95	0.00E+00	1.72E-03	1.72E-03		
Pb-210	1.4712E-06	155,363.95	155,363.95	0.00E+00	2.29E-03	2.29E-03		
Pm-147	3.5920E-07	155,363.95	155,363.95	0.00E+00	5.58E-02	5.58E-02		
Pu-238	5.0700E-03	155,363.95	155,363.95	0.00E+00	7.88E+02	7.88E+02		
Pu-239	1.8728E-02	155,363.95	155,363.95	0.00E+00	2.91E+03	2.91E+03		
Pu-240	8.3280E-03	155,363.95	155,363.95	0.00E+00	1.29E+03	1.29E+03		
Pu-241	3.4460E-02	155,363.95	155,363.95	0.00E+00	5.35E+03	5.35E+03		
Pu-242	2.0380E-06	155,363.95	155,363.95	0.00E+00	3.17E-01	3.17E-01		
Ra-226	2.9640E-08	155,363.95	155,363.95	0.00E+00	4.60E-03	4.60E-03		
Ra-228	1.1922E-09	155,363.95	155,363.95	0.00E+00	1.85E-04	1.85E-04		
Ru-106	3.5780E-19	155,363.95	155,363.95	0.00E+00	5.56E-14	5.56E-14		
Se-79	1.2520E-05	155,363.95	155,363.95	0.00E+00	1.95E+00	1.95E+00		
Sn-126	1.2050E-05	155,363.95	155,363.95	0.00E+00	1.87E+00	1.87E+00		
Sr-90	6.1880E-01	155,363.95	155,363.95	0.00E+00	9.61E+04	9.61E+04		
Tc-99	4.4120E-04	155,363.95	155,363.95	0.00E+00	6.85E+01	6.85E+01		
Ti-229	6.9280E-09	155,363.95	155,363.95	0.00E+00	1.08E-03	1.08E-03		
Th-230	1.7084E-06	155,363.95	155,363.95	0.00E+00	2.65E-01	2.65E-01		
Th-232	1.1926E-09	155,363.95	155,363.95	0.00E+00	1.85E-04	1.85E-04		
Ti-208	3.4740E-08	155,363.95	155,363.95	0.00E+00	5.40E-03	5.40E-03		
U-232	9.2940E-08	155,363.95	155,363.95	0.00E+00	1.44E-02	1.44E-02		
U-233	9.1680E-07	155,363.95	155,363.95	0.00E+00	1.42E-01	1.42E-01		
U-234	2.3440E-03	155,363.95	155,363.95	0.00E+00	3.64E+02	3.64E+02		
U-235	2.3296E-08	155,363.95	0.00	3.50E-02	0.00E+00	3.50E-02		
U-236	2.6620E-05	155,363.95	155,363.95	0.00E+00	4.14E+00	4.14E+00		
U-238	1.3291E-07	155,363.95	0.00	1.02E-01	8.18E-02	1.02E-01		
Y-90	6.1900E-01	155,363.95	155,363.95	0.00E+00	9.62E+04	9.62E+04		
Other Radionuclides					1.06E+05	1.06E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
BOL HMI Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		155,363.95	Nominal burnup set equal to bounding burnup.
		155,363.95	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:	32.83	32.83	2.59

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

³Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TMT-1-2 & 1-3 (U/TH)

SNF ID #: 112

Fuel Units & Descr: 2 - TUBE

Heavy Metal Mass: BOL = 77.91kg

ROD Storage Site: INEEL

Fuel decay start date: 1964

Estimates as of: 2030

Template: (Worst Case)

Template Burnup (MWd): 62.5

Template BOL Heavy Metal Mass (MT): 0.00186865

Template Decay Time: 65 years

Estimated

Canister usage:

18"x15"

0.09

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.6528E-06	273.69	547.39	0.00E+00	7.26E-04	1.45E-03	Avg. MeV	
Am-241	8.6432E+00	273.69	547.39	0.00E+00	2.37E+03	4.73E+03	0.0150	3.426E+14
Am-242m	1.4688E-02	273.69	547.39	0.00E+00	4.02E+00	8.04E+00	0.0250	6.503E+13
Am-243	1.6272E-02	273.69	547.39	0.00E+00	4.45E+00	8.91E+00	0.0375	5.347E+13
C-14	1.2046E-01	273.69	547.39	0.00E+00	3.30E+01	6.59E+01	0.0575	1.215E+14
Ci-36	2.2849E-03	273.69	547.39	0.00E+00	6.25E-01	1.25E+00	0.0850	3.424E+13
Cm-243	4.1760E-04	273.69	547.39	0.00E+00	1.14E-01	2.29E-01	0.1250	2.301E+13
Cm-244	5.3440E-02	273.69	547.39	0.00E+00	1.46E+01	2.93E+01	0.2250	2.944E+13
Co-60	5.4296E-01	273.69	547.39	0.00E+00	1.49E+02	2.97E+02	0.3750	1.281E+13
Cs-134	1.4346E-08	273.69	547.39	0.00E+00	3.93E-06	7.85E-06	0.5750	2.147E+14
Cs-135	4.3976E-04	273.69	547.39	0.00E+00	1.20E-01	2.41E-01	0.8500	3.212E+12
Cs-137	1.0528E+01	273.69	547.39	0.00E+00	2.88E+03	5.76E+03	1.2500	2.391E+13
Eu-154	1.1156E-01	273.69	547.39	0.00E+00	3.05E+01	6.11E+01	1.7500	8.930E+10
Eu-155	1.0445E-03	273.69	547.39	0.00E+00	2.86E-01	5.72E-01	2.2500	1.237E+08
Fe-55	9.8542E-05	273.69	547.39	0.00E+00	2.70E-02	5.39E-02	2.7500	1.262E+09
H-3	4.5119E-02	273.69	547.39	0.00E+00	1.23E+01	2.47E+01	3.5000	6.505E+05
I-129	1.0618E-05	273.69	547.39	0.00E+00	2.91E-03	5.81E-03	5.0000	2.731E+05
Kr-85	8.6191E-02	273.69	547.39	0.00E+00	2.36E+01	4.72E+01	7.0000	3.086E+04
Np-237	2.0592E-04	273.69	547.39	0.00E+00	5.64E-02	1.13E-01	11.0000	3.505E+03
Pa-231	2.8720E-06	273.69	547.39	0.00E+00	7.86E-04	1.57E-03		
Pb-210	8.0265E-08	273.69	547.39	0.00E+00	2.20E-05	4.39E-05		
Pm-147	6.1354E-06	273.69	547.39	0.00E+00	1.68E-03	3.36E-03		
Pu-238	2.3536E+00	273.69	547.39	0.00E+00	6.44E+02	1.29E+03		
Pu-239	4.1616E-01	273.69	547.39	0.00E+00	1.14E+02	2.28E+02		
Pu-240	2.8200E-01	273.69	547.39	0.00E+00	7.99E+01	1.60E+02		
Pu-241	1.1490E+01	273.69	547.39	0.00E+00	3.14E+03	6.29E+03		
Pu-242	2.4560E-03	273.69	547.39	0.00E+00	6.72E-01	1.34E+00		
Ra-226	1.6171E-07	273.69	547.39	0.00E+00	4.43E-05	8.85E-05		
Ra-228	6.0192E-07	273.69	547.39	0.00E+00	1.65E-04	3.29E-04		
Ru-106	1.3163E-15	273.69	547.39	0.00E+00	3.60E-13	7.21E-13		
Se-79	1.9176E-04	273.69	547.39	0.00E+00	5.25E-02	1.05E-01		
Sn-126	1.6666E-04	273.69	547.39	0.00E+00	4.56E-02	9.12E-02		
Sr-90	9.7004E+00	273.69	547.39	0.00E+00	2.85E+03	5.31E+03		
Tc-99	6.7654E-03	273.69	547.39	0.00E+00	1.85E+00	3.70E+00		
Th-229	2.7664E-06	273.69	547.39	0.00E+00	7.57E-04	1.51E-03		
Th-230	9.3206E-06	273.69	547.39	0.00E+00	2.55E-03	5.10E-03		
Th-232	4.2431E-09	273.69	0.00	1.59E-03	1.58E-03	1.59E-03		
Ti-208	6.5604E-05	273.69	547.39	0.00E+00	1.80E-02	3.59E-02		
U-232	1.7765E-04	273.69	547.39	0.00E+00	4.86E-02	9.72E-02		
U-233	3.6128E-04	273.69	547.39	0.00E+00	9.89E-02	1.98E-01		
U-234	1.2788E-02	273.69	547.39	0.00E+00	3.50E+00	7.00E+00		
U-235	5.7486E-04	273.69	547.39	3.36E-02	1.91E-01	3.48E-01		
U-236	2.3485E-04	273.69	547.39	0.00E+00	6.43E-02	1.29E-01		
U-238	1.1581E-04	273.69	547.39	4.19E-03	3.59E-02	6.76E-02		
Y-90	9.7028E+00	273.69	547.39	0.00E+00	2.86E+03	5.31E+03		
Other Radionuclides					1.19E+04	2.37E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	HEAVY WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
Fuel Cladding:	ZIRC	SST/Inconel	
BOL HM Constituents:	Th and U	U, Th, & Pu	
BOL Enrichment %:		0 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		273.69	Nominal burnup taken from SFD and converted to MWd using BOL=78.196kg
Bounding:		547.39	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.10		2.74
Bounding:	0.21		

²Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TWNT (U METAL) LEU
 SNF ID #: 791
 Fuel Units & Descr: 15 - TUBE
 Heavy Metal Mass: BOL: ; EOL=321.82kg
 ROD Storage Site: INEEL

Fuel decay start date: 1984
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Zirc., 0 to 5% U)
 Template Burnup (MWd): 5
 Template BOL Heavy Metal Mass (MT): 0.00034251
 Template Decay Time: 65 years

Estimated
 Canister usage:
 18"x18"
 0.68

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	7.7980E-09	308,482.10	308,482.10	0.00E+00	2.41E-03	2.41E-03	Avg. MeV	
Am-241	2.3560E-02	308,482.10	308,482.10	0.00E+00	7.27E+03	7.27E+03	0.0150	1.056E+16
Am-242m	3.0880E-06	308,482.10	308,482.10	0.00E+00	9.53E-01	9.53E-01	0.0250	2.180E+15
Am-243	2.0520E-06	308,482.10	308,482.10	0.00E+00	6.33E-01	6.33E-01	0.0375	1.920E+15
C-14	1.1222E-03	308,482.10	308,482.10	0.00E+00	3.46E+02	3.46E+02	0.0575	2.128E+15
Cl-36	8.3760E-11	308,482.10	308,482.10	0.00E+00	2.58E-05	2.58E-05	0.0850	1.223E+15
Cm-243	2.4260E-07	308,482.10	308,482.10	0.00E+00	7.48E-02	7.48E-02	0.1250	7.960E+14
Cm-244	3.3140E-06	308,482.10	308,482.10	0.00E+00	1.02E+00	1.02E+00	0.2250	1.053E+15
Co-60	1.2454E-03	308,482.10	308,482.10	0.00E+00	3.84E+02	3.84E+02	0.3750	4.588E+14
Cs-134	3.3040E-10	308,482.10	308,482.10	0.00E+00	1.02E-04	1.02E-04	0.5750	8.202E+15
Cs-135	7.9140E-06	308,482.10	308,482.10	0.00E+00	2.44E+00	2.44E+00	0.8500	7.835E+13
Cs-137	7.1580E-01	308,482.10	308,482.10	0.00E+00	2.21E+05	2.21E+05	1.2500	5.662E+13
Eu-154	6.0500E-04	308,482.10	308,482.10	0.00E+00	1.87E+02	1.87E+02	1.7500	2.024E+12
Eu-155	9.4880E-06	308,482.10	308,482.10	0.00E+00	2.93E+00	2.93E+00	2.2500	3.643E+08
Fe-55	1.9322E-08	308,482.10	308,482.10	0.00E+00	5.96E-03	5.96E-03	2.7500	3.785E+08
H-3	4.4180E-03	308,482.10	308,482.10	0.00E+00	1.36E+03	1.36E+03	3.5000	1.543E+06
I-129	7.5020E-07	308,482.10	308,482.10	0.00E+00	2.31E-01	2.31E-01	5.0000	6.473E+05
Kr-85	5.4940E-03	308,482.10	308,482.10	0.00E+00	1.69E+03	1.69E+03	7.0000	7.278E+04
Np-237	5.8040E-06	308,482.10	308,482.10	0.00E+00	1.79E+00	1.79E+00	11.0000	8.257E+03
Pa-231	1.1096E-08	308,482.10	308,482.10	0.00E+00	3.42E-03	3.42E-03		
Pb-210	1.4712E-08	308,482.10	308,482.10	0.00E+00	4.54E-03	4.54E-03		
Pm-147	3.5920E-07	308,482.10	308,482.10	0.00E+00	1.11E-01	1.11E-01		
Pu-238	5.0700E-03	308,482.10	308,482.10	0.00E+00	1.56E+03	1.56E+03		
Pu-239	1.8728E-02	308,482.10	308,482.10	0.00E+00	5.78E+03	5.78E+03		
Pu-240	8.3280E-03	308,482.10	308,482.10	0.00E+00	2.57E+03	2.57E+03		
Pu-241	3.4460E-02	308,482.10	308,482.10	0.00E+00	1.06E+04	1.06E+04		
Pu-242	2.0380E-06	308,482.10	308,482.10	0.00E+00	6.29E-01	6.29E-01		
Ra-226	2.9640E-08	308,482.10	308,482.10	0.00E+00	9.14E-03	9.14E-03		
Ra-228	1.1922E-09	308,482.10	308,482.10	0.00E+00	3.68E-04	3.68E-04		
Ru-106	3.5780E-19	308,482.10	308,482.10	0.00E+00	1.10E-13	1.10E-13		
Se-79	1.2520E-05	308,482.10	308,482.10	0.00E+00	3.86E+00	3.86E+00		
Sn-126	1.2050E-05	308,482.10	308,482.10	0.00E+00	3.72E+00	3.72E+00		
Sr-90	8.1880E-01	308,482.10	308,482.10	0.00E+00	1.91E+05	1.91E+05		
Tc-99	4.4120E-04	308,482.10	308,482.10	0.00E+00	1.36E+02	1.36E+02		
Th-229	6.9280E-09	308,482.10	308,482.10	0.00E+00	2.14E-03	2.14E-03		
Th-230	1.7084E-06	308,482.10	308,482.10	0.00E+00	5.27E-01	5.27E-01		
Th-232	1.1926E-09	308,482.10	308,482.10	0.00E+00	3.68E-04	3.68E-04		
Th-208	3.4740E-08	308,482.10	308,482.10	0.00E+00	1.07E-02	1.07E-02		
U-232	9.2940E-08	308,482.10	308,482.10	0.00E+00	2.87E-02	2.87E-02		
U-233	9.1680E-07	308,482.10	308,482.10	0.00E+00	2.83E-01	2.83E-01		
U-234	2.3440E-03	308,482.10	308,482.10	0.00E+00	7.23E+02	7.23E+02		
U-235	-2.3296E-06	308,482.10	0.00	8.96E-02	0.00E+00	6.96E-02		
U-236	2.6620E-05	308,482.10	308,482.10	0.00E+00	8.21E+00	8.21E+00		
U-238	-1.3291E-07	308,482.10	0.00	2.03E-01	1.62E-01	2.03E-01		
Y-90	8.1900E-01	308,482.10	308,482.10	0.00E+00	1.91E+05	1.91E+05		
Other Radionuclides					2.11E+05	2.11E+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 (unknown).
Reactor Moderator:	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ^a			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:		308,482.10	

Checks			Estimated EOL HM/Given EOL HM 2.59
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	32.83	32.83	

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: UN-H1 (COLUMBIA)
 SNF ID #: 896
 Fuel Units & Descr: 16 - MTR TYPE
 Heavy Metal Mass: BOL-2-559kg; EOL-2-628kg
 ROD Storage Site: SRS

Fuel decay start date: 1994
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 60 to 100%, U)
 Template BOL Heavy Metal Mass (kg): 367.2
 Template Decay Time: 0.00116689
 35 years

Estimated
 Canister usage:
 18 "10"
 0.67

Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd/G)	Bounding Fuel Burnup (MWd/G)	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group	Gamma Sources
Ac-227	2.0068E-09	104.55	209.10	0.00E+00	2.10E-07	4.20E-07	Avg. May	
Am-241	2.5251E-03	104.55	209.10	0.00E+00	2.64E-01	5.28E-01	0.0150	1.540E+13
Am-242m	3.9624E-07	104.55	209.10	0.00E+00	4.14E-05	8.29E-05	0.0250	3.109E+12
Am-243	1.4880E-06	104.55	209.10	0.00E+00	1.56E-04	3.11E-04	0.0375	2.780E+12
C-14	5.7053E-09	104.55	209.10	0.00E+00	5.96E-07	1.19E-06	0.0575	2.992E+12
Co-56	1.3124E-32	104.55	209.10	0.00E+00	1.37E-30	2.74E-30	0.0650	1.803E+12
Co-243	1.1419E-07	104.55	209.10	0.00E+00	1.19E-05	2.39E-05	0.1250	1.191E+12
Co-244	1.6622E-05	104.55	209.10	0.00E+00	1.73E-03	3.45E-03	0.2250	1.555E+12
Co-60	7.4047E-07	104.55	209.10	0.00E+00	7.74E-05	1.55E-04	0.3750	6.771E+11
Co-134	2.0455E-05	104.55	209.10	0.00E+00	2.14E-03	4.28E-03	0.5750	1.119E+13
Co-136	3.4477E-06	104.55	209.10	0.00E+00	3.60E-04	7.21E-04	0.8500	1.367E+11
Co-137	1.4365E+00	104.55	209.10	0.00E+00	1.50E-02	3.00E+02	1.2500	6.611E+10
Eu-154	7.3620E-03	104.55	209.10	0.00E+00	7.66E-01	1.53E+00	1.7500	3.721E+09
Eu-155	5.9259E-04	104.55	209.10	0.00E+00	6.20E-02	1.24E-01	2.2500	3.111E+05
Fe-55	2.2791E-06	104.55	209.10	0.00E+00	2.38E-04	4.77E-04	2.7500	2.992E+02
H-3	1.9698E-03	104.55	209.10	0.00E+00	2.06E-01	4.12E-01	3.5000	1.224E+02
I-129	7.5300E-07	104.55	209.10	0.00E+00	7.67E-05	1.57E-04	5.0000	7.067E+01
K-85	4.1176E-02	104.55	209.10	0.00E+00	4.31E+00	8.61E+00	7.0000	7.712E+00
Nb-237	9.5752E-06	104.55	209.10	0.00E+00	1.00E-03	2.00E-03	11.0000	8.599E-01
Pb-210	3.8793E-09	104.55	209.10	0.00E+00	4.12E-07	8.23E-07		
Pb-211	3.3115E-10	104.55	209.10	0.00E+00	3.46E-08	6.92E-08		
Pm-147	9.2402E-04	104.55	209.10	0.00E+00	9.66E-02	1.93E-01		
Pu-238	1.8217E-02	104.55	209.10	0.00E+00	1.70E+00	3.39E+00		
Pu-239	4.2810E-04	104.55	209.10	0.00E+00	4.48E-02	8.95E-02		
Pu-240	2.4333E-04	104.55	209.10	0.00E+00	2.54E-02	5.09E-02		
Pu-241	1.6242E-02	104.55	209.10	0.00E+00	1.70E+00	3.40E+00		
Pu-242	3.6329E-07	104.55	209.10	0.00E+00	3.80E-05	7.60E-05		
Pu-246	9.0114E-10	104.55	209.10	0.00E+00	9.42E-08	1.88E-07		
Ra-226	3.1019E-14	104.55	209.10	0.00E+00	3.24E-12	6.49E-12		
Ra-106	2.1225E-10	104.55	209.10	0.00E+00	2.22E-08	4.44E-08		
Sr-79	1.2830E-05	104.55	209.10	0.00E+00	1.35E-03	2.70E-03		
Sr-126	1.1571E-05	104.55	209.10	0.00E+00	1.21E-03	2.42E-03		
Sr-90	1.3472E+00	104.55	209.10	0.00E+00	1.41E+02	2.82E+02		
Tb-80	4.2239E-04	104.55	209.10	0.00E+00	4.42E-02	8.83E-02		
Tb-229	1.2407E-11	104.55	209.10	0.00E+00	1.30E-09	2.60E-09		
Tb-230	8.3497E-08	104.55	209.10	0.00E+00	8.73E-06	1.75E-05		
Tb-232	3.6371E-14	104.55	209.10	0.00E+00	4.01E-12	8.02E-12		
Tb-208	4.0414E-08	104.55	209.10	0.00E+00	4.23E-06	8.45E-06		
U-232	1.0849E-07	104.55	209.10	0.00E+00	1.14E-05	2.29E-05		
U-233	3.6275E-09	104.55	209.10	0.00E+00	3.79E-07	7.59E-07		
U-234	1.8562E-04	104.55	209.10	0.00E+00	1.94E-02	3.88E-02		
U-235	2.7355E-06	104.55	0.00	5.11E-03	4.82E-03	5.11E-03		
U-236	1.5493E-05	104.55	209.10	0.00E+00	1.62E-03	3.24E-03		
U-238	4.2951E-09	104.55	0.00	5.79E-05	6.79E-05	6.79E-05		
Y-90	1.3475E+00	104.55	209.10	0.00E+00	1.41E+02	2.82E+02		

Thermal Power	
Nominal Heat Output (Watts)	3.88E+02
Bounding Heat Output (Watts)	3.24E+03
Total	3.60E+00

III. Template Selection Summary, Burnup Summary, and Checks

From STD		Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HMI Constituents:	U	U
BOL Enrichment %:	80.2025561	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd/G)	
From STD	Estimated
Nominal:	104.55
Bounding:	209.10

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:	0.13	
Bounding:	0.26	

Estimated EOL HMI/Given EOL HMI

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/GMTR).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IAN-R1 (COLUMBIA)

SNF ID #: 803

Fuel Units & Descr: 5 - MTR TYPE

Heavy Metal Mass: BOL=0.685kg; EOL=0.685kg

ROD Storage Site: SRS

Fuel decay start date: 1996

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: 25 years

Estimated

Canister usage:

18"x19"

0.21

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	1.1465E-09	12.97	25.95	0.00E+00	1.49E-08	2.98E-08	0.0150 2.428E+12
Am-241	2.3056E-03	12.97	25.95	0.00E+00	2.99E-02	5.98E-02	0.0250 5.044E+11
Am-242m	4.1476E-07	12.97	25.95	0.00E+00	5.38E-06	1.08E-05	0.0375 4.393E+11
Am-243	1.4894E-08	12.97	25.95	0.00E+00	1.93E-05	3.86E-05	0.0575 4.717E+11
C-14	5.7108E-09	12.97	25.95	0.00E+00	7.41E-08	1.48E-07	0.0850 2.846E+11
Cl-36	1.3124E-32	12.97	25.95	0.00E+00	1.70E-31	3.41E-31	0.1250 1.907E+11
Cm-243	1.4562E-07	12.97	25.95	0.00E+00	1.89E-06	3.78E-06	0.2250 2.458E+11
Cm-244	2.4221E-05	12.97	25.95	0.00E+00	3.14E-04	6.28E-04	0.3750 1.068E+11
Co-60	2.7560E-06	12.97	25.95	0.00E+00	3.58E-05	7.15E-05	0.5750 1.751E+12
Cs-134	5.8851E-04	12.97	25.95	0.00E+00	7.64E-03	1.53E-02	0.8500 2.524E+10
Cs-136	3.4477E-06	12.97	25.95	0.00E+00	4.47E-05	8.95E-05	1.2500 1.403E+10
Cs-137	1.8099E+00	12.97	25.95	0.00E+00	2.35E+01	4.70E+01	1.7500 6.934E+08
Eu-154	1.6386E-02	12.97	25.95	0.00E+00	2.13E-01	4.25E-01	2.2500 4.942E+04
Eu-155	2.3957E-03	12.97	25.95	0.00E+00	3.11E-02	6.22E-02	2.7500 4.047E+04
Fe-55	3.2707E-05	12.97	25.95	0.00E+00	4.24E-04	8.49E-04	3.5000 3.066E+01
H-3	3.4504E-03	12.97	25.95	0.00E+00	4.48E-02	8.95E-02	5.0000 1.032E+01
I-129	7.5300E-07	12.97	25.95	0.00E+00	9.77E-06	1.95E-05	7.0000 1.136E+00
Kr-85	7.8540E-02	12.97	25.95	0.00E+00	1.02E+00	2.04E+00	11.0000 1.271E-01
Np-237	9.5615E-08	12.97	25.95	0.00E+00	1.24E-04	2.48E-04	
Pa-231	2.7968E-09	12.97	25.95	0.00E+00	3.63E-08	7.26E-08	
Pb-210	1.2612E-10	12.97	25.95	0.00E+00	1.64E-09	3.27E-09	
Pm-147	1.2952E-02	12.97	25.95	0.00E+00	1.68E-01	3.36E-01	
Pu-238	1.7549E-02	12.97	25.95	0.00E+00	2.28E-01	4.55E-01	
Pu-239	4.2810E-04	12.97	25.95	0.00E+00	5.55E-03	1.11E-02	
Pu-240	2.4357E-04	12.97	25.95	0.00E+00	3.16E-03	6.32E-03	
Pu-241	2.6277E-02	12.97	25.95	0.00E+00	3.41E-01	6.82E-01	
Pu-242	3.6329E-07	12.97	25.95	0.00E+00	4.71E-06	9.43E-06	
Ra-226	4.4444E-10	12.97	25.95	0.00E+00	5.77E-09	1.15E-08	
Ra-228	1.9714E-14	12.97	25.95	0.00E+00	2.56E-13	5.12E-13	
Ru-106	2.0477E-07	12.97	25.95	0.00E+00	2.66E-06	5.31E-06	
Se-79	1.2933E-05	12.97	25.95	0.00E+00	1.68E-04	3.36E-04	
Sn-126	1.1574E-05	12.97	25.95	0.00E+00	1.50E-04	3.00E-04	
Sr-90	1.7092E+00	12.97	25.95	0.00E+00	2.22E+01	4.43E+01	
Tc-99	4.2239E-04	12.97	25.95	0.00E+00	5.48E-03	1.10E-02	
Th-229	7.7260E-12	12.97	25.95	0.00E+00	1.00E-10	2.00E-10	
Th-230	5.8497E-08	12.97	25.95	0.00E+00	7.59E-07	1.52E-06	
Th-232	2.6906E-14	12.97	25.95	0.00E+00	3.49E-13	6.98E-13	
Th-208	4.4336E-08	12.97	25.95	0.00E+00	5.75E-07	1.15E-06	
U-232	1.2037E-07	12.97	25.95	0.00E+00	1.56E-06	3.12E-06	
U-233	3.0011E-09	12.97	25.95	0.00E+00	3.89E-08	7.79E-08	
U-234	1.8497E-04	12.97	25.95	0.00E+00	2.40E-03	4.80E-03	
U-235	-2.7235E-06	12.97	0.00	1.38E-03	1.34E-03	1.38E-03	
U-238	1.5493E-05	12.97	25.95	0.00E+00	2.01E-04	4.02E-04	
U-238	-4.2851E-09	12.97	0.00	1.62E-05	1.62E-05	1.62E-05	
Y-90	1.7094E+00	12.97	25.95	0.00E+00	2.22E+01	4.44E+01	
Other Radionuclides					2.24E+01	4.47E+01	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.95939437	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		12.97
Bounding:		25.95

Basis for burnup used in estimates:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.08	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM

0.93

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX HEU) BRAZIL
 SNF ID #: 954
 Fuel Units & Descr: 43 - ASSEMBLY
 Heavy Metal Mass: BOL=8.295kg; EOL=4.975kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1998
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 1.19

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	1.1465E-09	3,143.73	6,287.45	0.00E+00	3.60E-06	7.21E-06	Avg. MeV	
Am-241	2.3056E-03	3,143.73	6,287.45	0.00E+00	7.25E+00	1.45E+01	0.0150	5.883E+14
Am-242m	4.1476E-07	3,143.73	6,287.45	0.00E+00	1.30E-03	2.61E-03	0.0250	1.222E+14
Am-243	1.4894E-06	3,143.73	6,287.45	0.00E+00	4.68E-03	9.36E-03	0.0375	1.064E+14
C-14	5.7108E-09	3,143.73	6,287.45	0.00E+00	1.80E-05	3.59E-05	0.0575	1.143E+14
Cl-36	1.3124E-32	3,143.73	6,287.45	0.00E+00	4.13E-29	8.25E-29	0.0850	6.897E+13
Cm-243	1.4562E-07	3,143.73	6,287.45	0.00E+00	4.58E-04	9.16E-04	0.1250	4.619E+13
Cm-244	2.4221E-05	3,143.73	6,287.45	0.00E+00	7.81E-02	1.52E-01	0.2250	5.954E+13
Co-60	2.7560E-06	3,143.73	6,287.45	0.00E+00	8.66E-03	1.73E-02	0.3750	2.589E+13
Cs-134	5.8851E-04	3,143.73	6,287.45	0.00E+00	1.85E+00	3.70E+00	0.5750	4.244E+14
Cs-135	3.4477E-06	3,143.73	6,287.45	0.00E+00	1.08E-02	2.17E-02	0.8500	6.115E+12
Cs-137	1.8099E+00	3,143.73	6,287.45	0.00E+00	5.69E+03	1.14E+04	1.2500	3.401E+12
Eu-154	1.6386E-02	3,143.73	6,287.45	0.00E+00	5.15E+01	1.03E+02	1.7500	1.690E+11
Eu-155	2.3957E-03	3,143.73	6,287.45	0.00E+00	7.53E+00	1.51E+01	2.2500	1.197E+07
Fe-55	3.2707E-05	3,143.73	6,287.45	0.00E+00	1.03E-01	2.06E-01	2.7500	9.805E+06
H-3	3.4504E-03	3,143.73	6,287.45	0.00E+00	1.08E+01	2.17E+01	3.5000	7.399E+03
I-129	7.5300E-07	3,143.73	6,287.45	0.00E+00	2.37E-03	4.73E-03	5.0000	2.489E+03
Kr-85	7.8540E-02	3,143.73	6,287.45	0.00E+00	2.47E+02	4.94E+02	7.0000	2.738E+02
Np-237	9.5615E-06	3,143.73	6,287.45	0.00E+00	3.01E-02	6.01E-02	11.0000	3.063E+01
Pa-231	2.7968E-09	3,143.73	6,287.45	0.00E+00	8.79E-06	1.76E-05		
Pb-210	1.2612E-10	3,143.73	6,287.45	0.00E+00	3.96E-07	7.93E-07		
Pm-147	1.2952E-02	3,143.73	6,287.45	0.00E+00	4.07E+01	8.14E+01		
Pu-238	1.7549E-02	3,143.73	6,287.45	0.00E+00	5.52E+01	1.10E+02		
Pu-239	4.2810E-04	3,143.73	6,287.45	0.00E+00	1.35E+00	2.69E+00		
Pu-240	2.4357E-04	3,143.73	6,287.45	0.00E+00	7.66E-01	1.53E+00		
Pu-241	2.6277E-02	3,143.73	6,287.45	0.00E+00	8.26E+01	1.65E+02		
Pu-242	3.6329E-07	3,143.73	6,287.45	0.00E+00	1.14E-03	2.28E-03		
Ra-226	4.4444E-10	3,143.73	6,287.45	0.00E+00	1.40E-06	2.79E-06		
Ra-228	1.9714E-14	3,143.73	6,287.45	0.00E+00	6.20E-11	1.24E-10		
Ru-106	2.0477E-07	3,143.73	6,287.45	0.00E+00	6.44E-04	1.29E-03		
Se-79	1.2933E-05	3,143.73	6,287.45	0.00E+00	4.07E-02	8.13E-02		
Sn-126	1.1574E-05	3,143.73	6,287.45	0.00E+00	3.84E-02	7.28E-02		
Sr-90	1.7092E+00	3,143.73	6,287.45	0.00E+00	5.37E+03	1.07E+04		
Tc-99	4.2239E-04	3,143.73	6,287.45	0.00E+00	1.33E+00	2.66E+00		
Th-229	7.7260E-12	3,143.73	6,287.45	0.00E+00	2.43E-08	4.86E-08		
Th-230	5.8497E-08	3,143.73	6,287.45	0.00E+00	1.84E-04	3.68E-04		
Th-232	2.6906E-14	3,143.73	6,287.45	0.00E+00	8.46E-11	1.69E-10		
Th-208	4.4336E-08	3,143.73	6,287.45	0.00E+00	1.39E-04	2.79E-04		
U-232	1.2037E-07	3,143.73	6,287.45	0.00E+00	3.78E-04	7.57E-04		
U-233	3.0011E-09	3,143.73	6,287.45	0.00E+00	9.43E-06	1.89E-05		
U-234	1.8497E-04	3,143.73	6,287.45	0.00E+00	5.81E-01	1.16E+00		
U-235	-2.7235E-06	3,143.73	0.00	1.67E-02	8.13E-03	1.67E-02		
U-236	1.5493E-05	3,143.73	6,287.45	0.00E+00	4.87E-02	9.74E-02		
U-238	-4.2851E-09	3,143.73	0.00	1.92E-04	1.79E-04	1.92E-04		
Y-90	1.7094E+00	3,143.73	6,287.45	0.00E+00	5.37E+03	1.07E+04		
Other Radionuclides					5.42E+03	1.08E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.10655847	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,143.73	
Bounding:		6,287.45	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.20		
Bounding:	2.41		1.04

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX LEU) BRAZIL
SNF ID #: 545
Fuel Units & Descr: 84 - ASSEMBLY
Heavy Metal Mass: BOL=63.554kg; EOL=61.732kg
ROD Storage Site: SRS

Fuel decay start date: 1998
Estimate 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: 25 years

Estimated
Canister usage:
18"x10"
3.50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	1.1465E-09	1,726.23	3,452.45	0.00E+00	1.98E-08	3.96E-08	0.0150 3.231E+14
Am-241	2.3056E-03	1,726.23	3,452.45	0.00E+00	3.98E+00	7.96E+00	0.0250 6.711E+13
Am-242m	4.1476E-07	1,726.23	3,452.45	0.00E+00	7.16E-04	1.43E-03	0.0375 5.845E+13
Am-243	1.4894E-06	1,726.23	3,452.45	0.00E+00	2.57E-03	5.14E-03	0.0675 6.276E+13
C-14	5.7108E-09	1,726.23	3,452.45	0.00E+00	9.86E-08	1.97E-07	0.0850 3.787E+13
Cl-36	1.3124E-32	1,726.23	3,452.45	0.00E+00	2.27E-29	4.53E-29	0.1250 2.537E+13
Cm-243	1.4562E-07	1,726.23	3,452.45	0.00E+00	2.51E-04	5.03E-04	0.2250 3.270E+13
Cm-244	2.4221E-05	1,726.23	3,452.45	0.00E+00	4.18E-02	8.36E-02	0.3750 1.421E+13
Co-60	2.7580E-06	1,726.23	3,452.45	0.00E+00	4.76E-03	9.51E-03	0.5750 2.330E+14
Cs-134	5.8851E-04	1,726.23	3,452.45	0.00E+00	1.02E+00	2.03E+00	0.8500 3.358E+12
Cs-135	3.4477E-06	1,726.23	3,452.45	0.00E+00	5.95E-03	1.19E-02	1.2500 1.867E+12
Cs-137	1.8099E+00	1,726.23	3,452.45	0.00E+00	3.12E+03	6.25E+03	1.7500 9.226E+10
Eu-154	1.6386E-02	1,726.23	3,452.45	0.00E+00	2.83E+01	5.66E+01	2.2500 6.576E+06
Eu-155	2.3957E-03	1,726.23	3,452.45	0.00E+00	4.14E+00	8.27E+00	2.7500 5.384E+06
Fe-55	3.2707E-05	1,726.23	3,452.45	0.00E+00	5.65E-02	1.13E-01	3.5000 4.154E+03
H-3	3.4504E-03	1,726.23	3,452.45	0.00E+00	5.96E+00	1.19E+01	5.0000 1.406E+03
I-129	7.5300E-07	1,726.23	3,452.45	0.00E+00	1.30E-03	2.60E-03	7.0000 1.549E+02
Kr-85	7.8540E-02	1,726.23	3,452.45	0.00E+00	1.36E+02	2.71E+02	11.0000 1.734E+01
Np-237	9.5615E-06	1,726.23	3,452.45	0.00E+00	1.65E-02	3.30E-02	
Pa-231	2.7968E-09	1,726.23	3,452.45	0.00E+00	4.83E-06	9.66E-06	
Pb-210	1.2612E-10	1,726.23	3,452.45	0.00E+00	2.18E-07	4.35E-07	
Pm-147	1.2952E-02	1,726.23	3,452.45	0.00E+00	2.24E+01	4.47E+01	
Pu-238	1.7549E-02	1,726.23	3,452.45	0.00E+00	3.03E+01	6.06E+01	
Pu-239	4.2810E-04	1,726.23	3,452.45	0.00E+00	7.39E-01	1.48E+00	
Pu-240	2.4357E-04	1,726.23	3,452.45	0.00E+00	4.20E-01	8.41E-01	
Pu-241	2.6277E-02	1,726.23	3,452.45	0.00E+00	4.54E+01	9.07E+01	
Pu-242	3.6329E-07	1,726.23	3,452.45	0.00E+00	6.27E-04	1.25E-03	
Ra-226	4.4444E-10	1,726.23	3,452.45	0.00E+00	7.67E-07	1.53E-06	
Ra-228	1.9714E-14	1,726.23	3,452.45	0.00E+00	3.40E-11	6.81E-11	
Ru-106	2.0477E-07	1,726.23	3,452.45	0.00E+00	3.53E-04	7.07E-04	
Se-79	1.2933E-05	1,726.23	3,452.45	0.00E+00	2.23E-02	4.47E-02	
Sn-126	1.1574E-05	1,726.23	3,452.45	0.00E+00	2.00E-02	4.00E-02	
Sr-90	1.7092E+00	1,726.23	3,452.45	0.00E+00	2.95E+03	5.90E+03	
Tc-99	4.2239E-04	1,726.23	3,452.45	0.00E+00	7.29E-01	1.46E+00	
Th-229	7.7260E-12	1,726.23	3,452.45	0.00E+00	1.33E-08	2.67E-08	
Th-230	5.8497E-08	1,726.23	3,452.45	0.00E+00	1.01E-04	2.02E-04	
Th-232	2.6906E-14	1,726.23	3,452.45	0.00E+00	4.64E-11	9.29E-11	
Ti-208	4.4336E-08	1,726.23	3,452.45	0.00E+00	7.65E-05	1.53E-04	
U-232	1.2037E-07	1,726.23	3,452.45	0.00E+00	2.08E-04	4.16E-04	
U-233	3.0011E-09	1,726.23	3,452.45	0.00E+00	5.18E-08	1.04E-07	
U-234	1.8497E-04	1,726.23	3,452.45	0.00E+00	3.19E-01	6.39E-01	
U-235	-2.7235E-06	1,726.23	0.00	2.70E-02	2.23E-02	2.70E-02	
U-238	1.5493E-05	1,726.23	3,452.45	0.00E+00	2.67E-02	5.35E-02	
U-238	-4.2851E-09	1,726.23	0.00	1.72E-02	1.72E-02	1.72E-02	
Y-90	1.7094E+00	1,726.23	3,452.45	0.00E+00	2.95E+03	5.90E+03	
Other Radionuclides					2.97E+03	5.95E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.66156126	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,726.23	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,452.45	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.09		1.00
Bounding:	0.17		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX LEU) BRAZIL
SNF ID #: 1076
Fuel Units & Descr: 39 - ASSEMBLY
Heavy Metal Mass: BOL=29.507kg; EOL=28.861kg
ROD Storage Site: SRS

Fuel decay start date: 1998
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: 25 years

Estimated
Canister usage:
18"x10"
1.63

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	801.46	1,602.93	0.00E+00	9.19E-07	1.84E-06	Avg. MeV	
Am-241	2.3056E-03	801.46	1,602.93	0.00E+00	1.85E+00	3.70E+00	0.0150	1.500E+14
Am-242m	4.1476E-07	801.46	1,602.93	0.00E+00	3.32E-04	6.65E-04	0.0250	3.118E+13
Am-243	1.4894E-06	801.46	1,602.93	0.00E+00	1.19E-03	2.39E-03	0.0375	2.714E+13
C-14	5.7108E-09	801.46	1,602.93	0.00E+00	4.58E-06	9.15E-06	0.0575	2.914E+13
Cl-36	1.3124E-32	801.46	1,602.93	0.00E+00	1.05E-29	2.10E-29	0.0850	1.758E+13
Cm-243	1.4562E-07	801.46	1,602.93	0.00E+00	1.17E-04	2.33E-04	0.1250	1.178E+13
Cm-244	2.4221E-05	801.46	1,602.93	0.00E+00	1.94E-02	3.88E-02	0.2250	1.518E+13
Co-60	2.7560E-06	801.46	1,602.93	0.00E+00	2.21E-03	4.42E-03	0.3750	6.599E+12
Cs-134	5.8851E-04	801.46	1,602.93	0.00E+00	4.72E-01	9.43E-01	0.5750	1.082E+14
Cs-135	3.4477E-06	801.46	1,602.93	0.00E+00	2.76E-03	5.53E-03	0.8500	1.559E+12
Cs-137	1.8099E+00	801.46	1,602.93	0.00E+00	1.45E+03	2.90E+03	1.2500	8.670E+11
Eu-154	1.6386E-02	801.46	1,602.93	0.00E+00	1.31E+01	2.63E+01	1.7500	4.283E+10
Eu-155	2.3957E-03	801.46	1,602.93	0.00E+00	1.92E+00	3.84E+00	2.2500	3.053E+06
Fe-55	3.2707E-05	801.46	1,602.93	0.00E+00	2.62E-02	5.24E-02	2.7500	2.500E+06
H-3	3.4504E-03	801.46	1,602.93	0.00E+00	2.77E+00	5.53E+00	3.5000	1.929E+03
I-129	7.5300E-07	801.46	1,602.93	0.00E+00	6.03E-04	1.21E-03	5.0000	6.527E+02
Kr-85	7.8540E-02	801.46	1,602.93	0.00E+00	6.29E+01	1.26E+02	7.0000	7.191E+01
Np-237	9.5615E-06	801.46	1,602.93	0.00E+00	7.66E-03	1.53E-02	11.0000	8.050E+00
Pa-231	2.7968E-09	801.46	1,602.93	0.00E+00	2.24E-06	4.48E-06		
Pb-210	1.2612E-10	801.46	1,602.93	0.00E+00	1.01E-07	2.02E-07		
Pm-147	1.2952E-02	801.46	1,602.93	0.00E+00	1.04E+01	2.08E+01		
Pu-238	1.7549E-02	801.46	1,602.93	0.00E+00	1.41E+01	2.81E+01		
Pu-239	4.2810E-04	801.46	1,602.93	0.00E+00	3.43E-01	6.86E-01		
Pu-240	2.4357E-04	801.46	1,602.93	0.00E+00	1.95E-01	3.90E-01		
Pu-241	2.6277E-02	801.46	1,602.93	0.00E+00	2.11E+01	4.21E+01		
Pu-242	3.6329E-07	801.46	1,602.93	0.00E+00	2.91E-04	5.82E-04		
Ra-226	4.4444E-10	801.46	1,602.93	0.00E+00	3.56E-07	7.12E-07		
Ra-228	1.9714E-14	801.46	1,602.93	0.00E+00	1.58E-11	3.16E-11		
Ru-106	2.0477E-07	801.46	1,602.93	0.00E+00	1.64E-04	3.28E-04		
Se-79	1.2933E-05	801.46	1,602.93	0.00E+00	1.04E-02	2.07E-02		
Sn-126	1.1574E-05	801.46	1,602.93	0.00E+00	9.28E-03	1.86E-02		
Sr-90	1.7092E+00	801.46	1,602.93	0.00E+00	1.37E+03	2.74E+03		
Tc-99	4.2239E-04	801.46	1,602.93	0.00E+00	3.39E-01	6.77E-01		
Th-229	7.7260E-12	801.46	1,602.93	0.00E+00	6.19E-09	1.24E-08		
Th-230	5.8497E-08	801.46	1,602.93	0.00E+00	4.69E-05	9.38E-05		
Th-232	2.6906E-14	801.46	1,602.93	0.00E+00	2.16E-11	4.31E-11		
Ti-208	4.4336E-08	801.46	1,602.93	0.00E+00	3.55E-05	7.11E-05		
U-232	1.2037E-07	801.46	1,602.93	0.00E+00	9.65E-05	1.93E-04		
U-233	3.0011E-09	801.46	1,602.93	0.00E+00	2.41E-06	4.81E-06		
U-234	1.8497E-04	801.46	1,602.93	0.00E+00	1.48E-01	2.96E-01		
U-235	-2.7235E-06	801.46	0.00	1.25E-02	1.04E-02	1.25E-02		
U-236	1.5493E-05	801.46	1,602.93	0.00E+00	1.24E-02	2.48E-02		
U-238	-4.2851E-09	801.46	0.00	7.97E-03	7.96E-03	7.97E-03		
Y-90	1.7094E+00	801.46	1,602.93	0.00E+00	1.37E+03	2.74E+03		
Other Radionuclides					1.38E+03	2.76E+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	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.66156126	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		801.46	Nominal burnup calculated from the heavy metal mass destroyed. 1,602.93 Bounding burnup assumed to be twice nominal burnup.
Bounding:		1,602.93	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.09		1.00
Bounding:	0.17		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IOWA ST. UNIV. (HEU UALX)
SNF ID #: 792
Fuel Units & Descr: 22 - FLAT PLATES IN CAN
Heavy Metal Mass: BOL=3.478kg; EOL=3.474kg
ROD Storage Site: SRS

¹Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.61

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	4.17	8.33	0.00E+00	4.78E-09	9.55E-09	Avg. MeV	
Am-241	2.3056E-03	4.17	8.33	0.00E+00	9.61E-03	1.92E-02	0.0150	7.800E+11
Am-242m	4.1476E-07	4.17	8.33	0.00E+00	1.73E-06	3.46E-06	0.0250	1.620E+11
Am-243	1.4894E-06	4.17	8.33	0.00E+00	6.21E-06	1.24E-05	0.0375	1.411E+11
C-14	5.7108E-09	4.17	8.33	0.00E+00	2.38E-08	4.76E-08	0.0675	1.515E+11
Cl-36	1.3124E-32	4.17	8.33	0.00E+00	5.47E-32	1.09E-31	0.0850	9.143E+10
Cm-243	1.4562E-07	4.17	8.33	0.00E+00	6.07E-07	1.21E-06	0.1250	6.127E+10
Cm-244	2.4221E-05	4.17	8.33	0.00E+00	1.01E-04	2.02E-04	0.2250	7.908E+10
Co-60	2.7560E-06	4.17	8.33	0.00E+00	1.15E-05	2.30E-05	0.3750	3.431E+10
Cs-134	5.8851E-04	4.17	8.33	0.00E+00	2.45E-03	4.90E-03	0.5750	5.625E+11
Cs-135	3.4477E-06	4.17	8.33	0.00E+00	1.44E-05	2.87E-05	0.8500	8.106E+09
Cs-137	1.8099E+00	4.17	8.33	0.00E+00	7.54E+00	1.51E+01	1.2500	4.508E+09
Eu-154	1.6386E-02	4.17	8.33	0.00E+00	6.83E-02	1.37E-01	1.7500	2.227E+08
Eu-155	2.3957E-03	4.17	8.33	0.00E+00	9.98E-03	2.00E-02	2.2500	1.567E+04
Fe-55	3.2707E-05	4.17	8.33	0.00E+00	1.36E-04	2.73E-04	2.7500	1.300E+04
H-3	3.4504E-03	4.17	8.33	0.00E+00	1.44E-02	2.88E-02	3.5000	1.046E+01
I-129	7.5300E-07	4.17	8.33	0.00E+00	3.14E-06	6.28E-06	5.0000	3.572E+00
Kr-85	7.8540E-02	4.17	8.33	0.00E+00	3.27E-01	6.55E-01	7.0000	3.938E-01
Np-237	9.5815E-06	4.17	8.33	0.00E+00	3.98E-05	7.97E-05	11.0000	4.410E-02
Pa-231	2.7968E-09	4.17	8.33	0.00E+00	1.17E-08	2.33E-08		
Pb-210	1.2612E-10	4.17	8.33	0.00E+00	5.26E-10	1.05E-09		
Pm-147	1.2952E-02	4.17	8.33	0.00E+00	5.40E-02	1.08E-01		
Pu-238	1.7549E-02	4.17	8.33	0.00E+00	7.31E-02	1.46E-01		
Pu-239	4.2810E-04	4.17	8.33	0.00E+00	1.78E-03	3.57E-03		
Pu-240	2.4357E-04	4.17	8.33	0.00E+00	1.01E-03	2.03E-03		
Pu-241	2.6277E-02	4.17	8.33	0.00E+00	1.09E-01	2.19E-01		
Pu-242	3.6329E-07	4.17	8.33	0.00E+00	1.51E-06	3.03E-06		
Ra-226	4.4444E-10	4.17	8.33	0.00E+00	1.85E-09	3.70E-09		
Ra-228	1.9714E-14	4.17	8.33	0.00E+00	8.21E-14	1.64E-13		
Ru-106	2.0477E-07	4.17	8.33	0.00E+00	8.53E-07	1.71E-06		
Se-79	1.2933E-05	4.17	8.33	0.00E+00	5.39E-05	1.08E-04		
Sn-126	1.1574E-05	4.17	8.33	0.00E+00	4.82E-05	9.65E-05		
Sr-90	1.7092E+00	4.17	8.33	0.00E+00	7.12E+00	1.42E+01		
Tc-99	4.2239E-04	4.17	8.33	0.00E+00	1.76E-03	3.52E-03		
Th-229	7.7260E-12	4.17	8.33	0.00E+00	3.22E-11	6.44E-11		
Th-230	5.8497E-06	4.17	8.33	0.00E+00	2.44E-07	4.87E-07		
Th-232	2.6906E-14	4.17	8.33	0.00E+00	1.12E-13	2.24E-13		
Th-208	4.4336E-08	4.17	8.33	0.00E+00	1.85E-07	3.69E-07		
U-232	1.2037E-07	4.17	8.33	0.00E+00	5.02E-07	1.00E-06		
U-233	3.0011E-09	4.17	8.33	0.00E+00	1.25E-08	2.50E-08		
U-234	1.8497E-04	4.17	8.33	0.00E+00	7.71E-04	1.54E-03		
U-235	-2.7235E-08	4.17	0.00	7.01E-03	7.00E-03	7.01E-03		
U-236	1.5493E-05	4.17	8.33	0.00E+00	6.46E-05	1.29E-04		
U-238	-4.2851E-09	4.17	0.00	7.82E-05	7.82E-05	7.82E-05		
Y-90	1.7094E+00	4.17	8.33	0.00E+00	7.12E+00	1.42E+01		
Other Radionuclides					7.18E+00	1.44E+01		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							8.83E-02	1.76E-01
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	93.3081127	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		4.17	
Bounding:		8.33	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.00		
Bounding:	0.01		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IOWA STATE UNIVERSITY (U3S2 LEU)

SNF ID #: 953

Fuel Units & Descr: 24 - 24 FLAT PLATES

Heavy Metal Mass: BOL=19.205kg; EOL=19.195kg

ROD Storage Site: SRS

¹Fuel decay start date: 1998

Estimates as of: 2030

Template: ATR (Light Water, Alum., 60 to 100%, U)

²Template Burnup (MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 25 years

Estimated

Canister usage:

18"x10"

0.67

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
Ac-227	1.1465E-09	9.09	18.18	0.00E+00	1.04E-08	2.08E-08	Avg. MeV
Am-241	2.3066E-03	9.09	18.18	0.00E+00	2.10E-02	4.19E-02	0.0150
Am-242m	4.1476E-07	9.09	18.18	0.00E+00	3.77E-06	7.54E-06	0.0250
Am-243	1.4894E-06	9.09	18.18	0.00E+00	1.35E-05	2.71E-05	0.0375
C-14	5.7108E-09	9.09	18.18	0.00E+00	5.19E-08	1.04E-07	0.0575
Cl-36	1.3124E-32	9.09	18.18	0.00E+00	1.19E-31	2.39E-31	0.0850
Cm-243	1.4562E-07	9.09	18.18	0.00E+00	1.32E-06	2.65E-06	0.1250
Cm-244	2.4221E-05	9.09	18.18	0.00E+00	2.20E-04	4.40E-04	0.2250
Co-60	2.7560E-06	9.09	18.18	0.00E+00	2.51E-05	5.01E-05	0.3750
Cs-134	5.8851E-04	9.09	18.18	0.00E+00	5.35E-03	1.07E-02	0.5750
Cs-135	3.4477E-06	9.09	18.18	0.00E+00	3.13E-05	6.27E-05	0.8500
Cs-137	1.8099E+00	9.09	18.18	0.00E+00	1.65E+01	3.29E+01	1.2500
Eu-154	1.6386E-02	9.09	18.18	0.00E+00	1.49E-01	2.98E-01	1.7500
Eu-155	2.3957E-03	9.09	18.18	0.00E+00	2.18E-02	4.36E-02	2.2500
Fe-55	3.2707E-05	9.09	18.18	0.00E+00	2.97E-04	5.95E-04	2.7500
H-3	3.4504E-03	9.09	18.18	0.00E+00	3.14E-02	6.27E-02	3.5000
I-129	7.5300E-07	9.09	18.18	0.00E+00	6.85E-06	1.37E-05	5.0000
Kr-85	7.8540E-02	9.09	18.18	0.00E+00	7.14E-01	1.43E+00	7.0000
Np-237	9.5615E-06	9.09	18.18	0.00E+00	8.69E-05	1.74E-04	11.0000
Pa-231	2.7968E-09	9.09	18.18	0.00E+00	2.54E-08	5.09E-08	
Pb-210	1.2612E-10	9.09	18.18	0.00E+00	1.15E-09	2.29E-09	
Pm-147	1.2952E-02	9.09	18.18	0.00E+00	1.18E-01	2.36E-01	
Pu-238	1.7549E-02	9.09	18.18	0.00E+00	1.60E-01	3.19E-01	
Pu-239	4.2610E-04	9.09	18.18	0.00E+00	3.89E-03	7.78E-03	
Pu-240	2.4357E-04	9.09	18.18	0.00E+00	2.21E-03	4.43E-03	
Pu-241	2.6277E-02	9.09	18.18	0.00E+00	2.39E-01	4.78E-01	
Pu-242	3.6329E-07	9.09	18.18	0.00E+00	3.30E-06	6.61E-06	
Ra-226	4.4444E-10	9.09	18.18	0.00E+00	4.04E-09	8.08E-09	
Ra-228	1.9714E-14	9.09	18.18	0.00E+00	1.79E-13	3.58E-13	
Ru-106	2.0477E-07	9.09	18.18	0.00E+00	1.86E-06	3.72E-06	
Se-79	1.2933E-05	9.09	18.18	0.00E+00	1.18E-04	2.35E-04	
Sn-126	1.1574E-05	9.09	18.18	0.00E+00	1.05E-04	2.10E-04	
Sr-90	1.7092E+00	9.09	18.18	0.00E+00	1.55E+01	3.11E+01	
Tc-99	4.2239E-04	9.09	18.18	0.00E+00	3.84E-03	7.68E-03	
Th-229	7.7260E-12	9.09	18.18	0.00E+00	7.02E-11	1.40E-10	
Th-230	5.8497E-08	9.09	18.18	0.00E+00	5.32E-07	1.06E-06	
Th-232	2.6906E-14	9.09	18.18	0.00E+00	2.45E-13	4.89E-13	
Ti-208	4.4336E-08	9.09	18.18	0.00E+00	4.03E-07	8.06E-07	
U-232	1.2037E-07	9.09	18.18	0.00E+00	1.09E-06	2.19E-06	
U-233	3.0011E-09	9.09	18.18	0.00E+00	2.73E-08	5.46E-08	
U-234	1.8497E-04	9.09	18.18	0.00E+00	1.68E-03	3.36E-03	
U-235	-2.7235E-06	9.09	0.00	8.20E-03	8.18E-03	8.20E-03	
U-236	1.5493E-05	9.09	18.18	0.00E+00	1.41E-04	2.82E-04	
U-238	-4.2851E-09	9.09	0.00	5.18E-03	5.18E-03	5.18E-03	
Y-90	1.7094E+00	9.09	18.18	0.00E+00	1.55E+01	3.11E+01	
Other Radionuclides					1.57E+01	3.13E+01	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.78527712	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	0.02	9.09	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		18.18	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.00	473.39	1.00
Bounding:	0.00		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JEN-1 (HEU UALX) SPAIN

SNF ID #: 795

Fuel Units & Descr: 23 - 16 CURVED PLATES

Heavy Metal Mass: BOL=4.002kg; EOL=3.783kg

ROD Storage Site: SRS

Fuel decay start date:

1995

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"

0.96

II. Estimates

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	206.92	413.85	0.00E+00	4.15E-07	8.31E-07	Avg. MeV	
Am-241	2.5251E-03	206.92	413.85	0.00E+00	5.22E-01	1.04E+00	0.0150	3.048E+13
Am-242m	3.9624E-07	206.92	413.85	0.00E+00	8.20E-05	1.64E-04	0.0250	6.329E+12
Am-243	1.4880E-06	206.92	413.85	0.00E+00	3.08E-04	6.16E-04	0.0375	5.501E+12
C-14	5.7053E-09	206.92	413.85	0.00E+00	1.18E-06	2.36E-06	0.0575	5.922E+12
Cf-254	1.3124E-32	206.92	413.85	0.00E+00	2.72E-30	5.43E-30	0.0850	3.568E+12
Cm-243	1.1419E-07	206.92	413.85	0.00E+00	2.36E-05	4.73E-05	0.1250	2.357E+12
Cm-244	1.6522E-05	206.92	413.85	0.00E+00	3.42E-03	6.84E-03	0.2250	3.080E+12
Co-60	7.4047E-07	206.92	413.85	0.00E+00	1.53E-04	3.06E-04	0.3750	1.340E+12
Cs-134	2.0455E-05	206.92	413.85	0.00E+00	4.23E-03	8.47E-03	0.5750	2.215E+13
Cs-135	3.4477E-06	206.92	413.85	0.00E+00	7.13E-04	1.43E-03	0.8500	2.705E+11
Cs-137	1.4365E+00	206.92	413.85	0.00E+00	2.97E+02	5.95E+02	1.2500	1.308E+11
Eu-154	7.3230E-03	206.92	413.85	0.00E+00	1.52E+00	3.03E+00	1.7500	7.364E+09
Eu-155	5.9259E-04	206.92	413.85	0.00E+00	1.23E-01	2.45E-01	2.2500	6.157E+05
Fe-55	2.2791E-06	206.92	413.85	0.00E+00	4.72E-04	9.43E-04	2.7500	5.877E+05
H-3	1.9698E-03	206.92	413.85	0.00E+00	4.08E-01	8.15E-01	3.5000	3.422E+02
I-129	7.5300E-07	206.92	413.85	0.00E+00	1.56E-04	3.12E-04	5.0000	1.398E+02
Kr-85	4.1176E-02	206.92	413.85	0.00E+00	8.52E+00	1.70E+01	7.0000	1.531E+01
Np-237	9.5752E-06	206.92	413.85	0.00E+00	1.98E-03	3.96E-03	11.0000	1.707E+00
Pa-231	3.9379E-09	206.92	413.85	0.00E+00	8.15E-07	1.63E-06		
Pb-210	3.3115E-10	206.92	413.85	0.00E+00	6.85E-08	1.37E-07		
Pm-147	9.2402E-04	206.92	413.85	0.00E+00	1.91E-01	3.82E-01		
Pu-238	1.6217E-02	206.92	413.85	0.00E+00	3.36E+00	6.71E+00		
Pu-239	4.2810E-04	206.92	413.85	0.00E+00	8.86E-02	1.77E-01		
Pu-240	2.4333E-04	206.92	413.85	0.00E+00	5.04E-02	1.01E-01		
Pu-241	1.6242E-02	206.92	413.85	0.00E+00	3.36E+00	6.72E+00		
Pu-242	3.6329E-07	206.92	413.85	0.00E+00	7.52E-05	1.50E-04		
Ra-226	9.0114E-10	206.92	413.85	0.00E+00	1.86E-07	3.73E-07		
Ra-228	3.1019E-14	206.92	413.85	0.00E+00	6.42E-12	1.28E-11		
Ru-106	2.1225E-10	206.92	413.85	0.00E+00	4.39E-08	8.78E-08		
Se-79	1.2930E-05	206.92	413.85	0.00E+00	2.68E-03	5.35E-03		
Sn-126	1.1571E-05	206.92	413.85	0.00E+00	2.39E-03	4.79E-03		
Sr-90	1.3472E+00	206.92	413.85	0.00E+00	2.79E+02	5.58E+02		
Tc-99	4.2239E-04	206.92	413.85	0.00E+00	8.74E-02	1.75E-01		
Th-229	1.2407E-11	206.92	413.85	0.00E+00	2.57E-09	5.13E-09		
Th-230	8.3497E-08	206.92	413.85	0.00E+00	1.73E-05	3.46E-05		
Th-232	3.8371E-14	206.92	413.85	0.00E+00	7.94E-12	1.59E-11		
Th-208	4.0414E-08	206.92	413.85	0.00E+00	8.36E-06	1.67E-05		
U-232	1.0948E-07	206.92	413.85	0.00E+00	2.27E-05	4.53E-05		
U-233	3.6275E-09	206.92	413.85	0.00E+00	7.51E-07	1.50E-06		
U-234	1.8562E-04	206.92	413.85	0.00E+00	3.84E-02	7.68E-02		
U-235	-2.7235E-06	206.92	0.00	6.71E-03	6.15E-03	6.71E-03		
U-236	1.5493E-05	206.92	413.85	0.00E+00	3.21E-03	6.41E-03		
U-238	-4.2851E-09	206.92	0.00	3.01E-04	3.01E-04	3.01E-04		
Y-90	1.3475E+00	206.92	413.85	0.00E+00	2.79E+02	5.58E+02		
Other Radionuclides					2.83E+02	5.66E+02		

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.46E+09	6.93E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	77.58892697	60 to 100

Basic for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		206.92
Bounding:		413.85

Basic for burnup used in estimates:

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:	0.16	
Bounding:	0.33	

Estimated EOL HM/ Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JEN-1 (UALX LEU) SPAIN
SNF ID #: 749
Fuel Units & Descr: 18 - 16 CURVED PLATES
Heavy Metal Mass: BOL=12.64kg; EOL=12.447kg
ROD Storage Site: SRS

Fuel decay start date: 1995
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"
0.75

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	182.40	364.79	0.00E+00	3.66E-07	7.32E-07	Avg. MeV	
Am-241	2.5251E-03	182.40	364.79	0.00E+00	4.61E-01	9.21E-01	0.0150	2.887E+13
Am-242m	3.9624E-07	182.40	364.79	0.00E+00	7.23E-05	1.45E-04	0.0250	5.579E+12
Am-243	1.4880E-06	182.40	364.79	0.00E+00	2.71E-04	5.43E-04	0.0375	4.849E+12
C-14	5.7053E-09	182.40	364.79	0.00E+00	1.04E-06	2.08E-06	0.0575	5.220E+12
Cf-252	1.3124E-32	182.40	364.79	0.00E+00	2.39E-30	4.79E-30	0.0850	3.145E+12
Cm-243	1.1419E-07	182.40	364.79	0.00E+00	2.08E-05	4.17E-05	0.1250	2.077E+12
Cm-244	1.6522E-05	182.40	364.79	0.00E+00	3.01E-03	6.03E-03	0.2250	2.715E+12
Co-60	7.4047E-07	182.40	364.79	0.00E+00	1.35E-04	2.70E-04	0.3750	1.181E+12
Cs-134	2.0455E-05	182.40	364.79	0.00E+00	3.73E-03	7.46E-03	0.5750	1.952E+13
Cs-135	3.4477E-06	182.40	364.79	0.00E+00	6.29E-04	1.26E-03	0.8500	2.384E+11
Cs-137	1.4365E+00	182.40	364.79	0.00E+00	2.62E+02	5.24E+02	1.2500	1.153E+11
Eu-154	7.3230E-03	182.40	364.79	0.00E+00	1.34E+00	2.67E+00	1.7500	6.491E+09
Eu-155	5.8259E-04	182.40	364.79	0.00E+00	1.08E-01	2.16E-01	2.2500	5.427E+05
Fe-55	2.2791E-06	182.40	364.79	0.00E+00	4.16E-04	8.31E-04	2.7500	5.180E+05
H-3	1.9698E-03	182.40	364.79	0.00E+00	3.59E-01	7.19E-01	3.5000	3.185E+02
I-129	7.5300E-07	182.40	364.79	0.00E+00	1.37E-04	2.75E-04	5.0000	1.305E+02
Kr-85	4.1176E-02	182.40	364.79	0.00E+00	7.51E+00	1.50E+01	7.0000	1.433E+01
Np-237	9.5752E-06	182.40	364.79	0.00E+00	1.75E-03	3.49E-03	11.0000	1.601E+00
Pa-231	3.6379E-09	182.40	364.79	0.00E+00	7.18E-07	1.44E-06		
Pb-210	3.3115E-10	182.40	364.79	0.00E+00	6.04E-08	1.21E-07		
Pm-147	9.2402E-04	182.40	364.79	0.00E+00	1.69E-01	3.37E-01		
Pu-238	1.6217E-02	182.40	364.79	0.00E+00	2.96E+00	5.92E+00		
Pu-239	4.2810E-04	182.40	364.79	0.00E+00	7.81E-02	1.56E-01		
Pu-240	2.4333E-04	182.40	364.79	0.00E+00	4.44E-02	8.88E-02		
Pu-241	1.6242E-02	182.40	364.79	0.00E+00	2.96E+00	5.92E+00		
Pu-242	3.6329E-07	182.40	364.79	0.00E+00	6.63E-05	1.33E-04		
Ra-226	9.0114E-10	182.40	364.79	0.00E+00	1.64E-07	3.29E-07		
Ra-228	3.1019E-14	182.40	364.79	0.00E+00	5.66E-12	1.13E-11		
Ru-106	2.1225E-10	182.40	364.79	0.00E+00	3.87E-08	7.74E-08		
Se-79	1.2930E-05	182.40	364.79	0.00E+00	2.36E-03	4.72E-03		
Sn-126	1.1571E-05	182.40	364.79	0.00E+00	2.11E-03	4.22E-03		
Sr-90	1.3472E+00	182.40	364.79	0.00E+00	2.46E+02	4.91E+02		
Tc-99	4.2239E-04	182.40	364.79	0.00E+00	7.70E-02	1.54E-01		
Th-229	1.2407E-11	182.40	364.79	0.00E+00	2.26E-09	4.53E-09		
Th-230	8.3497E-08	182.40	364.79	0.00E+00	1.52E-05	3.05E-05		
Th-232	3.8371E-14	182.40	364.79	0.00E+00	7.00E-12	1.40E-11		
Ti-208	4.0414E-08	182.40	364.79	0.00E+00	7.37E-06	1.47E-05		
U-232	1.0948E-07	182.40	364.79	0.00E+00	2.00E-05	3.99E-05		
U-233	3.6275E-09	182.40	364.79	0.00E+00	6.82E-07	1.32E-06		
U-234	1.8562E-04	182.40	364.79	0.00E+00	3.39E-02	6.77E-02		
U-235	2.7235E-06	182.40	0.00	5.25E-03	4.75E-03	5.25E-03		
U-236	1.5493E-05	182.40	364.79	0.00E+00	2.83E-03	5.65E-03		
U-238	4.2851E-09	182.40	0.00	3.43E-03	3.43E-03	3.43E-03		
Y-90	1.3475E+00	182.40	364.79	0.00E+00	2.46E+02	4.92E+02		
Other Radionuclides					2.50E+02	4.99E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	19.22436767	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		182.40	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		364.79	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.05		1.00
Bounding:	0.09		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR
SNF ID #: 507
Fuel Units & Descr: 574 - ASSEMBLY
Heavy Metal Mass: BOL=1176.7kg; EOL=1106.098kg
ROD Storage Site: SRS

¹Fuel decay start date: 1983
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"
23.92

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	66,861.47	133,722.93	0.00E+00	1.34E-04	2.68E-04	Avg. MeV	
Am-241	2.5251E-03	66,861.47	133,722.93	0.00E+00	1.69E+02	3.38E+02	0.0150	9.849E+15
Am-242m	3.9624E-07	66,861.47	133,722.93	0.00E+00	2.65E-02	5.30E-02	0.0250	2.045E+15
Am-243	1.4880E-06	66,861.47	133,722.93	0.00E+00	9.95E-02	1.99E-01	0.0375	1.778E+15
C-14	5.7053E-09	66,861.47	133,722.93	0.00E+00	3.81E-04	7.63E-04	0.0575	1.913E+15
Cl-36	1.3124E-32	66,861.47	133,722.93	0.00E+00	8.77E-28	1.75E-27	0.0850	1.153E+15
Cm-243	1.1419E-07	66,861.47	133,722.93	0.00E+00	7.63E-03	1.53E-02	0.1250	7.615E+14
Cm-244	1.6522E-05	66,861.47	133,722.93	0.00E+00	1.10E+00	2.21E+00	0.2250	9.953E+14
Co-60	7.4047E-07	66,861.47	133,722.93	0.00E+00	4.95E-02	9.90E-02	0.3750	4.330E+14
Cs-134	2.0455E-05	66,861.47	133,722.93	0.00E+00	1.37E+00	2.74E+00	0.5750	7.156E+15
Cs-135	3.4477E-06	66,861.47	133,722.93	0.00E+00	2.31E-01	4.61E-01	0.8500	8.741E+13
Cs-137	1.4365E+00	66,861.47	133,722.93	0.00E+00	9.60E+04	1.92E+05	1.2500	4.228E+13
Eu-154	7.3230E-03	66,861.47	133,722.93	0.00E+00	4.90E+02	9.79E+02	1.7500	2.379E+12
Eu-155	5.9259E-04	66,861.47	133,722.93	0.00E+00	3.96E+01	7.92E+01	2.2500	1.989E+08
Fe-55	2.2791E-06	66,861.47	133,722.93	0.00E+00	1.52E-01	3.05E-01	2.7500	1.899E+08
H-3	1.9998E-03	66,861.47	133,722.93	0.00E+00	1.32E+02	2.63E+02	3.5000	1.117E+05
I-129	7.5300E-07	66,861.47	133,722.93	0.00E+00	5.03E-02	1.01E-01	5.0000	4.567E+04
Kr-85	4.1176E-02	66,861.47	133,722.93	0.00E+00	2.75E+03	5.51E+03	7.0000	5.001E+03
Np-237	9.5752E-06	66,861.47	133,722.93	0.00E+00	6.40E-01	1.28E+00	11.0000	5.579E+02
Pa-231	3.9379E-09	66,861.47	133,722.93	0.00E+00	2.63E-04	5.27E-04		
Pb-210	3.3115E-10	66,861.47	133,722.93	0.00E+00	2.21E-05	4.43E-05		
Pm-147	9.2402E-04	66,861.47	133,722.93	0.00E+00	6.18E+01	1.24E+02		
Pu-238	1.6217E-02	66,861.47	133,722.93	0.00E+00	1.08E+03	2.17E+03		
Pu-239	4.2810E-04	66,861.47	133,722.93	0.00E+00	2.86E+01	5.72E+01		
Pu-240	2.4333E-04	66,861.47	133,722.93	0.00E+00	1.63E+01	3.25E+01		
Pu-241	1.6242E-02	66,861.47	133,722.93	0.00E+00	1.09E+03	2.17E+03		
Pu-242	3.6329E-07	66,861.47	133,722.93	0.00E+00	2.43E-02	4.86E-02		
Ra-226	9.0114E-10	66,861.47	133,722.93	0.00E+00	6.03E-05	1.21E-04		
Ra-228	3.1019E-14	66,861.47	133,722.93	0.00E+00	2.07E-09	4.15E-09		
Ru-106	2.1225E-10	66,861.47	133,722.93	0.00E+00	1.42E-05	2.84E-05		
Se-79	1.2930E-05	66,861.47	133,722.93	0.00E+00	8.65E-01	1.73E+00		
Sn-126	1.1571E-05	66,861.47	133,722.93	0.00E+00	7.74E-01	1.55E+00		
Sr-90	1.3472E+00	66,861.47	133,722.93	0.00E+00	9.01E+04	1.80E+05		
Tc-99	4.2239E-04	66,861.47	133,722.93	0.00E+00	2.82E+01	5.65E+01		
Th-229	1.2407E-11	66,861.47	133,722.93	0.00E+00	8.30E-07	1.66E-06		
Th-230	8.3497E-08	66,861.47	133,722.93	0.00E+00	5.58E-03	1.12E-02		
Th-232	3.8371E-14	66,861.47	133,722.93	0.00E+00	2.57E-09	5.13E-09		
Th-208	4.0414E-08	66,861.47	133,722.93	0.00E+00	2.70E-03	5.40E-03		
U-232	1.0948E-07	66,861.47	133,722.93	0.00E+00	7.32E-03	1.46E-02		
U-233	3.6275E-09	66,861.47	133,722.93	0.00E+00	2.43E-04	4.85E-04		
U-234	1.8562E-04	66,861.47	133,722.93	0.00E+00	1.24E+01	2.48E+01		
U-235	-2.7235E-06	66,861.47	0.00	5.09E-01	3.26E-01	5.09E-01		
U-236	1.5493E-05	66,861.47	133,722.93	0.00E+00	1.04E+00	2.07E+00		
U-238	-4.2851E-09	66,861.47	0.00	3.16E-01	3.16E-01	3.16E-01		
Y-90	1.3475E+00	66,861.47	133,722.93	0.00E+00	9.01E+04	1.80E+05		
Other Radionuclides					9.15E+04	1.83E+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:	ALLUM	ALLUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000029	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimates: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:	From SFD	Estimated 66,861.47	
Bounding:		133,722.93	

Checks			Estimated EOL HM/Given EOL HM 1.00
Nominal:	Burnup Multiplier 0.18	Estimated Burnup/ Given Burnup	
Bounding:	0.36		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR (UALX 45% MEU) JAPAN
SNF ID #: 886
Fuel Units & Descr: 570 - MTR TYPE
Heavy Metal Mass: BOL=349.353kg; EOL=323.646kg
ROD Storage Site: SRS

Fuel decay start date: 1989
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"
15.83

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ¹	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	24,345.03	48,690.06	0.00E+00	4.89E-05	9.77E-05	Avg. MeV	
Am-241	2.5251E-03	24,345.03	48,690.06	0.00E+00	6.15E+01	1.23E+02	0.0150	3.586E+15
Am-242m	3.9624E-07	24,345.03	48,690.06	0.00E+00	9.65E-03	1.93E-02	0.0250	7.446E+14
Am-243	1.4880E-06	24,345.03	48,690.06	0.00E+00	3.62E-02	7.25E-02	0.0375	6.473E+14
C-14	5.7053E-09	24,345.03	48,690.06	0.00E+00	1.39E-04	2.78E-04	0.0575	8.967E+14
Cf-252	1.3124E-32	24,345.03	48,690.06	0.00E+00	3.19E-28	6.39E-28	0.0650	4.198E+14
Cm-243	1.1419E-07	24,345.03	48,690.06	0.00E+00	2.78E-03	5.56E-03	0.1250	2.773E+14
Cm-244	1.6522E-05	24,345.03	48,690.06	0.00E+00	4.02E-01	8.04E-01	0.2250	3.624E+14
Co-60	7.4047E-07	24,345.03	48,690.06	0.00E+00	1.80E-02	3.61E-02	0.3750	1.577E+14
Cs-134	2.0455E-05	24,345.03	48,690.06	0.00E+00	4.98E-01	9.96E-01	0.5750	2.806E+15
Cs-135	3.4477E-06	24,345.03	48,690.06	0.00E+00	8.39E-02	1.68E-01	0.8500	3.183E+13
Cs-137	1.4365E+00	24,345.03	48,690.06	0.00E+00	3.50E+04	6.99E+04	1.2500	1.539E+13
Eu-154	7.3230E-03	24,345.03	48,690.06	0.00E+00	1.78E+02	3.57E+02	1.7500	8.664E+11
Eu-155	5.9259E-04	24,345.03	48,690.06	0.00E+00	1.44E+01	2.89E+01	2.2500	7.244E+07
Fe-55	2.2791E-06	24,345.03	48,690.06	0.00E+00	5.55E-02	1.11E-01	2.7500	6.914E+07
H-3	1.9698E-03	24,345.03	48,690.06	0.00E+00	4.80E+01	9.59E+01	3.5000	4.040E+04
I-129	7.5300E-07	24,345.03	48,690.06	0.00E+00	1.83E-02	3.67E-02	6.0000	1.851E+04
Kr-85	4.1176E-02	24,345.03	48,690.06	0.00E+00	1.00E+03	2.00E+03	7.0000	1.808E+03
Np-237	9.5752E-06	24,345.03	48,690.06	0.00E+00	2.33E-01	4.66E-01	11.0000	2.016E+02
Pa-231	3.9379E-09	24,345.03	48,690.06	0.00E+00	9.59E-05	1.92E-04		
Pb-210	3.3115E-10	24,345.03	48,690.06	0.00E+00	8.06E-06	1.61E-05		
Pm-147	9.2402E-04	24,345.03	48,690.06	0.00E+00	2.25E+01	4.50E+01		
Pu-238	1.6217E-02	24,345.03	48,690.06	0.00E+00	3.95E+02	7.90E+02		
Pu-239	4.2810E-04	24,345.03	48,690.06	0.00E+00	1.04E+01	2.08E+01		
Pu-240	2.4333E-04	24,345.03	48,690.06	0.00E+00	5.92E+00	1.18E+01		
Pu-241	1.6242E-02	24,345.03	48,690.06	0.00E+00	3.95E+02	7.91E+02		
Pu-242	3.6329E-07	24,345.03	48,690.06	0.00E+00	8.84E-03	1.77E-02		
Ra-226	9.0114E-10	24,345.03	48,690.06	0.00E+00	2.19E-05	4.39E-05		
Ra-228	3.1019E-14	24,345.03	48,690.06	0.00E+00	7.55E-10	1.51E-09		
Ru-106	2.1225E-10	24,345.03	48,690.06	0.00E+00	5.17E-06	1.03E-05		
Se-79	1.2930E-05	24,345.03	48,690.06	0.00E+00	3.15E-01	6.30E-01		
Sn-126	1.1571E-05	24,345.03	48,690.06	0.00E+00	2.82E-01	5.63E-01		
Sr-90	1.3472E+00	24,345.03	48,690.06	0.00E+00	3.28E+04	6.56E+04		
Tc-99	4.2239E-04	24,345.03	48,690.06	0.00E+00	1.03E+01	2.06E+01		
Th-229	1.2407E-11	24,345.03	48,690.06	0.00E+00	3.02E-07	6.04E-07		
Th-230	8.3497E-08	24,345.03	48,690.06	0.00E+00	2.03E-03	4.07E-03		
Th-232	3.8371E-14	24,345.03	48,690.06	0.00E+00	9.34E-10	1.87E-09		
Ti-208	4.0414E-08	24,345.03	48,690.06	0.00E+00	9.84E-04	1.97E-03		
U-232	1.0948E-07	24,345.03	48,690.06	0.00E+00	2.67E-03	5.33E-03		
U-233	3.6275E-09	24,345.03	48,690.06	0.00E+00	8.83E-05	1.77E-04	Thermal Power	
U-234	1.8562E-04	24,345.03	48,690.06	0.00E+00	4.52E+00	9.04E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	2.7235E-06	24,345.03	0.00	3.40E-01	2.74E-01	3.40E-01	4.07E+02	8.15E+02
U-236	1.5493E-05	24,345.03	48,690.06	0.00E+00	3.77E-01	7.54E-01	Total	Total
U-238	4.2851E-09	24,345.03	0.00	6.46E-02	6.45E-02	6.46E-02		
Y-90	1.3475E+00	24,345.03	48,690.06	0.00E+00	3.28E+04	6.56E+04		
Other Radionuclides					3.33E+04	6.66E+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:	ALUM	ALUM	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	45.011	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 24,345.03	Estimated 24,345.03	
Bounding:		48,690.06	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 0.22	Estimated Burnup/ Given Burnup	
Bounding:	0.44		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR (UALX HEU) JAPAN

SNF ID #: 123

Fuel Units & Descr: 152 - MTR TYPE

Heavy Metal Mass: BOL=44.384kg; EOL=37.21kg

ROD Storage Site: SRS

Fuel decay start date: 1989

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"

4.22

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	2.0068E-09	6,794.30	13,588.59	0.00E+00	1.36E-05	2.73E-05	Avg. MeV	
Am-241	2.5251E-03	6,794.30	13,588.59	0.00E+00	1.72E+01	3.43E+01	0.0150	1.001E+15
Am-242m	3.9624E-07	6,794.30	13,588.59	0.00E+00	2.69E-03	5.38E-03	0.0250	2.078E+14
Am-243	1.4880E-06	6,794.30	13,588.59	0.00E+00	1.01E-02	2.02E-02	0.0375	1.806E+14
C-14	5.7053E-09	6,794.30	13,588.59	0.00E+00	3.88E-05	7.75E-05	0.0575	1.944E+14
Cf-252	1.3124E-32	6,794.30	13,588.59	0.00E+00	8.92E-29	1.78E-28	0.0850	1.172E+14
Cm-243	1.1419E-07	6,794.30	13,588.59	0.00E+00	7.76E-04	1.55E-03	0.1250	7.738E+13
Cm-244	1.6522E-05	6,794.30	13,588.59	0.00E+00	1.12E-01	2.25E-01	0.2250	1.011E+14
Co-60	7.4047E-07	6,794.30	13,588.59	0.00E+00	5.03E-03	1.01E-02	0.3750	4.400E+13
Cs-134	2.0455E-05	6,794.30	13,588.59	0.00E+00	1.39E-01	2.78E-01	0.5750	7.272E+14
Cs-135	3.4477E-06	6,794.30	13,588.59	0.00E+00	2.34E-02	4.68E-02	0.8500	8.882E+12
Cs-137	1.4365E+00	6,794.30	13,588.59	0.00E+00	9.76E+03	1.95E+04	1.2500	4.296E+12
Eu-154	7.3230E-08	6,794.30	13,588.59	0.00E+00	4.98E+01	9.95E+01	1.7500	2.418E+11
Eu-155	5.9259E-04	6,794.30	13,588.59	0.00E+00	4.03E+00	8.05E+00	2.2500	2.022E+07
Fe-55	2.2791E-06	6,794.30	13,588.59	0.00E+00	1.55E-02	3.10E-02	2.7500	1.930E+07
H-3	1.9698E-03	6,794.30	13,588.59	0.00E+00	1.34E+01	2.68E+01	3.5000	1.118E+04
I-129	7.5300E-07	6,794.30	13,588.59	0.00E+00	5.12E-03	1.02E-02	5.0000	4.570E+03
Kr-85	4.1176E-02	6,794.30	13,588.59	0.00E+00	2.80E+02	5.60E+02	7.0000	5.001E+02
Np-237	9.5752E-06	6,794.30	13,588.59	0.00E+00	6.51E-02	1.30E-01	11.0000	5.576E+01
Pa-231	3.9379E-09	6,794.30	13,588.59	0.00E+00	2.68E-06	5.35E-06		
Pb-210	3.3115E-10	6,794.30	13,588.59	0.00E+00	2.25E-06	4.50E-06		
Pm-147	9.2402E-04	6,794.30	13,588.59	0.00E+00	6.28E+00	1.26E+01		
Pu-238	1.6217E-02	6,794.30	13,588.59	0.00E+00	1.10E+02	2.20E+02		
Pu-239	4.2810E-04	6,794.30	13,588.59	0.00E+00	2.91E+00	5.82E+00		
Pu-240	2.4333E-04	6,794.30	13,588.59	0.00E+00	1.65E+00	3.31E+00		
Pu-241	1.6242E-02	6,794.30	13,588.59	0.00E+00	1.10E+02	2.21E+02		
Pu-242	3.6329E-07	6,794.30	13,588.59	0.00E+00	2.47E-03	4.94E-03		
Ra-226	9.0114E-10	6,794.30	13,588.59	0.00E+00	6.12E-06	1.22E-05		
Ra-228	3.1019E-14	6,794.30	13,588.59	0.00E+00	2.11E-10	4.21E-10		
Ru-106	2.1225E-10	6,794.30	13,588.59	0.00E+00	1.44E-06	2.88E-06		
Se-79	1.2930E-05	6,794.30	13,588.59	0.00E+00	8.79E-02	1.76E-01		
Sn-126	1.1571E-05	6,794.30	13,588.59	0.00E+00	7.86E-02	1.57E-01		
Sr-90	1.3472E+00	6,794.30	13,588.59	0.00E+00	9.15E+03	1.83E+04		
Tc-99	4.2239E-04	6,794.30	13,588.59	0.00E+00	2.87E+00	5.74E+00		
Th-229	1.2407E-11	6,794.30	13,588.59	0.00E+00	8.43E-08	1.69E-07		
Th-230	8.3497E-08	6,794.30	13,588.59	0.00E+00	5.67E-04	1.13E-03		
Th-232	3.8371E-14	6,794.30	13,588.59	0.00E+00	2.81E-10	5.21E-10		
Ti-208	4.0414E-06	6,794.30	13,588.59	0.00E+00	2.75E-04	5.49E-04		
U-232	1.0948E-07	6,794.30	13,588.59	0.00E+00	7.44E-04	1.49E-03		
U-233	3.6275E-09	6,794.30	13,588.59	0.00E+00	2.48E-05	4.93E-05		
U-234	1.8562E-04	6,794.30	13,588.59	0.00E+00	1.26E+00	2.52E+00		
U-235	-2.7235E-06	6,794.30	0.00	8.94E-02	7.09E-02	8.94E-02		
U-238	1.5493E-05	6,794.30	13,588.59	0.00E+00	1.05E-01	2.11E-01		
U-238	-4.2851E-09	6,794.30	0.00	1.02E-03	9.87E-04	1.02E-03		
Y-90	1.3475E+00	6,794.30	13,588.59	0.00E+00	9.16E+03	1.83E+04		
Other Radionuclides					9.30E+03	1.86E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E+02	2.27E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.1852593	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		6,794.30	
		13,588.59	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.49	0.97	
			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: JRR-2 (UALX-HEU 45%) JAPAN
SNF ID #: 885
Fuel Units & Descr: 144 - 12 CURVED PLATES
Heavy Metal Mass: BOL=70.225kg; EOL=62.496kg
ROD Storage Site: SRS

¹Fuel decay start date: 1969
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
²Template Burnup (MWd): 164.8
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
4.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	9.5869E-10	7,122.71	14,245.41	0.00E+00	6.83E-06	1.37E-05	0.0150 1.052E+15
Am-241	1.0109E-02	7,122.71	14,245.41	0.00E+00	7.20E+01	1.44E+02	0.0250 2.162E+14
Am-242m	1.2789E-06	7,122.71	14,245.41	0.00E+00	9.11E-03	1.82E-02	0.0375 1.895E+14
Am-243	3.7047E-06	7,122.71	14,245.41	0.00E+00	2.64E-01	5.28E-01	0.0575 2.039E+14
C-14	2.6416E-08	7,122.71	14,245.41	0.00E+00	1.88E-04	3.76E-04	0.0850 1.220E+14
Cl-36	4.4441E-31	7,122.71	14,245.41	0.00E+00	3.17E-27	6.33E-27	0.1250 8.227E+13
Cm-243	3.9605E-06	7,122.71	14,245.41	0.00E+00	2.82E-02	5.64E-02	0.2250 1.064E+14
Cm-244	2.6227E-03	7,122.71	14,245.41	0.00E+00	1.87E+01	3.74E+01	0.3750 4.575E+13
Co-60	6.7740E-06	7,122.71	14,245.41	0.00E+00	4.82E-02	9.65E-02	0.5750 7.842E+14
Cs-134	6.8994E-05	7,122.71	14,245.41	0.00E+00	4.91E-01	9.81E-01	0.8500 1.132E+13
Cs-135	4.2564E-06	7,122.71	14,245.41	0.00E+00	3.03E-02	6.06E-02	1.2500 6.763E+12
Cs-137	1.4399E+00	7,122.71	14,245.41	0.00E+00	1.03E+04	2.05E+04	1.7500 3.199E+11
Eu-154	1.5522E-02	7,122.71	14,245.41	0.00E+00	1.11E+02	2.21E+02	2.2500 2.215E+07
Eu-155	1.7588E-03	7,122.71	14,245.41	0.00E+00	1.25E+01	2.51E+01	2.7500 2.226E+07
Fe-55	2.4933E-05	7,122.71	14,245.41	0.00E+00	1.78E-01	3.55E-01	3.5000 5.919E+05
H-3	1.9945E-03	7,122.71	14,245.41	0.00E+00	1.42E+01	2.84E+01	5.0000 2.516E+05
I-129	6.6403E-07	7,122.71	14,245.41	0.00E+00	4.73E-03	9.46E-03	7.0000 2.890E+04
Kr-85	4.1002E-02	7,122.71	14,245.41	0.00E+00	2.82E+02	5.64E+02	11.0000 3.296E+03
Np-237	3.1610E-05	7,122.71	14,245.41	0.00E+00	2.25E-01	4.50E-01	
Pa-231	1.8876E-09	7,122.71	14,245.41	0.00E+00	1.34E-05	2.69E-05	
Pb-210	8.3840E-11	7,122.71	14,245.41	0.00E+00	5.97E-07	1.19E-06	
Pm-147	4.6501E-04	7,122.71	14,245.41	0.00E+00	3.91E+00	6.62E+00	
Pu-238	1.3645E-01	7,122.71	14,245.41	0.00E+00	9.72E+02	1.94E+03	
Pu-239	6.9502E-04	7,122.71	14,245.41	0.00E+00	4.95E+00	9.90E+00	
Pu-240	3.8183E-04	7,122.71	14,245.41	0.00E+00	2.72E+00	5.44E+00	
Pu-241	6.5310E-02	7,122.71	14,245.41	0.00E+00	4.65E+02	9.30E+02	
Pu-242	3.0911E-06	7,122.71	14,245.41	0.00E+00	2.20E-02	4.40E-02	
Ra-226	2.3512E-10	7,122.71	14,245.41	0.00E+00	1.67E-06	3.35E-06	
Ra-228	3.3366E-14	7,122.71	14,245.41	0.00E+00	2.38E-10	4.75E-10	
Ru-106	2.4490E-10	7,122.71	14,245.41	0.00E+00	1.74E-06	3.49E-06	
Se-79	1.2333E-05	7,122.71	14,245.41	0.00E+00	8.78E-02	1.76E-01	
Sn-126	1.0194E-05	7,122.71	14,245.41	0.00E+00	7.26E-02	1.45E-01	
Sr-90	1.3348E+00	7,122.71	14,245.41	0.00E+00	9.51E+03	1.90E+04	
Tc-99	3.8056E-04	7,122.71	14,245.41	0.00E+00	2.71E+00	5.42E+00	
Th-229	1.7868E-11	7,122.71	14,245.41	0.00E+00	1.27E-07	2.55E-07	
Th-230	2.3348E-08	7,122.71	14,245.41	0.00E+00	1.66E-04	3.33E-04	
Th-232	4.1288E-14	7,122.71	14,245.41	0.00E+00	2.94E-10	5.88E-10	
Ti-208	4.3190E-08	7,122.71	14,245.41	0.00E+00	3.08E-04	6.15E-04	
U-232	1.1707E-07	7,122.71	14,245.41	0.00E+00	8.34E-04	1.67E-03	
U-233	7.2175E-09	7,122.71	14,245.41	0.00E+00	5.14E-05	1.03E-04	
U-234	6.1543E-05	7,122.71	14,245.41	0.00E+00	4.38E-01	8.77E-01	
U-235	2.8661E-06	7,122.71	0.00	6.82E-02	4.78E-02	6.82E-02	
U-236	1.6701E-05	7,122.71	14,245.41	0.00E+00	1.19E-01	2.38E-01	
U-238	9.4194E-09	7,122.71	0.00	1.30E-02	1.29E-02	1.30E-02	
Y-90	1.3348E+00	7,122.71	14,245.41	0.00E+00	9.51E+03	1.90E+04	
Other Radionuclides					9.83E+03	1.97E+04	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	HEAVY WATER	HEAVY WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	44.93930164	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		7,122.71	
Bounding:		14,245.41	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:	0.23		
Bounding:	0.46		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-2 (JALX-HEU) JAPAN
 SNF ID #: 606
 Fuel Units & Descr: 34 - 17 FLAT PLATES
 Heavy Metal Mass: BOL=6.943kg; EOL=5.222kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1989
 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: 35 years

Estimated
 Canister usage:
 18"x10"
 0.94

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	9.5860E-10	1,584.67	3,169.33	0.00E+00	1.52E-06	3.04E-06	Avg. MeV		
Am-241	1.0109E-02	1,584.67	3,169.33	0.00E+00	1.60E+01	3.20E+01	0.0150	2.341E+14	
Am-242m	1.2789E-06	1,584.67	3,169.33	0.00E+00	2.03E-03	4.05E-03	0.0250	4.810E+13	
Am-243	3.7047E-05	1,584.67	3,169.33	0.00E+00	5.87E-02	1.17E-01	0.0375	4.216E+13	
C-14	2.6416E-08	1,584.67	3,169.33	0.00E+00	4.19E-06	8.37E-06	0.0575	4.535E+13	
Cl-36	4.4441E-31	1,584.67	3,169.33	0.00E+00	7.04E-28	1.41E-27	0.0850	2.714E+13	
Cm-243	3.9605E-06	1,584.67	3,169.33	0.00E+00	6.28E-03	1.26E-02	0.1250	1.830E+13	
Cm-244	2.6227E-03	1,584.67	3,169.33	0.00E+00	4.18E+00	8.31E+00	0.2250	2.345E+13	
Co-60	6.7740E-06	1,584.67	3,169.33	0.00E+00	1.07E-02	2.15E-02	0.3750	1.018E+13	
Cs-134	6.8894E-05	1,584.67	3,169.33	0.00E+00	1.09E-01	2.18E-01	0.5750	1.700E+14	
Cs-135	4.2564E-06	1,584.67	3,169.33	0.00E+00	6.74E-03	1.35E-02	0.8500	2.518E+12	
Cs-137	1.4399E+00	1,584.67	3,169.33	0.00E+00	2.28E+03	4.56E+03	1.2500	1.505E+12	
Eu-154	1.5522E-02	1,584.67	3,169.33	0.00E+00	2.48E+01	4.92E+01	1.7500	7.118E+10	
Eu-155	1.7588E-03	1,584.67	3,169.33	0.00E+00	2.79E+00	5.57E+00	2.2500	4.928E+06	
Fe-55	2.4933E-05	1,584.67	3,169.33	0.00E+00	3.95E-02	7.90E-02	2.7500	4.953E+06	
H-3	1.9945E-03	1,584.67	3,169.33	0.00E+00	3.16E+00	6.32E+00	3.5000	1.317E+05	
I-129	6.6403E-07	1,584.67	3,169.33	0.00E+00	1.05E-03	2.10E-03	5.0000	5.595E+04	
Kr-85	4.1002E-02	1,584.67	3,169.33	0.00E+00	6.50E+01	1.30E+02	7.0000	6.407E+03	
Np-237	3.1610E-05	1,584.67	3,169.33	0.00E+00	5.01E-02	1.00E-01	11.0000	7.331E+02	
Pa-231	1.8876E-09	1,584.67	3,169.33	0.00E+00	2.99E-06	5.98E-06			
Pb-210	8.3840E-11	1,584.67	3,169.33	0.00E+00	1.33E-07	2.66E-07			
Pm-147	4.6501E-04	1,584.67	3,169.33	0.00E+00	7.37E-01	1.47E+00			
Pu-238	1.3645E-01	1,584.67	3,169.33	0.00E+00	2.16E+02	4.32E+02			
Pu-239	6.9502E-04	1,584.67	3,169.33	0.00E+00	1.10E+00	2.20E+00			
Pu-240	3.8183E-04	1,584.67	3,169.33	0.00E+00	6.05E-01	1.21E+00			
Pu-241	6.5310E-02	1,584.67	3,169.33	0.00E+00	1.03E+02	2.07E+02			
Pu-242	3.0911E-06	1,584.67	3,169.33	0.00E+00	4.90E-03	9.80E-03			
Ra-226	2.3512E-10	1,584.67	3,169.33	0.00E+00	3.73E-07	7.45E-07			
Ra-228	3.3366E-14	1,584.67	3,169.33	0.00E+00	5.29E-11	1.06E-10			
Ru-106	2.4490E-10	1,584.67	3,169.33	0.00E+00	3.88E-07	7.76E-07			
Se-79	1.2333E-05	1,584.67	3,169.33	0.00E+00	1.95E-02	3.91E-02			
Sn-126	1.0194E-05	1,584.67	3,169.33	0.00E+00	1.62E-02	3.23E-02			
Sr-90	1.3348E+00	1,584.67	3,169.33	0.00E+00	2.12E+03	4.23E+03			
Tc-99	3.8056E-04	1,584.67	3,169.33	0.00E+00	6.03E-01	1.21E+00			
Th-229	1.7868E-11	1,584.67	3,169.33	0.00E+00	2.83E-08	5.66E-08			
Th-230	2.3348E-08	1,584.67	3,169.33	0.00E+00	3.70E-05	7.40E-05			
Th-232	4.1288E-14	1,584.67	3,169.33	0.00E+00	6.54E-11	1.31E-10			
Ti-208	4.3190E-08	1,584.67	3,169.33	0.00E+00	6.84E-05	1.37E-04			
U-232	1.1707E-07	1,584.67	3,169.33	0.00E+00	1.86E-04	3.71E-04			
U-233	7.2175E-09	1,584.67	3,169.33	0.00E+00	1.14E-05	2.29E-05			
U-234	8.1543E-05	1,584.67	3,169.33	0.00E+00	9.75E-02	1.95E-01			
U-235	2.8661E-06	1,584.67	0.00	1.40E-02	9.41E-03	1.40E-02			
U-238	1.6701E-05	1,584.67	3,169.33	0.00E+00	2.65E-02	5.29E-02			
U-238	-9.4194E-09	1,584.67	0.00	1.63E-04	1.48E-04	1.63E-04			
Y-90	1.3348E+00	1,584.67	3,169.33	0.00E+00	2.12E+03	4.23E+03			
Other Radionuclides					2.19E+03	4.37E+03			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.01903552	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		1,584.67
Bounding:		3,169.33

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:	0.52	
Bounding:	1.05	

Estimated EOL HM/Given EOL HM
 1.01

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-3M (ULAX LEU)
SNF ID #: 1056
Fuel Units & Descr: 111 - 20 FLAT PLATES
Heavy Metal Mass: BOL=165.701kg; EOL=157.043kg
ROD Storage Site: SRS

Fuel decay start date: 1989
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: 35 years

Estimated
Canister usage:
18"x10"
4.63

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8507E-09	8,229.12	16,458.25	0.00E+00	2.18E-05	4.36E-05	Avg. MeV	
Am-241	2.8587E-02	8,229.12	16,458.25	0.00E+00	2.35E+02	4.70E+02	0.0150	1.165E+15
Am-242m	8.3267E-06	8,229.12	16,458.25	0.00E+00	6.85E-02	1.37E-01	0.0250	2.415E+14
Am-243	6.3920E-06	8,229.12	16,458.25	0.00E+00	5.26E-02	1.05E-01	0.0375	2.115E+14
C-14	2.9567E-08	8,229.12	16,458.25	0.00E+00	2.43E-04	4.87E-04	0.0575	2.314E+14
Cl-36	5.9507E-35	8,229.12	16,458.25	0.00E+00	4.90E-31	9.79E-31	0.0850	1.358E+14
Cm-243	1.5333E-06	8,229.12	16,458.25	0.00E+00	1.26E-02	2.52E-02	0.1250	8.948E+13
Cm-244	6.1980E-05	8,229.12	16,458.25	0.00E+00	5.10E-01	1.02E+00	0.2250	1.171E+14
Co-60	2.2720E-06	8,229.12	16,458.25	0.00E+00	1.87E-02	3.74E-02	0.3750	5.092E+13
Cs-134	1.3787E-05	8,229.12	16,458.25	0.00E+00	1.13E-01	2.27E-01	0.5750	8.759E+14
Cs-135	4.8607E-06	8,229.12	16,458.25	0.00E+00	4.00E-02	8.00E-02	0.8500	1.005E+13
Cs-137	1.4300E+00	8,229.12	16,458.25	0.00E+00	1.18E+04	2.35E+04	1.2500	4.727E+12
Eu-154	6.2340E-03	8,229.12	16,458.25	0.00E+00	5.13E+01	1.03E+02	1.7500	2.724E+11
Eu-155	5.0213E-04	8,229.12	16,458.25	0.00E+00	4.13E+00	8.26E+00	2.2500	2.352E+07
Fe-55	2.5980E-05	8,229.12	16,458.25	0.00E+00	2.14E-01	4.28E-01	2.7500	3.927E+06
H-3	2.0100E-03	8,229.12	16,458.25	0.00E+00	1.65E+01	3.31E+01	3.5000	7.104E+04
I-129	7.1600E-07	8,229.12	16,458.25	0.00E+00	5.89E-03	1.18E-02	5.0000	2.960E+04
Kr-85	3.8813E-02	8,229.12	16,458.25	0.00E+00	3.19E+02	6.39E+02	7.0000	3.353E+03
Np-237	3.9360E-06	8,229.12	16,458.25	0.00E+00	3.24E-02	6.48E-02	11.0000	3.804E+02
Pa-231	5.2460E-08	8,229.12	16,458.25	0.00E+00	4.32E-05	8.63E-05		
Pb-210	4.8933E-13	8,229.12	16,458.25	0.00E+00	4.03E-09	8.05E-09		
Pm-147	8.8000E-04	8,229.12	16,458.25	0.00E+00	7.24E+00	1.45E+01		
Pu-238	4.9107E-03	8,229.12	16,458.25	0.00E+00	4.04E+01	8.08E+01		
Pu-239	1.0313E-02	8,229.12	16,458.25	0.00E+00	8.49E+01	1.70E+02		
Pu-240	5.4093E-03	8,229.12	16,458.25	0.00E+00	4.45E+01	8.90E+01		
Pu-241	1.8253E-01	8,229.12	16,458.25	0.00E+00	1.50E+03	3.00E+03		
Pu-242	3.0713E-06	8,229.12	16,458.25	0.00E+00	2.53E-02	5.05E-02		
Ra-226	1.5867E-12	8,229.12	16,458.25	0.00E+00	1.31E-08	2.61E-08		
Ra-228	2.6227E-14	8,229.12	16,458.25	0.00E+00	2.16E-10	4.32E-10		
Ru-106	2.8093E-10	8,229.12	16,458.25	0.00E+00	2.31E-06	4.62E-06		
Se-79	1.2533E-05	8,229.12	16,458.25	0.00E+00	1.03E-01	2.06E-01		
Sn-126	1.1393E-05	8,229.12	16,458.25	0.00E+00	9.38E-02	1.88E-01		
Sr-90	1.2873E+00	8,229.12	16,458.25	0.00E+00	1.06E+04	2.12E+04		
Tc-99	4.3533E-04	8,229.12	16,458.25	0.00E+00	3.58E+00	7.16E+00		
Th-229	2.1167E-12	8,229.12	16,458.25	0.00E+00	1.74E-08	3.48E-08		
Th-230	2.0387E-10	8,229.12	16,458.25	0.00E+00	1.68E-06	3.36E-06		
Th-232	3.2393E-14	8,229.12	16,458.25	0.00E+00	2.67E-10	5.33E-10		
Ti-208	6.6563E-09	8,229.12	16,458.25	0.00E+00	5.48E-05	1.10E-04		
U-232	1.8033E-08	8,229.12	16,458.25	0.00E+00	1.48E-04	2.97E-04		
U-233	8.5800E-10	8,229.12	16,458.25	0.00E+00	7.06E-06	1.41E-05		
U-234	8.0733E-07	8,229.12	16,458.25	0.00E+00	6.84E-03	1.33E-02		
U-235	-2.5335E-06	8,229.12	0.00	7.10E-02	6.02E-02	7.10E-02		
U-236	1.3007E-05	8,229.12	16,458.25	0.00E+00	1.07E-01	2.14E-01		
U-238	-1.4207E-08	8,229.12	0.00	4.46E-02	4.45E-02	4.46E-02		
Y-90	1.2873E+00	8,229.12	16,458.25	0.00E+00	1.06E+04	2.12E+04		
Other Radionuclides					1.12E+04	2.24E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.837	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		8,229.12
Bounding:		16,458.25

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.13	
Bounding:	2.27	

Estimated BOL HM/Given EOL HM

1.01

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (JSS12 LEU)

SNF ID #: 1071

Fuel Units & Descr: 47 - ASSEMBLY

Heavy Metal Mass: BOL=47kg; EOL=44.855kg

ROD Storage Site: SRS

Fuel decay start date: 1989

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:

15"x10"

1.96

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	2.0068E-09	2,221.04	4,442.09	0.00E+00	4.46E-06	8.91E-06	0.0150 3.272E+14
Am-241	2.5251E-03	2,221.04	4,442.09	0.00E+00	5.61E+00	1.12E+01	0.0250 6.794E+13
Am-242m	3.9624E-07	2,221.04	4,442.09	0.00E+00	8.80E-04	1.76E-03	0.0375 5.905E+13
Am-243	1.4880E-06	2,221.04	4,442.09	0.00E+00	3.30E-03	6.61E-03	0.0575 6.356E+13
C-14	5.7053E-09	2,221.04	4,442.09	0.00E+00	1.27E-05	2.53E-05	0.0850 3.830E+13
Cl-36	1.3124E-32	2,221.04	4,442.09	0.00E+00	2.91E-29	5.83E-29	0.1250 2.530E+13
Cm-243	1.1419E-07	2,221.04	4,442.09	0.00E+00	2.54E-04	5.07E-04	0.2250 3.306E+13
Cm-244	1.6522E-05	2,221.04	4,442.09	0.00E+00	3.67E-02	7.34E-02	0.3750 1.439E+13
Co-60	7.4047E-07	2,221.04	4,442.09	0.00E+00	1.64E-03	3.29E-03	0.5750 2.377E+14
Cs-134	2.0455E-05	2,221.04	4,442.09	0.00E+00	4.54E-02	9.09E-02	0.8500 2.904E+12
Cs-135	3.4477E-06	2,221.04	4,442.09	0.00E+00	7.66E-03	1.53E-02	1.2500 1.404E+12
Cs-137	1.4365E+00	2,221.04	4,442.09	0.00E+00	3.19E+03	6.38E+03	1.7500 7.904E+10
Eu-154	7.3230E-03	2,221.04	4,442.09	0.00E+00	1.63E+01	3.25E+01	2.2500 6.809E+06
Eu-155	5.9259E-04	2,221.04	4,442.09	0.00E+00	1.32E+00	2.63E+00	2.7500 6.308E+06
Fe-55	2.2791E-06	2,221.04	4,442.09	0.00E+00	5.06E-03	1.01E-02	3.5000 3.721E+03
H-3	1.9698E-03	2,221.04	4,442.09	0.00E+00	4.37E+00	8.75E+00	5.0000 1.522E+03
I-129	7.5300E-07	2,221.04	4,442.09	0.00E+00	1.67E-03	3.34E-03	7.0000 1.667E+02
Kr-85	4.1176E-02	2,221.04	4,442.09	0.00E+00	9.15E+01	1.83E+02	11.0000 1.860E+01
Np-237	9.5752E-08	2,221.04	4,442.09	0.00E+00	2.13E-02	4.25E-02	
Pa-231	3.9379E-09	2,221.04	4,442.09	0.00E+00	8.75E-06	1.75E-05	
Pb-210	3.3115E-10	2,221.04	4,442.09	0.00E+00	7.36E-07	1.47E-06	
Pm-147	9.2402E-04	2,221.04	4,442.09	0.00E+00	2.05E+00	4.10E+00	
Pu-238	1.6217E-02	2,221.04	4,442.09	0.00E+00	3.60E+01	7.20E+01	
Pu-239	4.2810E-04	2,221.04	4,442.09	0.00E+00	9.51E-01	1.90E+00	
Pu-240	2.4333E-04	2,221.04	4,442.09	0.00E+00	5.40E-01	1.08E+00	
Pu-241	1.6242E-02	2,221.04	4,442.09	0.00E+00	3.61E+01	7.21E+01	
Pu-242	3.6329E-07	2,221.04	4,442.09	0.00E+00	8.07E-04	1.61E-03	
Ra-226	9.0114E-10	2,221.04	4,442.09	0.00E+00	2.00E-06	4.00E-06	
Ra-228	3.1019E-14	2,221.04	4,442.09	0.00E+00	6.89E-11	1.38E-10	
Ru-106	2.1225E-10	2,221.04	4,442.09	0.00E+00	4.71E-07	9.43E-07	
Se-79	1.2930E-05	2,221.04	4,442.09	0.00E+00	2.87E-02	5.74E-02	
Sn-126	1.1571E-05	2,221.04	4,442.09	0.00E+00	2.57E-02	5.14E-02	
Sr-90	1.3472E+00	2,221.04	4,442.09	0.00E+00	2.99E+03	5.98E+03	
Tc-99	4.2239E-04	2,221.04	4,442.09	0.00E+00	9.38E-01	1.88E+00	
Th-229	1.2407E-11	2,221.04	4,442.09	0.00E+00	2.76E-08	5.51E-08	
Th-230	8.3497E-08	2,221.04	4,442.09	0.00E+00	1.85E-04	3.71E-04	
Th-232	3.8371E-14	2,221.04	4,442.09	0.00E+00	8.52E-11	1.70E-10	
Ti-208	4.0414E-08	2,221.04	4,442.09	0.00E+00	8.98E-05	1.80E-04	
U-232	1.0948E-07	2,221.04	4,442.09	0.00E+00	2.43E-04	4.86E-04	
U-233	3.6275E-09	2,221.04	4,442.09	0.00E+00	8.06E-06	1.61E-05	
U-234	1.8562E-04	2,221.04	4,442.09	0.00E+00	4.12E-01	8.25E-01	
U-235	-2.7235E-06	2,221.04	0.00	2.03E-02	1.43E-02	2.03E-02	
U-236	1.5493E-05	2,221.04	4,442.09	0.00E+00	3.44E-02	6.88E-02	
U-238	-4.2851E-09	2,221.04	0.00	1.26E-02	1.26E-02	1.26E-02	
Y-90	1.3475E+00	2,221.04	4,442.09	0.00E+00	2.99E+03	5.99E+03	
Other Radionuclides					3.04E+03	6.08E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,221.04	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,442.09	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.15		1.00
Bounding:	0.30		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (JALX HEU)
SNF ID #: 505
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=7.676kg; EOL=6.338kg
ROD Storage Site: SRS

*Fuel decay start date: 1989
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"
1.19

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	2.0068E-09	1,266.45	2,532.90	0.00E+00	2.54E-06	5.08E-06	Avg. MeV	
Am-241	2.5251E-03	1,266.45	2,532.90	0.00E+00	3.20E+00	6.40E+00	0.0150	1.866E+14
Am-242m	3.9624E-07	1,266.45	2,532.90	0.00E+00	5.02E-04	1.00E-03	0.0250	3.874E+13
Am-243	1.4880E-06	1,266.45	2,532.90	0.00E+00	1.88E-03	3.77E-03	0.0375	3.367E+13
C-14	5.7053E-09	1,266.45	2,532.90	0.00E+00	7.23E-06	1.45E-05	0.0575	3.624E+13
Ci-36	1.3124E-32	1,266.45	2,532.90	0.00E+00	1.86E-29	3.32E-29	0.0650	2.184E+13
Cm-243	1.1410E-07	1,266.45	2,532.90	0.00E+00	1.45E-04	2.89E-04	0.1250	1.442E+13
Cm-244	1.6522E-05	1,266.45	2,532.90	0.00E+00	2.09E-02	4.18E-02	0.2250	1.885E+13
Co-60	7.4047E-07	1,266.45	2,532.90	0.00E+00	9.38E-04	1.88E-03	0.3750	8.201E+12
Cs-134	2.0455E-05	1,266.45	2,532.90	0.00E+00	2.59E-02	5.18E-02	0.5750	1.355E+14
Cs-135	3.4477E-06	1,266.45	2,532.90	0.00E+00	4.37E-03	8.73E-03	0.8500	1.856E+12
Cs-137	1.4365E+00	1,266.45	2,532.90	0.00E+00	1.82E+03	3.64E+03	1.2500	8.008E+11
Eu-154	7.3230E-03	1,266.45	2,532.90	0.00E+00	9.27E+00	1.85E+01	1.7500	4.507E+10
Eu-155	5.9259E-04	1,266.45	2,532.90	0.00E+00	7.50E-01	1.50E+00	2.2500	3.788E+06
Fe-55	2.2791E-06	1,266.45	2,532.90	0.00E+00	2.89E-03	5.77E-03	2.7500	3.597E+06
H-3	1.9698E-03	1,266.45	2,532.90	0.00E+00	2.49E+00	4.99E+00	3.5000	2.084E+03
I-129	7.5300E-07	1,266.45	2,532.90	0.00E+00	9.54E-04	1.91E-03	5.0000	8.518E+02
Kr-85	4.1176E-02	1,266.45	2,532.90	0.00E+00	5.21E+01	1.04E+02	7.0000	9.321E+01
Np-237	9.5752E-06	1,266.45	2,532.90	0.00E+00	1.21E-02	2.43E-02	11.0000	1.039E+01
Pa-231	3.8379E-09	1,266.45	2,532.90	0.00E+00	4.99E-06	9.97E-06		
Pb-210	3.3115E-10	1,266.45	2,532.90	0.00E+00	4.19E-07	8.39E-07		
Pm-147	9.2402E-04	1,266.45	2,532.90	0.00E+00	1.17E+00	2.34E+00		
Pu-238	1.8217E-02	1,266.45	2,532.90	0.00E+00	2.05E+01	4.11E+01		
Pu-239	4.2810E-04	1,266.45	2,532.90	0.00E+00	5.42E-01	1.08E+00		
Pu-240	2.4333E-04	1,266.45	2,532.90	0.00E+00	3.08E-01	6.16E-01		
Pu-241	1.8242E-02	1,266.45	2,532.90	0.00E+00	2.06E+01	4.11E+01		
Pu-242	3.6329E-07	1,266.45	2,532.90	0.00E+00	4.80E-04	9.20E-04		
Ra-226	9.0114E-10	1,266.45	2,532.90	0.00E+00	1.14E-06	2.28E-06		
Ra-228	3.1019E-14	1,266.45	2,532.90	0.00E+00	3.93E-11	7.86E-11		
Ru-106	2.1225E-10	1,266.45	2,532.90	0.00E+00	2.69E-07	5.38E-07		
Se-79	1.2930E-05	1,266.45	2,532.90	0.00E+00	1.84E-02	3.28E-02		
Sn-126	1.1571E-05	1,266.45	2,532.90	0.00E+00	1.47E-02	2.93E-02		
Sr-90	1.3472E+00	1,266.45	2,532.90	0.00E+00	1.71E+03	3.41E+03		
Tc-99	4.2239E-04	1,266.45	2,532.90	0.00E+00	5.35E-01	1.07E+00		
Th-229	1.2407E-11	1,266.45	2,532.90	0.00E+00	1.57E-08	3.14E-08		
Th-230	8.3497E-06	1,266.45	2,532.90	0.00E+00	1.06E-04	2.11E-04		
Th-232	3.8371E-14	1,266.45	2,532.90	0.00E+00	4.86E-11	9.72E-11		
Ti-208	4.0414E-08	1,266.45	2,532.90	0.00E+00	5.12E-05	1.02E-04		
U-232	1.0948E-07	1,266.45	2,532.90	0.00E+00	1.39E-04	2.77E-04		
U-233	3.6275E-09	1,266.45	2,532.90	0.00E+00	4.59E-06	9.19E-06		
U-234	1.8562E-04	1,266.45	2,532.90	0.00E+00	2.35E-01	4.70E-01		
U-235	-2.7235E-06	1,266.45	0.00	1.54E-02	1.20E-02	1.54E-02		
U-236	1.5493E-05	1,266.45	2,532.90	0.00E+00	1.96E-02	3.92E-02		
U-238	-4.2851E-09	1,266.45	0.00	1.80E-04	1.74E-04	1.80E-04		
Y-90	1.3475E+00	1,266.45	2,532.90	0.00E+00	1.71E+03	3.41E+03		
Other Radionuclides					1.73E+03	3.47E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.03204799	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:		1,266.45
Bounding:		2,532.90

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:	0.52	
Bounding:	1.05	

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: JRR-4 (UALX HEU)

SNF ID #: 1070

Fuel Units & Descr: 11 - ASSEMBLY

Heavy Metal Mass: BOL=1.964kg; EOL=1.621kg

RCD Storage Site: SRS

¹Fuel decay start date:

1989

Estimate 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"

0.31

II. Estimates

Radionuclide	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	323.98	647.95	0.00E+00	6.50E-07	1.30E-06	Avg. MeV	
Am-241	2.5251E-03	323.98	647.95	0.00E+00	8.18E-01	1.64E+00	0.0150	4.772E+13
Am-242m	3.9624E-07	323.98	647.95	0.00E+00	1.28E-04	2.57E-04	0.0250	9.910E+12
Am-243	1.4880E-06	323.98	647.95	0.00E+00	4.82E-04	9.64E-04	0.0375	8.613E+12
C-14	5.7053E-09	323.98	647.95	0.00E+00	1.85E-06	3.70E-06	0.0575	9.271E+12
Cl-36	1.3124E-32	323.98	647.95	0.00E+00	4.25E-30	8.50E-30	0.0850	5.586E+12
Cm-243	1.1419E-07	323.98	647.95	0.00E+00	3.70E-05	7.40E-05	0.1250	3.690E+12
Cm-244	1.6522E-05	323.98	647.95	0.00E+00	5.35E-03	1.07E-02	0.2250	4.823E+12
Co-60	7.4047E-07	323.98	647.95	0.00E+00	2.40E-04	4.80E-04	0.3750	2.098E+12
Cs-134	2.0455E-05	323.98	647.95	0.00E+00	6.63E-03	1.33E-02	0.5750	3.467E+13
Cs-135	3.4477E-06	323.98	647.95	0.00E+00	1.12E-03	2.23E-03	0.8500	4.235E+11
Cs-137	1.4365E+00	323.98	647.95	0.00E+00	4.65E+02	9.31E+02	1.2500	2.049E+11
Eu-154	7.3230E-03	323.98	647.95	0.00E+00	2.37E+00	4.74E+00	1.7500	1.153E+10
Eu-155	5.9259E-04	323.98	647.95	0.00E+00	1.92E-01	3.84E-01	2.2500	9.640E+05
Fe-55	2.2791E-06	323.98	647.95	0.00E+00	7.38E-04	1.48E-03	2.7500	9.201E+05
H-3	1.9696E-03	323.98	647.95	0.00E+00	6.38E-01	1.28E+00	3.5000	5.332E+02
I-129	7.5300E-07	323.98	647.95	0.00E+00	2.44E-04	4.88E-04	5.0000	2.179E+02
Kr-85	4.1176E-02	323.98	647.95	0.00E+00	1.33E+01	2.67E+01	7.0000	2.384E+01
Np-237	9.5752E-06	323.98	647.95	0.00E+00	3.10E-03	6.20E-03	11.0000	2.659E+00
Pa-231	3.9379E-09	323.98	647.95	0.00E+00	1.28E-06	2.55E-06		
Pb-210	3.3115E-10	323.98	647.95	0.00E+00	1.07E-07	2.15E-07		
Pm-147	9.2402E-04	323.98	647.95	0.00E+00	2.99E-01	5.99E-01		
Pu-238	1.6217E-02	323.98	647.95	0.00E+00	5.25E+00	1.05E+01		
Pu-239	4.2810E-04	323.98	647.95	0.00E+00	1.39E-01	2.77E-01		
Pu-240	2.4333E-04	323.98	647.95	0.00E+00	7.88E-02	1.58E-01		
Pu-241	1.6242E-02	323.98	647.95	0.00E+00	5.26E+00	1.05E+01		
Pu-242	3.6329E-07	323.98	647.95	0.00E+00	1.18E-04	2.35E-04		
Ra-226	9.0114E-10	323.98	647.95	0.00E+00	2.92E-07	5.84E-07		
Ra-228	3.1019E-14	323.98	647.95	0.00E+00	1.00E-11	2.01E-11		
Ru-106	2.1225E-10	323.98	647.95	0.00E+00	6.88E-08	1.38E-07		
Se-79	1.2930E-05	323.98	647.95	0.00E+00	4.19E-03	8.38E-03		
Sn-126	1.1571E-05	323.98	647.95	0.00E+00	3.75E-03	7.50E-03		
Sr-90	1.3472E+00	323.98	647.95	0.00E+00	4.36E+02	8.73E+02		
Tc-99	4.2239E-04	323.98	647.95	0.00E+00	1.37E-01	2.74E-01		
Th-229	1.2407E-11	323.98	647.95	0.00E+00	4.02E-09	8.04E-09		
Th-230	8.3497E-08	323.98	647.95	0.00E+00	2.71E-05	5.41E-05		
Th-232	3.8371E-14	323.98	647.95	0.00E+00	1.24E-11	2.49E-11		
Ti-208	4.0414E-08	323.98	647.95	0.00E+00	1.31E-05	2.62E-05		
U-232	1.0948E-07	323.98	647.95	0.00E+00	3.55E-05	7.09E-05		
U-233	3.6275E-09	323.98	647.95	0.00E+00	1.18E-06	2.35E-06		
U-234	1.8562E-04	323.98	647.95	0.00E+00	6.01E-02	1.20E-01		
U-235	-2.7235E-06	323.98	0.00	3.95E-03	3.07E-03	3.95E-03		
U-236	1.5493E-05	323.98	647.95	0.00E+00	5.02E-03	1.00E-02		
U-238	-4.2851E-09	323.98	0.00	4.80E-05	4.46E-05	4.60E-05		
Y-90	1.3475E+00	323.98	647.95	0.00E+00	4.37E+02	8.73E+02		
Other Radionuclides					4.43E+02	8.87E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.03204799	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		323.98
Bounding:		647.95

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:	0.52	
Bounding:	1.05	

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: KURR (JALX-HEU) JAPAN

SNF ID #: 001

Fuel Units & Descr: 240 - 18 CURVED PLATES

Heavy Metal Mass: BOL=40.824kg; EOL=33.48kg

ROD Storage Site: SRS

Fuel decay start date: 2006

Estimates as of: 2030

Template: ATR (Light Water, Alum., 80 to 100%, U)

Template Burnup (MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 20 years

Estimated

Canister usage:

18"x10"

6.67

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	6,954.91	13,909.82	0.00E+00	4.61E-06	9.22E-06	Avg. MeV	
Am-241	2.0060E-03	6,954.91	13,909.82	0.00E+00	1.40E+01	2.79E+01	0.0150	1.468E+15
Am-242m	4.2429E-07	6,954.91	13,909.82	0.00E+00	2.95E-03	5.90E-03	0.0250	3.053E+14
Am-243	1.4899E-06	6,954.91	13,909.82	0.00E+00	1.04E-02	2.07E-02	0.0375	2.663E+14
C-14	5.7135E-09	6,954.91	13,909.82	0.00E+00	3.97E-05	7.95E-05	0.0575	2.852E+14
Cl-36	1.3124E-32	6,954.91	13,909.82	0.00E+00	9.13E-29	1.83E-28	0.0850	1.724E+14
Cm-243	1.6443E-07	6,954.91	13,909.82	0.00E+00	1.14E-03	2.29E-03	0.1250	1.166E+14
Cm-244	2.9330E-05	6,954.91	13,909.82	0.00E+00	2.04E-01	4.08E-01	0.2250	1.487E+14
Co-60	5.3186E-06	6,954.91	13,909.82	0.00E+00	3.70E-02	7.40E-02	0.3750	6.474E+13
Cs-134	3.1563E-03	6,954.91	13,909.82	0.00E+00	2.20E+01	4.39E+01	0.5750	1.056E+15
Cs-135	3.4477E-06	6,954.91	13,909.82	0.00E+00	2.40E-02	4.80E-02	0.8500	1.785E+13
Cs-137	2.0313E+00	6,954.91	13,909.82	0.00E+00	1.41E+04	2.83E+04	1.2500	1.019E+13
Eu-154	2.4513E-02	6,954.91	13,909.82	0.00E+00	1.70E+02	3.41E+02	1.7500	4.679E+11
Eu-155	4.8175E-03	6,954.91	13,909.82	0.00E+00	3.35E+01	6.70E+01	2.2500	4.105E+07
Fe-55	1.2397E-04	6,954.91	13,909.82	0.00E+00	8.62E-01	1.72E+00	2.7500	2.321E+07
H-3	4.5697E-03	6,954.91	13,909.82	0.00E+00	3.18E+01	6.36E+01	3.5000	1.066E+05
I-129	7.5300E-07	6,954.91	13,909.82	0.00E+00	5.24E-03	1.05E-02	5.0000	6.026E+03
Kr-85	1.0650E-01	6,954.91	13,909.82	0.00E+00	7.55E+02	1.51E+03	7.0000	6.655E+02
Np-237	9.5561E-06	6,954.91	13,909.82	0.00E+00	6.65E-02	1.33E-01	11.0000	7.459E+01
Pa-231	2.0359E-09	6,954.91	13,909.82	0.00E+00	1.42E-05	2.83E-05		
Pb-210	4.9728E-11	6,954.91	13,909.82	0.00E+00	3.46E-07	6.92E-07		
Pm-147	4.8502E-02	6,954.91	13,909.82	0.00E+00	3.37E+02	6.75E+02		
Pu-238	1.8254E-02	6,954.91	13,909.82	0.00E+00	1.27E+02	2.54E+02		
Pu-239	4.2810E-04	6,954.91	13,909.82	0.00E+00	2.98E+00	5.95E+00		
Pu-240	2.4368E-04	6,954.91	13,909.82	0.00E+00	1.69E+00	3.39E+00		
Pu-241	3.3415E-02	6,954.91	13,909.82	0.00E+00	2.32E+02	4.65E+02		
Pu-242	3.6329E-07	6,954.91	13,909.82	0.00E+00	2.53E-03	5.06E-03		
Ra-226	2.2854E-10	6,954.91	13,909.82	0.00E+00	1.59E-06	3.18E-06		
Ra-228	1.2426E-14	6,954.91	13,909.82	0.00E+00	8.64E-11	1.73E-10		
Ru-106	6.3589E-06	6,954.91	13,909.82	0.00E+00	4.42E-02	8.85E-02		
Se-79	1.2933E-05	6,954.91	13,909.82	0.00E+00	8.99E-02	1.80E-01		
Sn-126	1.1574E-05	6,954.91	13,909.82	0.00E+00	8.05E-02	1.61E-01		
Sr-90	1.9248E+00	6,954.91	13,909.82	0.00E+00	1.34E+04	2.68E+04		
Tc-99	4.2239E-04	6,954.91	13,909.82	0.00E+00	2.94E+00	5.88E+00		
Th-229	5.0953E-12	6,954.91	13,909.82	0.00E+00	3.54E-08	7.09E-08		
Th-230	4.1885E-08	6,954.91	13,909.82	0.00E+00	2.91E-04	5.83E-04		
Th-232	1.9270E-14	6,954.91	13,909.82	0.00E+00	1.34E-10	2.68E-10		
Ti-208	4.6024E-08	6,954.91	13,909.82	0.00E+00	3.20E-04	6.40E-04		
U-232	1.2582E-07	6,954.91	13,909.82	0.00E+00	8.75E-04	1.75E-03		
U-233	2.5825E-09	6,954.91	13,909.82	0.00E+00	1.80E-05	3.59E-05	Thermal Power	
U-234	1.8450E-04	6,954.91	13,909.82	0.00E+00	1.28E+00	2.57E+00	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	-2.7235E-06	6,954.91	0.00	8.22E-02	6.33E-02	8.22E-02	1.66E+02	3.32E+02
U-236	1.5493E-06	6,954.91	13,909.82	0.00E+00	1.08E-01	2.16E-01	Total	Total
U-238	-4.2851E-09	6,954.91	0.00	9.36E-04	9.07E-04	9.36E-04		
Y-90	1.9254E+00	6,954.91	13,909.82	0.00E+00	1.34E+04	2.68E+04		
Other Radionuclides					1.35E+04	2.69E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.175	80 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		6,954.91
Bounding:		13,909.82

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:	0.54	
Bounding:	1.08	

Estimated EOL HM/Given EOL HM
1.01

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: LWR SAMPLES
 SNF ID #: 134
 Fuel Units & Deser: S - ROD
 Heavy Metal Mass: BOL = 12.74kg
 ROD Storage Site: INEL

Estimated
 Canister usage:
 18"x19"
 0.18

Fuel decay start date: 1986
Estimates as of: 2000
Template: (Worst Case)
Template Burnup (MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.0018886
Template Decay Time: 50 years

Radionuclide	CUMWd From Template	m	x ₀	x ₁	Bounding Fuel Burnup (MWd) ¹	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Y ₀	Y ₁	Bounding Fuel Inventories(Ci)	Gamma Sources	
											Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-08	12,107.49	12,107.49	0.00E+00	3.05E-02	3.05E-02	3.05E-02	3.05E-02	3.05E-02	3.05E-02	Avg. MeV	
Am-241	8.6432E+00	12,107.49	12,107.49	0.00E+00	1.05E+05	1.05E+05	1.05E+05	1.05E+05	1.05E+05	1.05E+05	0.0150	1.029E+18
Am-242m	1.5728E-02	12,107.49	12,107.49	0.00E+00	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	0.0250	2.027E+15
Am-243	1.6288E-02	12,107.49	12,107.49	0.00E+00	1.97E+02	1.97E+02	1.97E+02	1.97E+02	1.97E+02	1.97E+02	0.0375	1.713E+15
C-14	1.2068E-01	12,107.49	12,107.49	0.00E+00	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	0.0575	3.237E+15
Cl-36	2.2849E-03	12,107.49	12,107.49	0.00E+00	2.77E+01	2.77E+01	2.77E+01	2.77E+01	2.77E+01	2.77E+01	0.0850	1.089E+15
Cm-243	6.0144E-04	12,107.49	12,107.49	0.00E+00	7.28E+00	7.28E+00	7.28E+00	7.28E+00	7.28E+00	7.28E+00	0.1250	7.878E+14
Cm-244	9.4890E-02	12,107.49	12,107.49	0.00E+00	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	0.2250	9.330E+14
Co-60	3.9052E+00	12,107.49	12,107.49	0.00E+00	4.73E+04	4.73E+04	4.73E+04	4.73E+04	4.73E+04	4.73E+04	0.3750	4.064E+14
Cs-134	2.2139E-08	12,107.49	12,107.49	0.00E+00	2.68E-02	2.68E-02	2.68E-02	2.68E-02	2.68E-02	2.68E-02	0.5750	6.729E+15
Cs-135	4.3978E-04	12,107.49	12,107.49	0.00E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	0.8500	6.729E+14
Cs-137	1.4887E+01	12,107.49	12,107.49	0.00E+00	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.2500	3.811E+15
Eu-154	3.7342E-01	12,107.49	12,107.49	0.00E+00	4.52E+03	4.52E+03	4.52E+03	4.52E+03	4.52E+03	4.52E+03	1.7500	4.339E+12
Eu-155	8.4893E-03	12,107.49	12,107.49	0.00E+00	1.03E+02	1.03E+02	1.03E+02	1.03E+02	1.03E+02	1.03E+02	2.2500	1.878E+10
Fe-55	5.3750E-03	12,107.49	12,107.49	0.00E+00	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	2.7500	3.230E+10
H-3	1.0472E-01	12,107.49	12,107.49	0.00E+00	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	3.5000	1.759E+07
I-129	1.0618E-05	12,107.49	12,107.49	0.00E+00	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	5.0000	7.432E+08
Kr-85	2.2717E-01	12,107.49	12,107.49	0.00E+00	2.75E+03	2.75E+03	2.75E+03	2.75E+03	2.75E+03	2.75E+03	7.0000	8.484E+05
Np-237	1.6400E-04	12,107.49	12,107.49	0.00E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	11.0000	9.654E+04
Pa-231	2.8688E-06	12,107.49	12,107.49	0.00E+00	3.47E-02	3.47E-02	3.47E-02	3.47E-02	3.47E-02	3.47E-02		
Pb-210	4.7312E-08	12,107.49	12,107.49	0.00E+00	5.73E-04	5.73E-04	5.73E-04	5.73E-04	5.73E-04	5.73E-04		
Pb-147	3.2198E-04	12,107.49	12,107.49	0.00E+00	3.90E+00	3.90E+00	3.90E+00	3.90E+00	3.90E+00	3.90E+00		
Pu-238	-1.1924E+00	0.00	3.27E+03	0.00E+00	3.27E+03	3.27E+03	3.27E+03	3.27E+03	3.27E+03	3.27E+03		
Pu-239	-4.8600E-02	0.00	3.96E+02	0.00E+00	3.96E+02	3.96E+02	3.96E+02	3.96E+02	3.96E+02	3.96E+02		
Pu-240	-3.0127E-01	0.00	5.06E+02	0.00E+00	5.06E+02	5.06E+02	5.06E+02	5.06E+02	5.06E+02	5.06E+02		
Pu-241	-1.2917E+02	0.00	1.30E+05	0.00E+00	1.30E+05	1.30E+05	1.30E+05	1.30E+05	1.30E+05	1.30E+05		
Pu-242	-1.1381E-04	0.00	2.19E+00	0.00E+00	2.19E+00	2.19E+00	2.19E+00	2.19E+00	2.19E+00	2.19E+00		
Ra-226	1.0760E-07	12,107.49	12,107.49	0.00E+00	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03		
Ra-228	6.0160E-07	12,107.49	12,107.49	0.00E+00	7.28E-03	7.28E-03	7.28E-03	7.28E-03	7.28E-03	7.28E-03		
Ru-106	1.3388E-13	12,107.49	12,107.49	0.00E+00	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09		
Sr-90	1.8978E-04	12,107.49	12,107.49	0.00E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00		
Sr-126	1.6689E-04	12,107.49	12,107.49	0.00E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00		
Sr-90	1.3859E+01	12,107.49	12,107.49	0.00E+00	1.58E+05	1.58E+05	1.58E+05	1.58E+05	1.58E+05	1.58E+05		
Tc-99	6.7678E-03	12,107.49	12,107.49	0.00E+00	8.19E+01	8.19E+01	8.19E+01	8.19E+01	8.19E+01	8.19E+01		
Th-229	2.2692E-08	12,107.49	12,107.49	0.00E+00	2.74E-02	2.74E-02	2.74E-02	2.74E-02	2.74E-02	2.74E-02		
Th-230	7.5855E-08	12,107.49	12,107.49	0.00E+00	9.20E-02	9.20E-02	9.20E-02	9.20E-02	9.20E-02	9.20E-02		
Th-232	6.0208E-07	12,107.49	12,107.49	0.00E+00	7.29E-03	7.29E-03	7.29E-03	7.29E-03	7.29E-03	7.29E-03		
Th-232	7.5795E-05	12,107.49	12,107.49	0.00E+00	9.18E-01	9.18E-01	9.18E-01	9.18E-01	9.18E-01	9.18E-01		
U-232	2.0521E-04	12,107.49	12,107.49	0.00E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00		
U-233	3.6128E-04	12,107.49	12,107.49	0.00E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00		
U-234	1.2789E-02	12,107.49	12,107.49	0.00E+00	1.55E+02	1.55E+02	1.55E+02	1.55E+02	1.55E+02	1.55E+02		
U-235	5.7486E-04	12,107.49	12,107.49	1.10E-02	6.97E+00	6.97E+00	6.97E+00	6.97E+00	6.97E+00	6.97E+00		
U-238	2.3485E-04	12,107.49	12,107.49	0.00E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00		
U-238	1.1581E-04	12,107.49	12,107.49	1.35E-03	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00		
Y-90	1.3881E+01	12,107.49	12,107.49	0.00E+00	6.22E+05	6.22E+05	6.22E+05	6.22E+05	6.22E+05	6.22E+05		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Basis for Parameter Differences:	
	Used
Reactor Moderator:	From SFD
Fuel Cladding:	LIGHT WATER
BOL HMI Constituents:	ZIRC OR SST
BOL Enrichment %:	Pu and U
	U, Th, & Pu
	0 to 100

This list didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd) ¹		Basis for burnup used in estimator:	
Nominal:	From SFD	Estimated	
Bounding:	From SFD	Estimated	

Checks		Estimated Burnup/ Given Burnup	
Nominal:	Burnup Multiplier	Estimated EOL HMI/Given EOL HMI	
Bounding:	Burnup Multiplier	Estimated EOL HMI/Given EOL HMI	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.
²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/GMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MIT
SNF ID #: 135
Fuel Units & Descr: 525 - 15 FLAT PLATES
Heavy Metal Mass: BOL=286.02kg; EOL=232.68kg
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): 0.00116889
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
17.50

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	95,816.70	191,633.40	0.00E+00	1.39E-05	2.79E-05	Avg. MeV	
Am-241	1.1190E-03	95,816.70	191,633.40	0.00E+00	1.07E+02	2.14E+02	0.0150	3.897E+16
Am-242m	4.5425E-07	95,816.70	191,633.40	0.00E+00	4.35E-02	8.70E-02	0.0250	7.965E+15
Am-243	1.4921E-06	95,816.70	191,633.40	0.00E+00	1.43E-01	2.86E-01	0.0375	7.350E+15
C-14	5.7244E-09	95,816.70	191,633.40	0.00E+00	5.48E-04	1.10E-03	0.0675	7.227E+15
Ci-36	1.3124E-32	95,816.70	191,633.40	0.00E+00	1.26E-27	2.51E-27	0.0850	4.807E+15
Cm-243	2.3676E-07	95,816.70	191,633.40	0.00E+00	2.27E-02	4.54E-02	0.1250	3.990E+15
Cm-244	5.2042E-05	95,816.70	191,633.40	0.00E+00	4.99E+00	9.97E+00	0.2250	3.905E+15
Co-60	3.8208E-05	95,816.70	191,633.40	0.00E+00	3.66E+00	7.32E+00	0.3750	1.890E+15
Cs-134	4.8693E-01	95,816.70	191,633.40	0.00E+00	4.87E+04	9.33E+04	0.5750	2.596E+16
Cs-135	3.4477E-06	95,816.70	191,633.40	0.00E+00	3.30E-01	6.61E-01	0.8500	3.636E+15
Cs-137	2.6731E+00	95,816.70	191,633.40	0.00E+00	2.75E+05	5.51E+05	1.2500	6.765E+14
Eu-154	8.2053E-02	95,816.70	191,633.40	0.00E+00	7.86E+03	1.57E+04	1.7500	2.837E+13
Eu-155	3.9134E-02	95,816.70	191,633.40	0.00E+00	3.75E+03	7.50E+03	2.2500	5.950E+13
Fe-55	6.7429E-03	95,816.70	191,633.40	0.00E+00	6.46E+02	1.29E+03	2.7500	3.423E+11
H-3	1.0599E-02	95,816.70	191,633.40	0.00E+00	1.02E+03	2.03E+03	3.5000	3.797E+10
I-129	7.5300E-07	95,816.70	191,633.40	0.00E+00	7.21E-02	1.44E-01	5.0000	1.135E+05
Kr-85	2.8595E-01	95,816.70	191,633.40	0.00E+00	2.74E+04	5.48E+04	7.0000	1.265E+04
Np-237	9.5479E-06	95,816.70	191,633.40	0.00E+00	9.15E-01	1.83E+00	11.0000	1.426E+03
Pa-231	8.9297E-10	95,816.70	191,633.40	0.00E+00	8.56E-05	1.71E-04		
Pb-210	3.7609E-12	95,816.70	191,633.40	0.00E+00	3.60E-07	7.21E-07		
Pm-147	2.5452E+00	95,816.70	191,633.40	0.00E+00	2.44E+05	4.88E+05		
Pu-238	2.0550E-02	95,816.70	191,633.40	0.00E+00	1.97E+03	3.94E+03		
Pu-239	4.2838E-04	95,816.70	191,633.40	0.00E+00	4.10E+01	8.21E+01		
Pu-240	2.4401E-04	95,816.70	191,633.40	0.00E+00	2.34E+01	4.68E+01		
Pu-241	6.8764E-02	95,816.70	191,633.40	0.00E+00	6.59E+03	1.32E+04		
Pu-242	3.6329E-07	95,816.70	191,633.40	0.00E+00	3.48E-02	6.96E-02		
Ra-226	3.8045E-11	95,816.70	191,633.40	0.00E+00	3.65E-06	7.29E-06		
Ra-228	2.9902E-15	95,816.70	191,633.40	0.00E+00	2.87E-10	5.73E-10		
Ru-106	1.9055E-01	95,816.70	191,633.40	0.00E+00	1.83E+04	3.65E+04		
Se-79	1.2936E-05	95,816.70	191,633.40	0.00E+00	1.24E+00	2.48E+00		
Sn-126	1.1574E-05	95,816.70	191,633.40	0.00E+00	1.11E+00	2.22E+00		
Sr-90	2.7505E+00	95,816.70	191,633.40	0.00E+00	2.64E+05	5.27E+05		
Tc-99	4.2239E-04	95,816.70	191,633.40	0.00E+00	4.05E+01	8.09E+01		
Th-229	1.8848E-12	95,816.70	191,633.40	0.00E+00	1.81E-07	3.61E-07		
Th-230	1.7042E-08	95,816.70	191,633.40	0.00E+00	1.63E-03	3.27E-03		
Th-232	7.8132E-15	95,816.70	191,633.40	0.00E+00	7.49E-10	1.50E-09		
Ti-208	4.4063E-06	95,816.70	191,633.40	0.00E+00	4.22E-03	8.44E-03		
U-232	1.3151E-07	95,816.70	191,633.40	0.00E+00	1.26E-02	2.52E-02		
U-233	1.9564E-09	95,816.70	191,633.40	0.00E+00	1.87E-04	3.75E-04		
U-234	1.8371E-04	95,816.70	191,633.40	0.00E+00	1.76E+01	3.52E+01		
U-235	-2.7235E-06	95,816.70	0.00	5.76E-01	3.15E-01	5.76E-01		
U-236	1.5493E-05	95,816.70	191,633.40	0.00E+00	1.48E+00	2.97E+00		
U-238	-4.2851E-09	95,816.70	0.00	6.61E-03	6.20E-03	6.61E-03		
Y-90	2.7505E+00	95,816.70	191,633.40	0.00E+00	2.64E+05	5.27E+05		
Other Radionuclides					4.93E+05	9.86E+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:	ALUM	
	BOL HM Constituents:	U	
BOL Enrichment %:	93.1245618	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
	95,816.70	50,514.01	
	Bounding:	191,633.40	
Nominal burnup taken directly from SFD (converted to MWd). Bounding burnup assumed to be twice nominal burnup.			

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.06	0.53	
	Bounding:	2.13	
Estimated EOL HM/Given EOL HM			0.82

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MIT
SNF ID #: 136
Fuel Units & Descr: 120 - 15 FLAT PLATES
Heavy Metal Mass: BOL=65.46kg; EOL=43.032kg
ROD Storage Site: SRS

*Fuel decay start date: 1994
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"
4.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	21,239.75	42,479.50	0.00E+00	4.26E-05	8.52E-05	Avg. MeV	
Am-241	2.5251E-03	21,239.75	42,479.50	0.00E+00	5.36E+01	1.07E+02	0.0150	3.129E+15
Am-242m	3.9624E-07	21,239.75	42,479.50	0.00E+00	8.42E-03	1.68E-02	0.0250	6.497E+14
Am-243	1.4880E-06	21,239.75	42,479.50	0.00E+00	3.16E-02	6.32E-02	0.0375	5.647E+14
C-14	5.7053E-09	21,239.75	42,479.50	0.00E+00	1.21E-04	2.42E-04	0.0575	6.078E+14
Cl-36	1.3124E-32	21,239.75	42,479.50	0.00E+00	2.79E-28	5.57E-28	0.0850	3.662E+14
Cm-243	1.1419E-07	21,239.75	42,479.50	0.00E+00	2.43E-03	4.85E-03	0.1250	2.419E+14
Cm-244	1.6522E-05	21,239.75	42,479.50	0.00E+00	3.51E-01	7.02E-01	0.2250	3.162E+14
Co-60	7.4047E-07	21,239.75	42,479.50	0.00E+00	1.57E-02	3.15E-02	0.3750	1.375E+14
Cs-134	2.0455E-05	21,239.75	42,479.50	0.00E+00	4.34E-01	8.69E-01	0.5750	2.273E+15
Cs-135	3.4477E-06	21,239.75	42,479.50	0.00E+00	7.32E-02	1.46E-01	0.8500	2.777E+13
Cs-137	1.4365E+00	21,239.75	42,479.50	0.00E+00	3.05E+04	6.10E+04	1.2500	1.343E+13
Eu-154	7.3230E-03	21,239.75	42,479.50	0.00E+00	1.56E+02	3.11E+02	1.7500	7.559E+11
Eu-155	5.9259E-04	21,239.75	42,479.50	0.00E+00	1.26E+01	2.52E+01	2.2500	6.320E+07
Fe-55	2.2791E-06	21,239.75	42,479.50	0.00E+00	4.84E-02	9.68E-02	2.7500	6.032E+07
H-3	1.9698E-03	21,239.75	42,479.50	0.00E+00	4.18E+01	8.37E+01	3.5000	3.495E+04
I-129	7.5300E-07	21,239.75	42,479.50	0.00E+00	1.60E-02	3.20E-02	5.0000	1.428E+04
Kr-85	4.1176E-02	21,239.75	42,479.50	0.00E+00	8.75E+02	1.75E+03	7.0000	1.563E+03
Np-237	9.5752E-06	21,239.75	42,479.50	0.00E+00	2.03E-01	4.07E-01	11.0000	1.742E+02
Pa-231	3.9379E-09	21,239.75	42,479.50	0.00E+00	8.36E-05	1.67E-04		
Pb-210	3.3115E-10	21,239.75	42,479.50	0.00E+00	7.03E-08	1.41E-05		
Pm-147	9.2402E-04	21,239.75	42,479.50	0.00E+00	1.96E+01	3.93E+01		
Pu-238	1.6217E-02	21,239.75	42,479.50	0.00E+00	3.44E+02	6.89E+02		
Pu-239	4.2810E-04	21,239.75	42,479.50	0.00E+00	9.09E+00	1.82E+01		
Pu-240	2.4333E-04	21,239.75	42,479.50	0.00E+00	5.17E+00	1.03E+01		
Pu-241	1.6242E-02	21,239.75	42,479.50	0.00E+00	3.45E+02	6.90E+02		
Pu-242	3.6329E-07	21,239.75	42,479.50	0.00E+00	7.72E-03	1.54E-02		
Ra-226	9.0114E-10	21,239.75	42,479.50	0.00E+00	1.91E-05	3.83E-05		
Ra-228	3.1019E-14	21,239.75	42,479.50	0.00E+00	6.59E-10	1.32E-09		
Ru-106	2.1225E-10	21,239.75	42,479.50	0.00E+00	4.51E-06	9.02E-06		
Se-78	1.2930E-05	21,239.75	42,479.50	0.00E+00	2.75E-01	5.49E-01		
Sn-126	1.1571E-05	21,239.75	42,479.50	0.00E+00	2.46E-01	4.92E-01		
Sr-90	1.3472E+00	21,239.75	42,479.50	0.00E+00	2.86E+04	5.72E+04		
Tc-99	4.2239E-04	21,239.75	42,479.50	0.00E+00	8.97E+00	1.79E+01		
Th-229	1.2407E-11	21,239.75	42,479.50	0.00E+00	2.64E-07	5.27E-07		
Th-230	8.3497E-08	21,239.75	42,479.50	0.00E+00	1.77E-03	3.55E-03		
Th-232	3.8371E-14	21,239.75	42,479.50	0.00E+00	8.15E-10	1.63E-09		
Ti-208	4.0414E-08	21,239.75	42,479.50	0.00E+00	8.58E-04	1.72E-03		
U-232	1.0948E-07	21,239.75	42,479.50	0.00E+00	2.33E-03	4.65E-03		
U-233	3.6275E-09	21,239.75	42,479.50	0.00E+00	7.70E-05	1.54E-04		
U-234	1.8562E-04	21,239.75	42,479.50	0.00E+00	3.94E+00	7.89E+00		
U-235	-2.7235E-06	21,239.75	0.00	1.32E-01	7.39E-02	1.32E-01		
U-236	1.5493E-05	21,239.75	42,479.50	0.00E+00	3.29E-01	6.58E-01		
U-238	-4.2851E-09	21,239.75	0.00	1.51E-03	1.42E-03	1.51E-03		
Y-90	1.3475E+00	21,239.75	42,479.50	0.00E+00	2.86E+04	5.72E+04		
Other Radionuclides					2.91E+04	5.81E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.145832	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:		21,239.75
Bounding:		42,479.50

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.03	
Bounding:	2.06	

Estimated EOL HM/Given EOL HM
1.03

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ML-1 (GCRE)
SNF ID #: 137
Fuel Units & Descr: 67 - 19 ROD ASSEMBLY
Heavy Metal Mass: BOL=58.625kg; EOL=58.29kg
ROD Storage Site: INEEL

Fuel decay start date: 1965
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"
3.72

II. Estimates	m	X _m	X _b	b	Y _m	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	4.5940E-08	316.46	632.91	0.00E+00	1.45E-05	2.91E-05	Avg. MeV	
Am-241	1.1471E-04	316.46	632.91	0.00E+00	3.63E-02	7.26E-02	0.0150	2.310E+13
Am-242m	7.4210E-09	316.46	632.91	0.00E+00	2.35E-06	4.70E-06	0.0250	4.800E+12
Am-243	9.8236E-10	316.46	632.91	0.00E+00	3.11E-07	6.22E-07	0.0375	4.171E+12
C-14	2.2928E-04	316.46	632.91	0.00E+00	7.26E-02	1.45E-01	0.0575	4.476E+12
Cl-36	1.2260E-06	316.46	632.91	0.00E+00	3.88E-04	7.76E-04	0.0850	2.704E+12
Cm-243	1.2000E-10	316.46	632.91	0.00E+00	3.80E-08	7.59E-08	0.1250	1.754E+12
Cm-244	7.3577E-10	316.46	632.91	0.00E+00	2.33E-07	4.66E-07	0.2250	2.332E+12
Co-60	1.3732E-03	316.46	632.91	0.00E+00	4.35E-01	8.69E-01	0.3750	1.016E+12
Cs-134	1.2709E-10	316.46	632.91	0.00E+00	4.02E-08	8.04E-08	0.5750	1.710E+13
Cs-135	3.0316E-05	316.46	632.91	0.00E+00	9.59E-03	1.92E-02	0.8500	1.660E+11
Cs-137	7.2579E-01	316.46	632.91	0.00E+00	2.30E+02	4.59E+02	1.2500	1.202E+11
Eu-154	5.9750E-05	316.46	632.91	0.00E+00	1.89E-02	3.78E-02	1.7500	4.271E+09
Eu-155	1.0577E-05	316.46	632.91	0.00E+00	3.35E-03	6.69E-03	2.2500	8.077E+05
Fe-55	4.1631E-07	316.46	632.91	0.00E+00	1.32E-04	2.63E-04	2.7500	3.818E+05
H-3	4.6722E-04	316.46	632.91	0.00E+00	1.48E-01	2.96E-01	3.5000	4.749E+01
I-129	7.3195E-07	316.46	632.91	0.00E+00	2.32E-04	4.63E-04	5.0000	1.969E+01
Kr-85	5.9418E-03	316.46	632.91	0.00E+00	1.88E+00	3.76E+00	7.0000	2.187E+00
Np-237	1.1499E-06	316.46	632.91	0.00E+00	3.64E-04	7.28E-04	11.0000	2.462E-01
Pa-231	7.0899E-08	316.46	632.91	0.00E+00	2.24E-05	4.48E-05		
Pb-210	2.2363E-12	316.46	632.91	0.00E+00	7.08E-10	1.42E-09		
Pm-147	4.2296E-07	316.46	632.91	0.00E+00	1.34E-04	2.68E-04		
Pu-238	2.3295E-04	316.46	632.91	0.00E+00	7.37E-02	1.47E-01		
Pu-239	6.6722E-04	316.46	632.91	0.00E+00	2.11E-01	4.22E-01		
Pu-240	8.6556E-05	316.46	632.91	0.00E+00	2.74E-02	5.48E-02		
Pu-241	1.6889E-04	316.46	632.91	0.00E+00	5.34E-02	1.07E-01		
Pu-242	1.9717E-09	316.46	632.91	0.00E+00	6.24E-07	1.25E-06		
Ra-226	4.5740E-12	316.46	632.91	0.00E+00	1.45E-09	2.89E-09		
Ra-228	8.3511E-12	316.46	632.91	0.00E+00	2.64E-09	5.29E-09		
Ru-106	2.0516E-19	316.46	632.91	0.00E+00	6.49E-17	1.30E-16		
Se-79	1.3220E-05	316.46	632.91	0.00E+00	4.18E-03	8.37E-03		
Sn-126	1.1489E-05	316.46	632.91	0.00E+00	3.64E-03	7.27E-03		
Sr-90	6.6872E-01	316.46	632.91	0.00E+00	2.12E+02	4.23E+02		
Tc-99	4.6639E-04	316.46	632.91	0.00E+00	1.48E-01	2.95E-01		
Th-229	2.3727E-11	316.46	632.91	0.00E+00	7.51E-09	1.50E-08		
Th-230	2.7354E-10	316.46	632.91	0.00E+00	8.66E-08	1.73E-07		
Th-232	8.3594E-12	316.46	632.91	0.00E+00	2.65E-09	5.29E-09		
Ti-208	1.6228E-08	316.46	632.91	0.00E+00	5.14E-06	1.03E-05		
U-232	4.3950E-08	316.46	632.91	0.00E+00	1.39E-05	2.78E-05		
U-233	3.3344E-09	316.46	632.91	0.00E+00	1.06E-06	2.11E-06		
U-234	4.0749E-07	316.46	632.91	0.00E+00	1.29E-04	2.58E-04		
U-235	2.7761E-06	316.46	0.00	1.18E-01	1.17E-01	1.18E-01		
U-236	1.8190E-05	316.46	632.91	0.00E+00	5.12E-03	1.02E-02		
U-238	2.8547E-09	316.46	0.00	1.35E-03	1.35E-03	1.35E-03		
Y-90	6.6889E-01	316.46	632.91	0.00E+00	2.12E+02	4.23E+02		
Other Radionuclides					2.88E+02	5.75E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents:	HASTELLOY	SST	
BOL Enrichment %:	U	U	
	93.143	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		316.46	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		632.91	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.12		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: MNR (UALX-HEU) CANADA
SNF ID #: 1064
Fuel Units & Descr: 11 - 18 CURVED PLATES
Heavy Metal Mass: BOL=1.959kg; EOL=1.383kg
ROD Storage Site: SRS

*Fuel decay start date: 2006
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: 20 years

Estimated
Canister usage:
18"x10"
0.31

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	6.6313E-10	545.86	1,091.72	0.00E+00	3.62E-07	7.24E-07	Avg. MeV	
Am-241	2.0060E-03	545.86	1,091.72	0.00E+00	1.09E+00	2.19E+00	0.0150	1.152E+14
Am-242m	4.2429E-07	545.86	1,091.72	0.00E+00	2.32E-04	4.63E-04	0.0250	2.396E+13
Am-243	1.4899E-06	545.86	1,091.72	0.00E+00	8.13E-04	1.63E-03	0.0375	2.090E+13
C-14	5.7135E-09	545.86	1,091.72	0.00E+00	3.12E-06	6.24E-06	0.0575	2.239E+13
Cl-36	1.3124E-32	545.86	1,091.72	0.00E+00	7.16E-30	1.43E-29	0.0850	1.353E+13
Cm-243	1.6433E-07	545.86	1,091.72	0.00E+00	8.98E-05	1.80E-04	0.1250	9.154E+12
Cm-244	2.9330E-05	545.86	1,091.72	0.00E+00	1.60E-02	3.20E-02	0.2250	1.167E+13
Co-60	5.3186E-06	545.86	1,091.72	0.00E+00	2.90E-03	5.81E-03	0.3750	5.081E+12
Cs-134	3.1563E-03	545.86	1,091.72	0.00E+00	1.72E+00	3.45E+00	0.5750	8.289E+13
Cs-135	3.4477E-06	545.86	1,091.72	0.00E+00	1.88E-03	3.76E-03	0.8500	1.401E+12
Cs-137	2.0313E+00	545.86	1,091.72	0.00E+00	1.11E+03	2.22E+03	1.2500	8.001E+11
Eu-154	2.4513E-02	545.86	1,091.72	0.00E+00	1.34E+01	2.68E+01	1.7500	3.673E+10
Eu-155	4.8175E-03	545.86	1,091.72	0.00E+00	2.63E+00	5.26E+00	2.2500	3.222E+06
Fe-55	1.2397E-04	545.86	1,091.72	0.00E+00	6.77E-02	1.35E-01	1.2750	1.821E+06
H-3	4.5697E-03	545.86	1,091.72	0.00E+00	2.49E+00	4.99E+00	3.5000	8.367E+03
I-129	7.5300E-07	545.86	1,091.72	0.00E+00	4.11E-04	8.22E-04	5.0000	4.730E+02
Kr-85	1.0850E-01	545.86	1,091.72	0.00E+00	5.92E+01	1.18E+02	7.0000	5.222E+01
Np-237	9.5561E-06	545.86	1,091.72	0.00E+00	5.22E-03	1.04E-02	11.0000	5.853E+00
Pa-231	2.0359E-09	545.86	1,091.72	0.00E+00	1.11E-06	2.22E-06		
Pb-210	4.9728E-11	545.86	1,091.72	0.00E+00	2.71E-08	5.43E-08		
Pm-147	4.8502E-02	545.86	1,091.72	0.00E+00	2.65E+01	5.30E+01		
Pu-238	1.8254E-02	545.86	1,091.72	0.00E+00	9.96E+00	1.99E+01		
Pu-239	4.2810E-04	545.86	1,091.72	0.00E+00	2.34E-01	4.67E-01		
Pu-240	2.4368E-04	545.86	1,091.72	0.00E+00	1.33E-01	2.66E-01		
Pu-241	3.3415E-02	545.86	1,091.72	0.00E+00	1.82E+01	3.65E+01		
Pu-242	3.6329E-07	545.86	1,091.72	0.00E+00	1.98E-04	3.97E-04		
Ra-226	2.2854E-10	545.86	1,091.72	0.00E+00	1.25E-07	2.50E-07		
Ra-228	1.2426E-14	545.86	1,091.72	0.00E+00	6.78E-12	1.36E-11		
Ru-106	6.3589E-06	545.86	1,091.72	0.00E+00	3.47E-03	6.94E-03		
Se-79	1.2933E-05	545.86	1,091.72	0.00E+00	7.06E-03	1.41E-02		
Sn-126	1.1574E-05	545.86	1,091.72	0.00E+00	6.32E-03	1.26E-02		
Sr-90	1.9248E+00	545.86	1,091.72	0.00E+00	1.05E+03	2.10E+03		
Tc-99	4.2239E-04	545.86	1,091.72	0.00E+00	2.31E-01	4.61E-01		
Th-229	5.0953E-12	545.86	1,091.72	0.00E+00	2.78E-09	5.56E-09		
Th-230	4.1885E-08	545.86	1,091.72	0.00E+00	2.29E-05	4.57E-05		
Th-232	1.9270E-14	545.86	1,091.72	0.00E+00	1.05E-11	2.10E-11		
Th-208	4.6024E-08	545.86	1,091.72	0.00E+00	2.51E-05	5.02E-05		
U-232	1.2582E-07	545.86	1,091.72	0.00E+00	6.87E-05	1.37E-04		
U-233	2.5825E-09	545.86	1,091.72	0.00E+00	1.41E-06	2.82E-06		
U-234	1.8450E-04	545.86	1,091.72	0.00E+00	1.01E-01	2.01E-01		
U-235	-2.7235E-06	545.86	0.00	3.94E-03	2.46E-03	3.94E-03		
U-236	1.5493E-05	545.86	1,091.72	0.00E+00	8.46E-03	1.69E-02		
U-238	-4.2851E-09	545.86	0.00	4.53E-05	4.30E-05	4.53E-05		
Y-90	1.9254E+00	545.86	1,091.72	0.00E+00	1.05E+03	2.10E+03		
Other Radionuclides					1.06E+03	2.11E+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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.11672336	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		545.86	
Bounding:		1,091.72	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.89		
Bounding:	1.77		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: MURR (UALX) COLUMBIA
SNF ID #: 144
Fuel Units & Descr: 972 - 24 CURVED PLATES
Heavy Metal Mass: BOL=807.732kg; EOL=704.311kg
ROD Storage Site: SRS

Fuel decay start date: 2036
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: 5 years

Estimated
Canister usage:
18"x10"
40.50

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	97,941.50	195,883.01	0.00E+00	1.42E-05	2.85E-05	Avg. MeV	
Am-241	1.1190E-03	97,941.50	195,883.01	0.00E+00	1.10E+02	2.19E+02	0.0150	3.779E+16
Am-242m	4.5425E-07	97,941.50	195,883.01	0.00E+00	4.45E-02	8.90E-02	0.0250	8.142E+15
Am-243	1.4921E-08	97,941.50	195,883.01	0.00E+00	1.46E-01	2.92E-01	0.0375	7.513E+15
C-14	5.7244E-09	97,941.50	195,883.01	0.00E+00	5.61E-04	1.12E-03	0.0575	7.387E+15
Cl-36	1.3124E-32	97,941.50	195,883.01	0.00E+00	1.29E-27	2.57E-27	0.0850	4.710E+15
Cm-243	2.3676E-07	97,941.50	195,883.01	0.00E+00	2.32E-02	4.64E-02	0.1250	4.078E+15
Cm-244	5.2042E-05	97,941.50	195,883.01	0.00E+00	5.10E+00	1.02E+01	0.2250	3.992E+15
Co-60	3.8208E-05	97,941.50	195,883.01	0.00E+00	3.74E+00	7.48E+00	0.3750	1.932E+15
Cs-134	4.8693E-01	97,941.50	195,883.01	0.00E+00	4.77E+04	9.54E+04	0.5750	2.854E+16
Cs-135	3.4477E-06	97,941.50	195,883.01	0.00E+00	3.38E-01	6.75E-01	0.8500	3.717E+15
Cs-137	2.8731E+00	97,941.50	195,883.01	0.00E+00	2.81E+05	5.63E+05	1.2500	6.915E+14
Eu-154	8.2053E-02	97,941.50	195,883.01	0.00E+00	8.04E+03	1.61E+04	1.7500	2.900E+13
Eu-155	3.9134E-02	97,941.50	195,883.01	0.00E+00	3.83E+03	7.67E+03	2.2500	6.082E+13
Fe-55	6.7429E-03	97,941.50	195,883.01	0.00E+00	6.60E+02	1.32E+03	2.7500	3.490E+11
H-3	1.0599E-02	97,941.50	195,883.01	0.00E+00	1.04E+03	2.08E+03	3.5000	3.881E+10
I-129	7.5300E-07	97,941.50	195,883.01	0.00E+00	7.37E-02	1.47E-01	5.0000	1.161E+05
Kr-85	2.8596E-01	97,941.50	195,883.01	0.00E+00	2.80E+04	5.60E+04	7.0000	1.294E+04
Np-237	9.5479E-06	97,941.50	195,883.01	0.00E+00	9.35E-01	1.87E+00	11.0000	1.458E+03
Pa-231	8.9297E-10	97,941.50	195,883.01	0.00E+00	8.75E-05	1.75E-04		
Pb-210	3.7609E-12	97,941.50	195,883.01	0.00E+00	3.68E-07	7.37E-07		
Pm-147	2.5452E+00	97,941.50	195,883.01	0.00E+00	2.49E+05	4.99E+05		
Pu-238	2.0550E-02	97,941.50	195,883.01	0.00E+00	2.01E+03	4.03E+03		
Pu-239	4.2638E-04	97,941.50	195,883.01	0.00E+00	4.20E+01	8.39E+01		
Pu-240	2.4401E-04	97,941.50	195,883.01	0.00E+00	2.39E+01	4.78E+01		
Pu-241	6.8764E-02	97,941.50	195,883.01	0.00E+00	6.73E+03	1.35E+04		
Pu-242	3.6329E-07	97,941.50	195,883.01	0.00E+00	3.56E-02	7.12E-02		
Ra-226	3.8045E-11	97,941.50	195,883.01	0.00E+00	3.73E-08	7.45E-08		
Ra-228	2.9902E-15	97,941.50	195,883.01	0.00E+00	2.93E-10	5.86E-10		
Ru-106	1.9055E-01	97,941.50	195,883.01	0.00E+00	1.87E+04	3.73E+04		
Se-79	1.2936E-05	97,941.50	195,883.01	0.00E+00	1.27E+00	2.53E+00		
Sn-126	1.1574E-05	97,941.50	195,883.01	0.00E+00	1.13E+00	2.27E+00		
Sr-90	2.7505E+00	97,941.50	195,883.01	0.00E+00	2.69E+05	5.39E+05		
Tc-99	4.2239E-04	97,941.50	195,883.01	0.00E+00	4.14E+01	8.27E+01		
Th-229	1.8848E-12	97,941.50	195,883.01	0.00E+00	1.85E-07	3.69E-07		
Th-230	1.7042E-08	97,941.50	195,883.01	0.00E+00	1.67E-03	3.34E-03		
Th-232	7.8132E-15	97,941.50	195,883.01	0.00E+00	7.65E-10	1.53E-09		
Th-208	4.4063E-08	97,941.50	195,883.01	0.00E+00	4.32E-03	8.63E-03		
U-232	1.3151E-07	97,941.50	195,883.01	0.00E+00	1.29E-02	2.58E-02		
U-233	1.9564E-09	97,941.50	195,883.01	0.00E+00	1.92E-04	3.83E-04		
U-234	1.8371E-04	97,941.50	195,883.01	0.00E+00	1.80E+01	3.60E+01		
U-235	-2.7235E-06	97,941.50	0.00	1.63E+00	1.36E+00	1.63E+00		
U-236	1.5493E-05	97,941.50	195,883.01	0.00E+00	1.52E+00	3.03E+00		
U-238	-4.2851E-09	97,941.50	0.00	1.83E-02	1.79E-02	1.83E-02		
Y-90	2.7505E+00	97,941.50	195,883.01	0.00E+00	2.69E+05	5.39E+05		
Other Radionuclides					5.04E+05	1.01E+06		

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:	ALLUM	ALLUM	
BOL Enrichment %:	U	U	
	93.26113117	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimates:
	From SFD	Estimated	
Nominal:		97,941.50	
Bounding:		195,883.01	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.39		
Bounding:	0.77		1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MURR (ULAX HEU) COLUMBIA
 SNF ID #: 143
 Fuel Units & Descr: 312 - 24 CURVED PLATES
 Heavy Metal Mass: BOL=259.022kg; EOL=213.065kg
 ROD Storage Site: SRS

*Fuel decay start date: 1990
 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"
 13.00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	43,522.74	87,045.48	0.00E+00	8.73E-05	1.75E-04	Avg. MeV	
Am-241	2.5251E-03	43,522.74	87,045.48	0.00E+00	1.10E+02	2.20E+02	0.0150	8.411E+15
Am-242m	3.9624E-07	43,522.74	87,045.48	0.00E+00	1.72E-02	3.45E-02	0.0250	1.331E+15
Am-243	1.4880E-06	43,522.74	87,045.48	0.00E+00	6.48E-02	1.30E-01	0.0375	1.157E+15
C-14	5.7053E-09	43,522.74	87,045.48	0.00E+00	2.48E-04	4.97E-04	0.0675	1.245E+15
Cl-36	1.3124E-32	43,522.74	87,045.48	0.00E+00	5.71E-28	1.14E-27	0.0850	7.504E+14
Cm-243	1.1419E-07	43,522.74	87,045.48	0.00E+00	4.97E-03	9.94E-03	0.1250	4.957E+14
Cm-244	1.6522E-05	43,522.74	87,045.48	0.00E+00	7.19E-01	1.44E+00	0.2250	6.479E+14
Co-60	7.4047E-07	43,522.74	87,045.48	0.00E+00	3.22E-02	6.45E-02	0.3750	2.819E+14
Cs-134	2.0455E-05	43,522.74	87,045.48	0.00E+00	8.90E-01	1.78E+00	0.5750	4.858E+15
Cs-135	3.4477E-06	43,522.74	87,045.48	0.00E+00	1.50E-01	3.00E-01	0.8500	5.890E+13
Cs-137	1.4365E+00	43,522.74	87,045.48	0.00E+00	6.25E+04	1.25E+05	1.2500	2.752E+13
Eu-154	7.3230E-03	43,522.74	87,045.48	0.00E+00	3.19E+02	6.37E+02	1.7500	1.549E+12
Eu-155	5.9259E-04	43,522.74	87,045.48	0.00E+00	2.58E+01	5.16E+01	2.2500	1.295E+08
Fe-55	2.2791E-06	43,522.74	87,045.48	0.00E+00	9.92E-02	1.98E-01	2.7500	1.236E+08
H-3	1.9698E-03	43,522.74	87,045.48	0.00E+00	8.57E+01	1.71E+02	3.5000	7.163E+04
I-129	7.5300E-07	43,522.74	87,045.48	0.00E+00	3.28E-02	6.55E-02	5.0000	2.827E+04
Kr-85	4.1176E-02	43,522.74	87,045.48	0.00E+00	1.79E+03	3.58E+03	7.0000	3.203E+03
Np-237	9.5752E-06	43,522.74	87,045.48	0.00E+00	4.17E-01	8.33E-01	11.0000	3.571E+02
Pa-231	3.9379E-09	43,522.74	87,045.48	0.00E+00	1.71E-04	3.43E-04		
Pb-210	3.3115E-10	43,522.74	87,045.48	0.00E+00	1.44E-05	2.88E-05		
Pm-147	9.2402E-04	43,522.74	87,045.48	0.00E+00	4.02E+01	8.04E+01		
Pu-238	1.6217E-02	43,522.74	87,045.48	0.00E+00	7.06E+02	1.41E+03		
Pu-239	4.2810E-04	43,522.74	87,045.48	0.00E+00	1.86E+01	3.73E+01		
Pu-240	2.4333E-04	43,522.74	87,045.48	0.00E+00	1.06E+01	2.12E+01		
Pu-241	1.6242E-02	43,522.74	87,045.48	0.00E+00	7.07E+02	1.41E+03		
Pu-242	3.6329E-07	43,522.74	87,045.48	0.00E+00	1.58E-02	3.16E-02		
Ra-226	9.0114E-10	43,522.74	87,045.48	0.00E+00	3.92E-05	7.84E-05		
Ra-228	3.1019E-14	43,522.74	87,045.48	0.00E+00	1.35E-09	2.70E-09		
Ru-106	2.1225E-10	43,522.74	87,045.48	0.00E+00	9.24E-06	1.85E-05		
Se-79	1.2930E-05	43,522.74	87,045.48	0.00E+00	5.83E-01	1.13E+00		
Sn-126	1.1571E-05	43,522.74	87,045.48	0.00E+00	5.04E-01	1.01E+00		
Sr-90	1.3472E+00	43,522.74	87,045.48	0.00E+00	5.86E+04	1.17E+05		
Tc-99	4.2239E-04	43,522.74	87,045.48	0.00E+00	1.84E+01	3.68E+01		
Th-229	1.2407E-11	43,522.74	87,045.48	0.00E+00	5.40E-07	1.08E-06		
Th-230	8.3497E-08	43,522.74	87,045.48	0.00E+00	3.63E-03	7.27E-03		
Th-232	3.6371E-14	43,522.74	87,045.48	0.00E+00	1.67E-09	3.34E-09		
Ti-208	4.0414E-08	43,522.74	87,045.48	0.00E+00	1.76E-03	3.52E-03		
U-232	1.0948E-07	43,522.74	87,045.48	0.00E+00	4.76E-03	9.53E-03		
U-233	3.6275E-09	43,522.74	87,045.48	0.00E+00	1.58E-04	3.16E-04		
U-234	1.8562E-04	43,522.74	87,045.48	0.00E+00	8.08E+00	1.62E+01		
U-235	2.7235E-06	43,522.74	0.00	5.21E-01	4.03E-01	5.21E-01		
U-236	1.5493E-05	43,522.74	87,045.48	0.00E+00	6.74E-01	1.35E+00		
U-238	4.2851E-09	43,522.74	0.00	5.97E-03	5.79E-03	5.97E-03		
U-90	1.3475E+00	43,522.74	87,045.48	0.00E+00	5.86E+04	1.17E+05		
Other Radionuclides					5.96E+04	1.19E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.137	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		43,522.74
Bounding:		87,045.48

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:	0.53	
Bounding:	1.07	

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: N.S. SAVANNAH (UO2)
SNF ID #: 854
Fuel Units & Descr: 12 - UNKNOWN
Heavy Metal Mass: BOL = ; EOL = 21.09kg
ROD Storage Site: NEEL

Fuel decay start date: 1983
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: 65 years

Estimated
Canister usage:
18"x10"
12.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/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	1.2581E-09	31.68	31.68	0.00E+00	3.99E-08	3.99E-08	Avg. MeV	
Am-241	1.4781E-01	31.68	31.68	0.00E+00	4.68E+00	4.68E+00	0.0150	8.578E+11
Am-242m	2.5032E-04	31.68	31.68	0.00E+00	7.93E-03	7.93E-03	0.0250	1.704E+11
Am-243	6.2387E-04	31.68	31.68	0.00E+00	1.98E-02	1.98E-02	0.0375	1.593E+11
C-14	4.7739E-05	31.68	31.68	0.00E+00	1.51E-03	1.51E-03	0.0575	2.186E+11
Cl-38	8.0297E-07	31.68	31.68	0.00E+00	2.54E-05	2.54E-05	0.0850	9.324E+10
Cm-243	1.2099E-04	31.68	31.68	0.00E+00	3.83E-03	3.83E-03	0.1250	6.083E+10
Cm-244	1.5560E-02	31.68	31.68	0.00E+00	4.93E-01	4.93E-01	0.2250	7.932E+10
Co-60	4.9580E-05	31.68	31.68	0.00E+00	1.57E-03	1.57E-03	0.3750	3.432E+10
Cs-134	1.7022E-09	31.68	31.68	0.00E+00	5.39E-08	5.39E-08	0.5750	8.169E+11
Cs-135	1.4433E-05	31.68	31.68	0.00E+00	4.57E-04	4.57E-04	0.8500	6.549E+09
Cs-137	6.9929E-01	31.68	31.68	0.00E+00	2.22E+01	2.22E+01	1.2500	3.062E+09
Eu-154	1.8023E-09	31.68	31.68	0.00E+00	5.71E-02	5.71E-02	1.7500	1.761E+08
Eu-155	2.6793E-05	31.68	31.68	0.00E+00	8.49E-04	8.49E-04	2.2500	3.109E+04
Fe-55	1.4580E-08	31.68	31.68	0.00E+00	4.62E-07	4.62E-07	2.7500	1.543E+06
H-3	3.8566E-03	31.68	31.68	0.00E+00	1.22E-01	1.22E-01	3.5000	7.694E+03
I-129	9.8288E-07	31.68	31.68	0.00E+00	3.11E-05	3.11E-05	5.0000	3.286E+03
Kr-85	4.0617E-03	31.68	31.68	0.00E+00	1.29E-01	1.29E-01	7.0000	3.783E+02
Np-237	1.2645E-05	31.68	31.68	0.00E+00	4.01E-04	4.01E-04	11.0000	4.342E+01
Pa-231	1.6376E-09	31.68	31.68	0.00E+00	5.19E-08	5.19E-08		
Pb-210	2.8795E-10	31.68	31.68	0.00E+00	9.12E-09	9.12E-09		
Pm-147	1.3264E-07	31.68	31.68	0.00E+00	4.20E-08	4.20E-08		
Pu-238	5.8882E-02	31.68	31.68	0.00E+00	1.87E+00	1.87E+00		
Pu-239	1.1613E-02	31.68	31.68	0.00E+00	3.68E-01	3.68E-01		
Pu-240	1.5142E-02	31.68	31.68	0.00E+00	4.80E-01	4.80E-01		
Pu-241	2.1269E-01	31.68	31.68	0.00E+00	6.74E+00	6.74E+00		
Pu-242	6.4280E-05	31.68	31.68	0.00E+00	2.04E-03	2.04E-03		
Ra-226	5.8689E-10	31.68	31.68	0.00E+00	1.86E-08	1.86E-08		
Ra-228	5.3036E-12	31.68	31.68	0.00E+00	1.68E-10	1.68E-10		
Ru-106	6.8136E-19	31.68	31.68	0.00E+00	2.16E-17	2.16E-17		
Se-79	1.2372E-05	31.68	31.68	0.00E+00	3.92E-04	3.92E-04		
Sn-126	2.5194E-05	31.68	31.68	0.00E+00	7.98E-04	7.98E-04		
Sr-90	4.4913E-01	31.68	31.68	0.00E+00	1.42E+01	1.42E+01		
Tc-99	3.9357E-04	31.68	31.68	0.00E+00	1.25E-02	1.25E-02		
Th-229	1.9331E-10	31.68	31.68	0.00E+00	6.13E-09	6.13E-09		
Th-230	3.5223E-08	31.68	31.68	0.00E+00	1.12E-06	1.12E-06		
Th-232	5.3085E-12	31.68	31.68	0.00E+00	1.68E-10	1.68E-10		
Ti-208	1.3102E-07	31.68	31.68	0.00E+00	4.15E-06	4.15E-06		
U-232	3.5497E-07	31.68	31.68	0.00E+00	1.12E-05	1.12E-05		
U-233	2.6647E-08	31.68	31.68	0.00E+00	8.44E-07	8.44E-07		
U-234	5.5023E-05	31.68	31.68	0.00E+00	1.74E-03	1.74E-03		
U-235	-1.4485E-06	31.68	0.00	1.46E-03	1.41E-03	1.46E-03		
U-236	7.5969E-06	31.68	31.68	0.00E+00	2.41E-04	2.41E-04		
U-238	-2.6129E-07	31.68	0.00	6.87E-03	6.86E-03	6.87E-03		
Y-90	4.4913E-01	31.68	31.68	0.00E+00	1.42E+01	1.42E+01		
Other Radionuclides					2.15E+01	2.15E+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:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		31.68	
Bounding:		31.68	Nominal burnup set equal to bounding burnup Bounding burnup taken from SFD and converted to MWd using BOL=21.123kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.04		
Bounding:	0.04		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: NEREIDE (FRANCE)
SNF ID #: 751
Fuel Units & Descr: 46 - 12 CURVED PLATES
Heavy Metal Mass: BOL= ; EOL=35.42kg
ROD Storage Site: SRS

Fuel decay start date: 1982
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"
1.92

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	21.27	42.53	0.00E+00	4.27E-08	8.54E-08	Avg. MeV	
Am-241	2.5251E-03	21.27	42.53	0.00E+00	5.37E-02	1.07E-01	0.0150	3.134E+12
Am-242m	3.9624E-07	21.27	42.53	0.00E+00	8.43E-06	1.69E-05	0.0250	6.505E+11
Am-243	1.4880E-06	21.27	42.53	0.00E+00	3.16E-05	6.33E-05	0.0375	5.854E+11
C-14	5.7053E-09	21.27	42.53	0.00E+00	1.21E-07	2.43E-07	0.0675	6.086E+11
Ci-36	1.3124E-32	21.27	42.53	0.00E+00	2.79E-31	5.58E-31	0.0850	3.669E+11
Cm-243	1.1419E-07	21.27	42.53	0.00E+00	2.43E-06	4.86E-06	0.1250	2.426E+11
Cm-244	1.6522E-05	21.27	42.53	0.00E+00	3.51E-04	7.03E-04	0.2250	3.180E+11
Co-60	7.4047E-07	21.27	42.53	0.00E+00	1.57E-05	3.15E-05	0.3750	1.377E+11
Cs-134	2.0455E-05	21.27	42.53	0.00E+00	4.35E-04	8.70E-04	0.5750	2.276E+12
Cs-135	3.4477E-06	21.27	42.53	0.00E+00	7.33E-05	1.47E-04	0.8500	2.780E+10
Cs-137	1.4365E+00	21.27	42.53	0.00E+00	3.05E+01	6.11E+01	1.2500	1.345E+10
Eu-154	7.3230E-03	21.27	42.53	0.00E+00	1.56E-01	3.11E-01	1.7500	7.568E+08
Eu-155	5.9259E-04	21.27	42.53	0.00E+00	1.26E-02	2.52E-02	2.2500	6.329E+04
Fe-55	2.2791E-06	21.27	42.53	0.00E+00	4.85E-05	9.69E-05	2.7500	8.040E+04
H-3	1.9698E-03	21.27	42.53	0.00E+00	4.19E-02	8.38E-02	3.5000	4.116E+01
I-129	7.5300E-07	21.27	42.53	0.00E+00	1.60E-05	3.20E-05	5.0000	1.689E+01
Kr-85	4.1176E-02	21.27	42.53	0.00E+00	6.78E-01	1.35E+00	7.0000	1.856E+00
Np-237	9.5752E-06	21.27	42.53	0.00E+00	2.04E-04	4.07E-04	11.0000	2.075E-01
Pa-231	3.9379E-09	21.27	42.53	0.00E+00	8.37E-08	1.67E-07		
Pb-210	3.3115E-10	21.27	42.53	0.00E+00	7.04E-09	1.41E-08		
Pm-147	9.2402E-04	21.27	42.53	0.00E+00	1.96E-02	3.93E-02		
Pu-238	1.6217E-02	21.27	42.53	0.00E+00	3.45E-01	6.90E-01		
Pu-239	4.2810E-04	21.27	42.53	0.00E+00	9.10E-03	1.82E-02		
Pu-240	2.4333E-04	21.27	42.53	0.00E+00	5.17E-03	1.03E-02		
Pu-241	1.6242E-02	21.27	42.53	0.00E+00	3.45E-01	6.91E-01		
Pu-242	3.6329E-07	21.27	42.53	0.00E+00	7.73E-06	1.55E-05		
Ra-226	9.0114E-10	21.27	42.53	0.00E+00	1.92E-08	3.83E-08		
Ra-228	3.1019E-14	21.27	42.53	0.00E+00	6.60E-13	1.32E-12		
Ru-106	2.1225E-10	21.27	42.53	0.00E+00	4.51E-09	9.03E-09		
Se-79	1.2930E-05	21.27	42.53	0.00E+00	2.76E-04	5.50E-04		
Sn-126	1.1571E-05	21.27	42.53	0.00E+00	2.46E-04	4.92E-04		
Sr-90	1.3472E+00	21.27	42.53	0.00E+00	2.86E+01	5.73E+01		
Tc-99	4.2239E-04	21.27	42.53	0.00E+00	6.98E-03	1.40E-02		
Th-229	1.2407E-11	21.27	42.53	0.00E+00	2.64E-10	5.28E-10		
Th-230	8.3497E-08	21.27	42.53	0.00E+00	1.78E-06	3.55E-06		
Th-232	3.8371E-14	21.27	42.53	0.00E+00	8.16E-13	1.63E-12		
Ti-208	4.0414E-08	21.27	42.53	0.00E+00	8.59E-07	1.72E-06		
U-232	1.0948E-07	21.27	42.53	0.00E+00	2.33E-06	4.66E-06		
U-233	3.6275E-09	21.27	42.53	0.00E+00	7.71E-08	1.54E-07		
U-234	1.8562E-04	21.27	42.53	0.00E+00	3.95E-03	7.89E-03		
U-235	-2.7235E-06	21.27	0.00	7.06E-02	7.06E-02	7.06E-02		
U-236	1.5493E-05	21.27	42.53	0.00E+00	3.29E-04	6.59E-04		
U-238	-4.2851E-09	21.27	0.00	7.14E-04	7.14E-04	7.14E-04		
Y-90	1.3475E+00	21.27	42.53	0.00E+00	2.87E+01	5.73E+01		
Other Radionuclides					2.91E+01	5.82E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.58E-01	7.14E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches on all parameters except enrichment (unknown).
BOL HM Constituents:	U	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		21.27	Nominal burnup taken from SFD and converted to MWd using BOL=35.442kg
Bounding:		42.53	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.00		0.96
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: NIST
SNF ID #: 154
Fuel Units & Descr: 980 - 17 CURVED PLATES
Heavy Metal Mass: BOL=367.5kg; EOL=159.74kg
ROD Storage Site: SRS

*Fuel decay start date: 1997
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: 25 years

Estimated
Canister usage:
18"x10"
27.22

II. Estimates	m	X ₀	X ₀	b	Y ₀	Y ₀	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	5.4520E-10	191,368.36	338,505.35	0.00E+00	1.04E-04	1.85E-04	Avg. MeV	
Am-241	9.2284E-03	191,368.36	338,505.35	0.00E+00	1.77E+03	3.12E+03	0.0150	3.173E+16
Am-242m	1.3390E-06	191,368.36	338,505.35	0.00E+00	2.56E-01	4.53E-01	0.0250	6.532E+15
Am-243	3.7084E-05	191,368.36	338,505.35	0.00E+00	7.10E+00	1.26E+01	0.0375	5.767E+15
C-14	2.6452E-08	191,368.36	338,505.35	0.00E+00	5.06E-03	8.95E-03	0.0575	6.151E+15
Cf-252	4.4441E-31	191,368.36	338,505.35	0.00E+00	8.50E-26	1.50E-25	0.0850	3.702E+15
Cm-243	5.0498E-06	191,368.36	338,505.35	0.00E+00	9.68E-01	1.71E+00	0.1250	2.563E+15
Cm-244	3.8451E-03	191,368.36	338,505.35	0.00E+00	7.36E+02	1.30E+03	0.2250	3.196E+15
Co-60	2.5225E-05	191,368.36	338,505.35	0.00E+00	4.83E+00	8.54E+00	0.3750	1.383E+15
Cs-134	1.9830E-03	191,368.36	338,505.35	0.00E+00	3.79E+02	6.71E+02	0.5750	2.294E+16
Cs-135	4.2564E-06	191,368.36	338,505.35	0.00E+00	8.15E-01	1.44E+00	0.8500	4.518E+14
Cs-137	1.8141E+00	191,368.36	338,505.35	0.00E+00	3.47E+05	6.14E+05	1.2500	3.049E+14
Eu-154	3.4733E-02	191,368.36	338,505.35	0.00E+00	6.65E+03	1.18E+04	1.7500	1.262E+13
Eu-155	7.1081E-03	191,368.36	338,505.35	0.00E+00	1.36E+03	2.41E+03	2.2500	6.803E+08
Fe-55	3.5790E-04	191,368.36	338,505.35	0.00E+00	6.85E+01	1.21E+02	2.7500	5.848E+08
H-3	3.4945E-03	191,368.36	338,505.35	0.00E+00	6.69E+02	1.18E+03	3.5000	2.008E+07
I-129	6.6403E-07	191,368.36	338,505.35	0.00E+00	1.27E-01	2.25E-01	5.0000	8.511E+08
Kr-85	7.8250E-02	191,368.36	338,505.35	0.00E+00	1.50E+04	2.65E+04	7.0000	9.782E+05
Np-237	3.1567E-05	191,368.36	338,505.35	0.00E+00	6.04E+00	1.07E+01	11.0000	1.118E+06
Pa-231	1.3372E-09	191,368.36	338,505.35	0.00E+00	2.56E-04	4.53E-04		
Pb-210	3.0644E-11	191,368.36	338,505.35	0.00E+00	5.86E-06	1.04E-05		
Pm-147	6.5188E-03	191,368.36	338,505.35	0.00E+00	1.25E+03	2.21E+03		
Pu-238	1.4769E-01	191,368.36	338,505.35	0.00E+00	2.83E+04	5.00E+04		
Pu-239	6.9502E-04	191,368.36	338,505.35	0.00E+00	1.33E+02	2.35E+02		
Pu-240	3.7928E-04	191,368.36	338,505.35	0.00E+00	7.26E+01	1.28E+02		
Pu-241	1.0565E-01	191,368.36	338,505.35	0.00E+00	2.02E+04	3.58E+04		
Pu-242	3.0911E-06	191,368.36	338,505.35	0.00E+00	5.92E-01	1.05E+00		
Ra-226	1.1081E-10	191,368.36	338,505.35	0.00E+00	2.12E-05	3.75E-05		
Ra-228	2.1185E-14	191,368.36	338,505.35	0.00E+00	4.05E-09	7.17E-09		
Ru-106	2.3621E-07	191,368.36	338,505.35	0.00E+00	4.52E-02	8.00E-02		
Se-79	1.2339E-05	191,368.36	338,505.35	0.00E+00	2.36E+00	4.18E+00		
Sn-126	1.0194E-05	191,368.36	338,505.35	0.00E+00	1.95E+00	3.45E+00		
Sr-90	1.6932E+00	191,368.36	338,505.35	0.00E+00	3.24E+05	5.73E+05		
Tc-99	3.8056E-04	191,368.36	338,505.35	0.00E+00	7.28E+01	1.29E+02		
Th-229	9.1252E-12	191,368.36	338,505.35	0.00E+00	1.75E-06	3.09E-06		
Th-230	1.5407E-08	191,368.36	338,505.35	0.00E+00	2.95E-03	5.22E-03		
Th-232	2.8937E-14	191,368.36	338,505.35	0.00E+00	5.54E-09	9.80E-09		
Ti-206	4.7272E-08	191,368.36	338,505.35	0.00E+00	9.05E-03	1.60E-02		
U-232	1.2855E-07	191,368.36	338,505.35	0.00E+00	2.46E-02	4.35E-02		
U-233	5.1470E-09	191,368.36	338,505.35	0.00E+00	9.85E-04	1.74E-03		
U-234	5.6069E-05	191,368.36	338,505.35	0.00E+00	1.07E+01	1.90E+01		
U-235	2.8661E-06	191,368.36	0.00	7.41E-01	1.93E-01	7.41E-01		
U-238	1.6701E-05	191,368.36	338,505.35	0.00E+00	3.20E+00	5.65E+00		
U-238	-9.4194E-09	191,368.36	0.00	8.23E-03	8.43E-03	8.23E-03		
Y-90	1.6932E+00	191,368.36	338,505.35	0.00E+00	3.24E+05	5.73E+05		
Other Radionuclides					3.32E+05	5.88E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	HEAVY WATER	HEAVY WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	93.3333333	40 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:	191,368.36	191,368.36	
	190,365.00	338,505.35	

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	1.19	1.78	
	2.11	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: NIST (U308 HEU)
 SNF ID #: 752
 Fuel Units & Descr: 420 - 17 CURVED PLATES
 Heavy Metal Mass: BOL=72.156kg; EOL=33.894kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2030
 Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
²Template Burnup (MWd): 164.6
 Template BOL Heavy Metal Mass (MT): 0.000377
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 11.67

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	5.4520E-10	35,243.24	66,463.11	0.00E+00	1.92E-05	3.62E-05	Avg. MeV	
Am-241	9.2284E-03	35,243.24	66,463.11	0.00E+00	3.25E+02	6.13E+02	0.0150	6.231E+15
Am-242m	1.3390E-06	35,243.24	66,463.11	0.00E+00	4.72E-02	8.90E-02	0.0250	1.282E+15
Am-243	3.7084E-05	35,243.24	66,463.11	0.00E+00	1.31E+00	2.46E+00	0.0375	1.132E+15
C-14	2.6452E-08	35,243.24	66,463.11	0.00E+00	9.32E-04	1.76E-03	0.0675	1.208E+15
Cl-36	4.4441E-31	35,243.24	66,463.11	0.00E+00	1.57E-26	2.95E-26	0.0850	7.269E+14
Cm-243	5.0498E-06	35,243.24	66,463.11	0.00E+00	1.78E-01	3.36E-01	0.1250	5.044E+14
Cm-244	3.8451E-03	35,243.24	66,463.11	0.00E+00	1.36E+02	2.56E+02	0.2250	6.274E+14
Co-60	2.5225E-05	35,243.24	66,463.11	0.00E+00	8.89E-01	1.88E+00	0.3750	2.716E+14
Cs-134	1.9830E-03	35,243.24	66,463.11	0.00E+00	6.99E+01	1.32E+02	0.5750	4.504E+15
Cs-135	4.2564E-06	35,243.24	66,463.11	0.00E+00	1.50E-01	2.83E-01	0.8500	8.871E+13
Cs-137	1.8141E+00	35,243.24	66,463.11	0.00E+00	6.39E+04	1.21E+05	1.2500	5.987E+13
Eu-154	3.4733E-02	35,243.24	66,463.11	0.00E+00	1.22E+03	2.31E+03	1.7500	2.478E+12
Eu-155	7.1081E-03	35,243.24	66,463.11	0.00E+00	2.51E+02	4.72E+02	2.2500	1.336E+08
Fe-55	3.5790E-04	35,243.24	66,463.11	0.00E+00	1.26E+01	2.38E+01	2.7500	1.148E+08
H-3	3.4945E-03	35,243.24	66,463.11	0.00E+00	1.23E+02	2.32E+02	3.5000	3.942E+06
I-129	6.8403E-07	35,243.24	66,463.11	0.00E+00	2.34E-02	4.41E-02	5.0000	1.871E+06
Kr-85	7.8250E-02	35,243.24	66,463.11	0.00E+00	2.76E+03	5.20E+03	7.0000	1.917E+05
Np-237	3.1567E-05	35,243.24	66,463.11	0.00E+00	1.11E+00	2.10E+00	11.0000	2.195E+04
Pa-231	1.3372E-09	35,243.24	66,463.11	0.00E+00	4.71E-05	8.89E-05		
Pb-210	3.0644E-11	35,243.24	66,463.11	0.00E+00	1.08E-06	2.04E-06		
Pm-147	6.5188E-03	35,243.24	66,463.11	0.00E+00	2.30E+02	4.33E+02		
Pu-238	1.4769E-01	35,243.24	66,463.11	0.00E+00	5.21E+03	9.82E+03		
Pu-239	6.9502E-04	35,243.24	66,463.11	0.00E+00	2.45E+01	4.82E+01		
Pu-240	3.7928E-04	35,243.24	66,463.11	0.00E+00	1.34E+01	2.52E+01		
Pu-241	1.0565E-01	35,243.24	66,463.11	0.00E+00	3.72E+03	7.02E+03		
Pu-242	3.0911E-06	35,243.24	66,463.11	0.00E+00	1.09E-01	2.05E-01		
Ra-226	1.1081E-10	35,243.24	66,463.11	0.00E+00	3.91E-06	7.37E-06		
Ra-228	2.1185E-14	35,243.24	66,463.11	0.00E+00	7.47E-10	1.41E-09		
Ru-106	2.3621E-07	35,243.24	66,463.11	0.00E+00	8.32E-03	1.57E-02		
Se-79	1.2339E-05	35,243.24	66,463.11	0.00E+00	4.35E-01	8.20E-01		
Sn-126	1.0194E-05	35,243.24	66,463.11	0.00E+00	3.59E-01	6.78E-01		
Sr-90	1.6932E+00	35,243.24	66,463.11	0.00E+00	5.97E+04	1.13E+05		
Tc-99	3.8056E-04	35,243.24	66,463.11	0.00E+00	1.34E+01	2.53E+01		
Th-229	9.1252E-12	35,243.24	66,463.11	0.00E+00	3.22E-07	6.06E-07		
Th-230	1.5407E-08	35,243.24	66,463.11	0.00E+00	5.43E-04	1.02E-03		
Th-232	2.8937E-14	35,243.24	66,463.11	0.00E+00	1.02E-09	1.92E-09		
Th-208	4.7272E-08	35,243.24	66,463.11	0.00E+00	1.67E-03	3.14E-03		
U-232	1.2855E-07	35,243.24	66,463.11	0.00E+00	4.53E-03	8.54E-03		
U-233	5.1470E-09	35,243.24	66,463.11	0.00E+00	1.81E-04	3.42E-04		
U-234	5.6069E-05	35,243.24	66,463.11	0.00E+00	1.98E+00	3.73E+00		
U-235	-2.8661E-06	35,243.24	0.00	1.45E-01	4.43E-02	1.45E-01		
U-236	1.6701E-05	35,243.24	66,463.11	0.00E+00	5.89E-01	1.11E+00		
U-238	-9.4194E-09	35,243.24	0.00	1.86E-03	1.32E-03	1.86E-03		
Y-90	1.6932E+00	35,243.24	66,463.11	0.00E+00	5.97E+04	1.13E+05		
Other Radionuclides					6.12E+04	1.15E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL NM Constituents:	U	U	
BOL Enrichment %:	93.17430199	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:	43.29	35,243.24	
Bounding:		66,463.11	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL NM/Given EOL NM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	1.12	814.05	
Bounding:	2.11		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

Template Information

Fuel Name: OHIO STATE (HEU)

Fuel Units & Descr: 24 - 18 FLAT PLATES
Heavy Metal Mass: BOL=3.41kg; EOL=3.41kg

RCD Storage Size: 500

1995

Template: ATR (Light Water, Alum., 80 to 100%, U)

2. Template Burnup (MWd):

372

Heavy Metal Mass (HMT):

16689

[illegible]

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II. Estimates		temperature decay time, 30 years						Gamma Sources		
	m	%	%	b	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Y ₆	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWD From Template	Nominal Fuel Burnup (MW/g) ^a	Bounding Fuel Burnup (MW/g) ^a						Avg. MeV	
Ac-227	2.0069E-09	64.59	129.19	0.00E+00	1.30E-07	2.59E-07			0.0150	9.515E+12
Am-241	2.5251E-03	64.59	129.19	0.00E+00	1.03E-01	3.26E-01			0.0250	1.976E+12
Am-242m	3.9824E-07	64.59	129.19	0.00E+00	2.56E-05	5.12E-05			0.0376	1.717E+12
Am-243	1.4890E-06	64.59	129.19	0.00E+00	9.61E-06	1.92E-04			0.0576	1.848E+12
C-14	5.7053E-09	64.59	129.19	0.00E+00	3.69E-07	7.37E-07			0.0850	1.114E+12
Cl-36	1.3124E-32	64.59	129.19	0.00E+00	8.48E-31	1.70E-30			0.1250	7.357E+11
Cm-243	1.1419E-07	64.59	129.19	0.00E+00	7.38E-06	1.48E-05			0.2250	9.616E+11
Cm-244	1.6522E-05	64.59	129.19	0.00E+00	1.07E-03	2.13E-03			0.3750	4.103E+11
Co-60	7.4047E-07	64.59	129.19	0.00E+00	4.78E-06	9.57E-06			0.5750	6.913E+12
Cs-134	2.0455E-05	64.59	129.19	0.00E+00	1.32E-03	2.64E-03			0.8500	8.445E+10
Cs-135	3.4477E-06	64.59	129.19	0.00E+00	2.23E-04	4.45E-04			1.2500	4.094E+10
Cs-137	1.4365E+00	64.59	129.19	0.00E+00	9.28E+01	1.86E+02			1.7500	2.299E+09
Eu-154	7.3230E-03	64.59	129.19	0.00E+00	4.73E-01	9.46E-01			2.2500	1.922E+05
Eu-155	5.9259E-04	64.59	129.19	0.00E+00	3.83E-02	7.66E-02			2.7500	1.834E+05
Fe-55	2.2791E-06	64.59	129.19	0.00E+00	1.47E-04	2.94E-04			3.5000	1.069E+02
H-3	1.9698E-03	64.59	129.19	0.00E+00	1.27E-01	2.54E-01			5.0000	4.368E+01
I-129	7.5300E-07	64.59	129.19	0.00E+00	4.86E-05	9.73E-05			11.0000	5.331E-01
Kr-85	4.1170E-02	64.59	129.19	0.00E+00	2.66E+00	5.32E+00			7.0000	4.791E+00
Np-237	9.5792E-06	64.59	129.19	0.00E+00	6.19E-04	1.24E-03			11.0000	5.331E-01

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.05E+00	2.16E+00
Total	Total

Y-90	1.3475E+00	64.59	129.19	0.00E+00	8.70E+01	1.74E+02
Other Radionuclides					8.84E+01	1.77E+02

Template Selection Summary		Basis for Parameter Differences:	
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Claddings:	ALUM	ALUM	
BOL HMI Constituents:	U	U	
BOL Enrichment %:	93.25425219	60 to 100	

Burnup Summary (MWd) ¹		Basis for burnup used in estimate:	
	From SFD	Estimated	
Nominal:		64.59	
Sounding:		128.19	

¹ Nominal burnup assumed to be 2% of BOL heavy metal mass.
² Sounding burnup assumed to be twice nominal burnup.

Checks		Estimated Burnup/ Given Burnup	Estimated EOL HMC/Given EOL HMC
Nominal:	Burnup Multiplier	0.06	
Bounding:		0.12	0.98

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OHIO STATE (LEU)
 SNF ID #: 158
 Fuel Units & Descr: 30 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=26.151kg, EOL=26.151kg
 ROD Storage Site: SRS

*Fuel decay start date: 2035
 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: 5 years

Estimated
 Canister usage:
 18"x10"
 1.25

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) 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	1.4545E-10	495.31	990.62	0.00E+00	7.20E-08	1.44E-07	Avg. MeV	
Am-241	1.1190E-03	495.31	990.62	0.00E+00	5.54E-01	1.11E+00	0.0150	1.911E+14
Am-242m	4.5425E-07	495.31	990.62	0.00E+00	2.25E-04	4.50E-04	0.0250	4.117E+13
Am-243	1.4921E-06	495.31	990.62	0.00E+00	7.39E-04	1.48E-03	0.0375	3.799E+13
C-14	5.7244E-09	495.31	990.62	0.00E+00	2.84E-06	5.67E-06	0.0575	3.736E+13
Cl-36	1.3124E-32	495.31	990.62	0.00E+00	6.50E-30	1.30E-29	0.0650	2.362E+13
Cm-243	2.3676E-07	495.31	990.62	0.00E+00	1.17E-04	2.35E-04	0.1250	2.063E+13
Cm-244	5.2042E-05	495.31	990.62	0.00E+00	2.58E-02	5.16E-02	0.2250	2.019E+13
Co-60	3.8208E-05	495.31	990.62	0.00E+00	1.89E-02	3.78E-02	0.3750	9.771E+12
Cs-134	4.8693E-01	495.31	990.62	0.00E+00	2.41E+02	4.82E+02	0.5750	1.342E+14
Cs-135	3.4477E-06	495.31	990.62	0.00E+00	1.71E-03	3.42E-03	0.8500	1.880E+13
Cs-137	2.8731E+00	495.31	990.62	0.00E+00	1.42E+03	2.85E+03	1.2500	3.497E+12
Eu-154	8.2053E-02	495.31	990.62	0.00E+00	4.06E+01	8.13E+01	1.7500	1.466E+11
Eu-155	3.9134E-02	495.31	990.62	0.00E+00	1.94E+01	3.88E+01	2.2500	3.076E+11
Fe-55	6.7429E-03	495.31	990.62	0.00E+00	3.34E+00	6.68E+00	2.7500	1.770E+09
H-3	1.0599E-02	495.31	990.62	0.00E+00	5.25E+00	1.05E+01	3.5000	1.963E+08
I-129	7.5300E-07	495.31	990.62	0.00E+00	3.73E-04	7.46E-04	5.0000	6.030E+02
Kr-85	2.8595E-01	495.31	990.62	0.00E+00	1.42E+02	2.83E+02	7.0000	6.728E+01
Np-237	9.5479E-06	495.31	990.62	0.00E+00	4.73E-03	9.46E-03	11.0000	7.588E+00
Pa-231	8.9297E-10	495.31	990.62	0.00E+00	4.42E-07	8.85E-07		
Pb-210	3.7609E-12	495.31	990.62	0.00E+00	1.86E-09	3.73E-09		
Pm-147	2.5452E+00	495.31	990.62	0.00E+00	1.26E+03	2.52E+03		
Pu-238	2.0550E-02	495.31	990.62	0.00E+00	1.02E+01	2.04E+01		
Pu-239	4.2838E-04	495.31	990.62	0.00E+00	2.12E-01	4.24E-01		
Pu-240	2.4401E-04	495.31	990.62	0.00E+00	1.21E-01	2.42E-01		
Pu-241	6.8764E-02	495.31	990.62	0.00E+00	3.41E+01	6.81E+01		
Pu-242	3.6329E-07	495.31	990.62	0.00E+00	1.80E-04	3.60E-04		
Ra-226	3.8045E-11	495.31	990.62	0.00E+00	1.88E-08	3.77E-08		
Ra-228	2.9902E-15	495.31	990.62	0.00E+00	1.48E-12	2.96E-12		
Ru-106	1.9055E-01	495.31	990.62	0.00E+00	9.44E+01	1.89E+02		
Se-79	1.2936E-05	495.31	990.62	0.00E+00	6.41E-03	1.28E-02		
Sn-126	1.1574E-05	495.31	990.62	0.00E+00	5.73E-03	1.15E-02		
Sr-90	2.7505E+00	495.31	990.62	0.00E+00	1.36E+03	2.72E+03		
Tc-99	4.2239E-04	495.31	990.62	0.00E+00	2.09E-01	4.18E-01		
Th-229	1.8848E-12	495.31	990.62	0.00E+00	9.34E-10	1.87E-09		
Th-230	1.7042E-08	495.31	990.62	0.00E+00	8.44E-06	1.69E-05		
Th-232	7.8132E-15	495.31	990.62	0.00E+00	3.87E-12	7.74E-12		
Th-208	4.4063E-08	495.31	990.62	0.00E+00	2.18E-05	4.36E-05		
U-232	1.3151E-07	495.31	990.62	0.00E+00	6.51E-05	1.30E-04		
U-233	1.9564E-09	495.31	990.62	0.00E+00	9.89E-07	1.94E-06		
U-234	1.8371E-04	495.31	990.62	0.00E+00	9.10E-02	1.82E-01		
U-235	-2.7235E-06	495.31	0.00	1.12E-02	9.82E-03	1.12E-02		
U-236	1.5493E-05	495.31	990.62	0.00E+00	7.67E-03	1.53E-02		
U-238	-4.2851E-09	495.31	0.00	7.05E-03	7.05E-03	7.05E-03		
Y-90	2.7505E+00	495.31	990.62	0.00E+00	1.36E+03	2.72E+03		
Other Radionuclides					2.55E+03	5.09E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.76578383	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 495.31	Estimated 495.31	
Bounding:		990.62	Nominal burnup assumed to be 2% of BOL heavy metal mass. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier 0.06	Estimated Burnup/ Given Burnup	
Bounding:	0.12		0.98

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OMEGA WEST (204)
SNF ID #: 408
Fuel Units & Descr: 16 - 18 OR 19 ELAT PLATES
Heavy Metal Mass: BOL=3.264kg; EOL=2.525kg
ROD Storage Site: SRS

Fuel decay start date: 1992
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"
0.67

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	848.64	1,021.63	0.00E+00	1.70E-06	2.05E-06	Avg. MeV	
Am-241	2.5251E-03	848.64	1,021.63	0.00E+00	2.14E+00	2.58E+00	0.0150	7.524E+13
Am-242m	3.9624E-07	848.64	1,021.63	0.00E+00	3.36E-04	4.05E-04	0.0250	1.582E+13
Am-243	1.4880E-06	848.64	1,021.63	0.00E+00	1.26E-03	1.52E-03	0.0375	1.358E+13
C-14	5.7053E-09	848.64	1,021.63	0.00E+00	4.84E-06	5.83E-06	0.0575	1.402E+13
Cl-36	1.3124E-32	848.64	1,021.63	0.00E+00	1.11E-29	1.34E-29	0.0850	8.808E+12
Cm-243	1.1419E-07	848.64	1,021.63	0.00E+00	9.69E-05	1.17E-04	0.1250	5.818E+12
Cm-244	1.6522E-05	848.64	1,021.63	0.00E+00	1.40E-02	1.69E-02	0.2250	7.804E+12
Co-60	7.4047E-07	848.64	1,021.63	0.00E+00	6.28E-04	7.56E-04	0.3750	3.308E+12
Cs-134	2.0455E-05	848.64	1,021.63	0.00E+00	1.74E-02	2.09E-02	0.5750	5.467E+13
Cs-135	3.4477E-06	848.64	1,021.63	0.00E+00	2.93E-03	3.52E-03	0.8500	6.678E+11
Cs-137	1.4385E+00	848.64	1,021.63	0.00E+00	1.22E+03	1.47E+03	1.2500	3.230E+11
Eu-154	7.3230E-03	848.64	1,021.63	0.00E+00	6.21E+00	7.48E+00	1.7500	1.818E+10
Eu-155	5.9259E-04	848.64	1,021.63	0.00E+00	5.03E-01	6.05E-01	2.2500	1.520E+06
Fe-55	2.2791E-06	848.64	1,021.63	0.00E+00	1.93E-03	2.33E-03	2.7500	1.451E+06
H-3	1.9698E-03	848.64	1,021.63	0.00E+00	1.67E+00	2.01E+00	3.5000	8.408E+02
I-129	7.5300E-07	848.64	1,021.63	0.00E+00	6.39E-04	7.69E-04	5.0000	3.438E+02
Kr-85	4.1178E-02	848.64	1,021.63	0.00E+00	3.49E+01	4.21E+01	7.0000	3.760E+01
Np-237	9.5752E-06	848.64	1,021.63	0.00E+00	8.13E-03	9.78E-03	11.0000	4.192E+00
Pa-231	3.9379E-09	848.64	1,021.63	0.00E+00	3.34E-06	4.02E-06		
Pb-210	3.3115E-10	848.64	1,021.63	0.00E+00	2.81E-07	3.38E-07		
Pm-147	9.2402E-04	848.64	1,021.63	0.00E+00	7.84E-01	9.44E-01		
Pu-238	1.6217E-02	848.64	1,021.63	0.00E+00	1.38E+01	1.66E+01		
Pu-239	4.2810E-04	848.64	1,021.63	0.00E+00	3.63E-01	4.37E-01		
Pu-240	2.4333E-04	848.64	1,021.63	0.00E+00	2.06E-01	2.49E-01		
Pu-241	1.6242E-02	848.64	1,021.63	0.00E+00	1.38E+01	1.66E+01		
Pu-242	3.6329E-07	848.64	1,021.63	0.00E+00	3.08E-04	3.71E-04		
Ra-226	9.0114E-10	848.64	1,021.63	0.00E+00	7.65E-07	9.21E-07		
Ra-228	3.1019E-14	848.64	1,021.63	0.00E+00	2.63E-11	3.17E-11		
Ru-106	2.1225E-10	848.64	1,021.63	0.00E+00	1.80E-07	2.17E-07		
Se-79	1.2930E-05	848.64	1,021.63	0.00E+00	1.10E-02	1.32E-02		
Sn-126	1.1571E-05	848.64	1,021.63	0.00E+00	9.82E-03	1.18E-02		
Sr-90	1.3472E+00	848.64	1,021.63	0.00E+00	1.14E+03	1.38E+03		
Tc-99	4.2239E-04	848.64	1,021.63	0.00E+00	3.58E-01	4.32E-01		
Th-229	1.2407E-11	848.64	1,021.63	0.00E+00	1.05E-08	1.27E-08		
Th-230	8.3497E-08	848.64	1,021.63	0.00E+00	7.09E-06	8.53E-06		
Th-232	3.8371E-14	848.64	1,021.63	0.00E+00	3.26E-11	3.92E-11		
Ti-208	4.0414E-06	848.64	1,021.63	0.00E+00	3.43E-05	4.13E-05		
U-232	1.0948E-07	848.64	1,021.63	0.00E+00	9.29E-05	1.12E-04		
U-233	3.6275E-09	848.64	1,021.63	0.00E+00	3.08E-06	3.71E-06		
U-234	1.8562E-04	848.64	1,021.63	0.00E+00	1.58E-01	1.90E-01		
U-235	-2.7235E-06	848.64	0.00	6.57E-03	4.26E-03	6.57E-03		
U-236	1.5493E-05	848.64	1,021.63	0.00E+00	1.31E-02	1.58E-02		
U-238	-4.2851E-09	848.64	0.00	7.53E-05	7.16E-05	7.53E-05		
Y-90	1.3475E+00	848.64	1,021.63	0.00E+00	1.14E+03	1.38E+03		
Other Radionuclides								
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							1.42E+01	1.71E+01
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1372549	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	848.64	700.04
Bounding:	1,021.63	1,400.07

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.83	0.82
Bounding:	0.99	1.37

Estimated EOL HM/Given EOL HM

0.98

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OMEGA WEST (236)
SNF ID #: 407
Fuel Units & Descr: 44 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=10.384kg; EOL=7.254kg
ROD Storage Site: SRS

Fuel decay start date: 1992
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"
1.83

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	3,665.55	4,475.50	0.00E+00	7.36E-06	8.98E-06	Avg. MeV	
Am-241	2.5251E-03	3,665.55	4,475.50	0.00E+00	9.26E+00	1.13E+01	0.0150	3.296E+14
Am-242m	3.9624E-07	3,665.55	4,475.50	0.00E+00	1.45E-03	1.77E-03	0.0250	6.845E+13
Am-243	1.4880E-06	3,665.55	4,475.50	0.00E+00	5.45E-03	6.66E-03	0.0375	5.949E+13
C-14	5.7053E-09	3,665.55	4,475.50	0.00E+00	2.09E-05	2.55E-05	0.0675	6.404E+13
Cl-36	1.3124E-32	3,665.55	4,475.50	0.00E+00	4.81E-29	5.87E-29	0.0850	3.858E+13
Cm-243	1.1419E-07	3,665.55	4,475.50	0.00E+00	4.19E-04	5.11E-04	0.1250	2.549E+13
Cm-244	1.8522E-05	3,665.55	4,475.50	0.00E+00	6.06E-02	7.39E-02	0.2250	3.331E+13
Co-60	7.4047E-07	3,665.55	4,475.50	0.00E+00	2.71E-03	3.31E-03	0.3750	1.449E+13
Cs-134	2.0455E-05	3,665.55	4,475.50	0.00E+00	7.50E-02	9.15E-02	0.5750	2.395E+14
Cs-135	3.4477E-06	3,665.55	4,475.50	0.00E+00	1.26E-02	1.54E-02	0.8500	2.925E+12
Cs-137	1.4365E+00	3,665.55	4,475.50	0.00E+00	5.27E+03	6.43E+03	1.2500	1.415E+12
Eu-154	7.3230E-03	3,665.55	4,475.50	0.00E+00	2.68E+01	3.28E+01	1.7500	7.964E+10
Eu-155	5.9259E-04	3,665.55	4,475.50	0.00E+00	2.17E+00	2.65E+00	2.2500	6.658E+06
Fe-55	2.2791E-06	3,665.55	4,475.50	0.00E+00	8.35E-03	1.02E-02	2.7500	6.355E+06
H-3	1.9698E-03	3,665.55	4,475.50	0.00E+00	7.22E+00	8.82E+00	3.5000	3.682E+03
I-129	7.5300E-07	3,665.55	4,475.50	0.00E+00	2.76E-03	3.37E-03	5.0000	1.505E+03
Kr-85	4.1176E-02	3,665.55	4,475.50	0.00E+00	1.51E+02	1.84E+02	7.0000	1.647E+02
Np-237	9.5752E-06	3,665.55	4,475.50	0.00E+00	3.51E-02	4.29E-02	11.0000	1.836E+01
Pa-231	3.9379E-09	3,665.55	4,475.50	0.00E+00	1.44E-05	1.76E-05		
Pb-210	3.3115E-10	3,665.55	4,475.50	0.00E+00	1.21E-06	1.48E-06		
Pm-147	9.2402E-04	3,665.55	4,475.50	0.00E+00	3.39E+00	4.14E+00		
Pu-238	1.6217E-02	3,665.55	4,475.50	0.00E+00	5.94E+01	7.26E+01		
Pu-239	4.2810E-04	3,665.55	4,475.50	0.00E+00	1.57E+00	1.92E+00		
Pu-240	2.4333E-04	3,665.55	4,475.50	0.00E+00	8.92E-01	1.09E+00		
Pu-241	1.6242E-02	3,665.55	4,475.50	0.00E+00	5.95E+01	7.27E+01		
Pu-242	3.6329E-07	3,665.55	4,475.50	0.00E+00	1.33E-03	1.63E-03		
Ra-226	9.0114E-10	3,665.55	4,475.50	0.00E+00	3.30E-06	4.03E-06		
Ra-228	3.1019E-14	3,665.55	4,475.50	0.00E+00	1.14E-10	1.39E-10		
Ru-106	2.1225E-10	3,665.55	4,475.50	0.00E+00	7.78E-07	9.50E-07		
Se-79	1.2930E-05	3,665.55	4,475.50	0.00E+00	4.74E-02	5.79E-02		
Sn-126	1.1571E-05	3,665.55	4,475.50	0.00E+00	4.24E-02	5.18E-02		
Sr-90	1.3472E+00	3,665.55	4,475.50	0.00E+00	4.94E+03	6.03E+03		
Tc-99	4.2239E-04	3,665.55	4,475.50	0.00E+00	1.55E+00	1.89E+00		
Th-229	1.2407E-11	3,665.55	4,475.50	0.00E+00	4.55E-08	5.55E-08		
Th-230	8.3497E-08	3,665.55	4,475.50	0.00E+00	3.06E-04	3.74E-04		
Th-232	3.8371E-14	3,665.55	4,475.50	0.00E+00	1.41E-10	1.72E-10		
Ti-208	4.0414E-08	3,665.55	4,475.50	0.00E+00	1.48E-04	1.81E-04		
U-232	1.0948E-07	3,665.55	4,475.50	0.00E+00	4.01E-04	4.90E-04		
U-233	3.6275E-09	3,665.55	4,475.50	0.00E+00	1.33E-05	1.62E-05		
U-234	1.8562E-04	3,665.55	4,475.50	0.00E+00	6.80E-01	8.31E-01		
U-235	-2.7235E-06	3,665.55	0.00	2.09E-02	1.09E-02	2.09E-02		
U-236	1.5493E-05	3,665.55	4,475.50	0.00E+00	5.68E-02	6.93E-02		
U-238	-4.2851E-09	3,665.55	0.00	2.37E-04	2.21E-04	2.37E-04		
Y-90	1.3475E+00	3,665.55	4,475.50	0.00E+00	4.94E+03	6.03E+03		
Other Radionuclides					5.02E+03	6.12E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.22033896	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	3,665.55	2,954.32
Bounding:	4,475.50	5,908.64

Basis for burnup used in estimate:

Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	0.81
Bounding:	1.37	1.32

Estimated EOL HM/Given EOL HM
0.93

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information:
 Fuel Name: OMEGA WEST (250)
 SWF ID #: 408
 Fuel Units & Decay: 27 - 18 OR 18 PLAT PLATES
 Heavy Metal Mass: BOL-6-75kg EOL-5-2kg
 ROD Storage Shw: SRS

Fuel decay start date: 1982
Estimate as of: 2000
Template: ATR (Ugn Waw, Alm, 60 to 100%, U)
***Template Burnup(MWD):** 387.2
Template BOL Heavy Metal Mass (MT): 0.0016689
Template Decay Time: 35 years

Estimated Canister Usage:
 18-210
 1.13

Radionuclide	Template	m	Nominal Fuel Burnup (MWD) ^a	Bounding Fuel Burnup (MWD) ^a	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Gamma Sources	Photon Energy Group	Total Photon/sec (Bounding)
Ac-227	2.0089E-09	1.559 25	2.948 75	0.00E+00	3.13E+08	5.92E+08				
Am-241	2.5251E-03	1.559 25	2.948 75	0.00E+00	3.94E+00	7.49E+00				
Am-243m	3.9824E-07	1.559 25	2.948 75	0.00E+00	6.19E-04	1.17E-03				
Am-243	1.4890E-06	1.559 25	2.948 75	0.00E+00	2.32E-03	4.39E-03				
C-14	5.7053E-09	1.559 25	2.948 75	0.00E+00	8.90E-08	1.68E-06				
Cm-243	1.3124E-32	1.559 25	2.948 75	0.00E+00	2.05E-29	3.87E-29				
Cm-244	1.1419E-07	1.559 25	2.948 75	0.00E+00	1.79E-04	3.37E-04				
Co-60	1.6622E-05	1.559 25	2.948 75	0.00E+00	2.59E-02	4.87E-02				
Co-134	7.4047E-07	1.559 25	2.948 75	0.00E+00	1.15E-03	2.18E-03				
Co-136	2.0455E-05	1.559 25	2.948 75	0.00E+00	3.19E-02	6.03E-02				
Cs-137	3.4477E-06	1.559 25	2.948 75	0.00E+00	5.39E-03	1.02E-02				
Eu-154	1.4365E+00	1.559 25	2.948 75	0.00E+00	2.24E+03	4.24E+03				
Eu-155	7.3230E-03	1.559 25	2.948 75	0.00E+00	1.14E+01	2.16E+01				
Fe-55	9.8259E-04	1.559 25	2.948 75	0.00E+00	9.24E-01	1.75E-01				
H-3	2.2791E-06	1.559 25	2.948 75	0.00E+00	3.55E-03	6.72E-03				
H-3	1.9698E-07	1.559 25	2.948 75	0.00E+00	3.07E-03	5.81E-03				
K-40	7.5390E-07	1.559 25	2.948 75	0.00E+00	1.17E-03	2.22E-03				
Np-237	4.1176E-02	1.559 25	2.948 75	0.00E+00	6.42E+01	1.21E+02				
Np-237	9.5752E-08	1.559 25	2.948 75	0.00E+00	1.49E-02	2.82E-02				
Pa-231	3.9379E-09	1.559 25	2.948 75	0.00E+00	6.14E-06	1.16E-05				
Pb-210	3.3115E-10	1.559 25	2.948 75	0.00E+00	5.16E-07	9.77E-07				
Pm-147	9.2402E-04	1.559 25	2.948 75	0.00E+00	1.44E+00	2.73E+00				
Pu-238	1.8217E-02	1.559 25	2.948 75	0.00E+00	2.53E+01	4.78E+01				
Pu-239	4.2810E-04	1.559 25	2.948 75	0.00E+00	6.69E-01	1.36E+01				
Pu-240	2.4332E-04	1.559 25	2.948 75	0.00E+00	3.79E-01	7.18E-01				
Pu-241	1.6242E-02	1.559 25	2.948 75	0.00E+00	2.53E+01	4.79E+01				
Pu-242	3.6392E-07	1.559 25	2.948 75	0.00E+00	5.68E-04	1.07E-03				
Ra-226	9.0114E-10	1.559 25	2.948 75	0.00E+00	1.41E-06	2.66E-06				
Ra-228	3.1019E-14	1.559 25	2.948 75	0.00E+00	4.84E-11	9.15E-11				
Ra-106	2.1225E-10	1.559 25	2.948 75	0.00E+00	3.31E-07	6.28E-07				
Sr-90	1.5717E-05	1.559 25	2.948 75	0.00E+00	2.02E-02	3.81E-02				
Sr-90	1.3472E+00	1.559 25	2.948 75	0.00E+00	2.10E+03	3.97E+03				
Tc-99	4.2238E-04	1.559 25	2.948 75	0.00E+00	6.59E-01	1.25E+00				
Th-229	1.2407E-11	1.559 25	2.948 75	0.00E+00	1.93E-08	3.66E-08				
Th-230	8.3497E-06	1.559 25	2.948 75	0.00E+00	1.30E-04	2.46E-04				
Th-232	3.8371E-14	1.559 25	2.948 75	0.00E+00	5.99E-11	1.19E-10				
Th-230	4.0414E-06	1.559 25	2.948 75	0.00E+00	6.30E-05	1.19E-04				
U-232	1.0848E-07	1.559 25	2.948 75	0.00E+00	1.71E-04	3.23E-04				
U-233	3.6275E-09	1.559 25	2.948 75	0.00E+00	5.66E-06	1.07E-05				
U-234	1.8562E-04	1.559 25	2.948 75	0.00E+00	2.69E-01	5.48E-01				
U-235	-2.7235E-06	1.559 25	0.00	1.38E-02	9.33E-03	1.38E-02				
U-236	1.5483E-05	1.559 25	2.948 75	0.00E+00	2.42E-02	4.57E-02				
U-238	-4.2851E-09	1.559 25	0.00	1.59E-04	1.51E-04	1.58E-04				
U-90	1.3475E+00	1.559 25	2.948 75	0.00E+00	2.10E+03	3.97E+03				
Other Radionuclides										
2.13E+03 4.04E+03										

Thermal Heat		Bounding	
Output (Watts)	Heat Output (Watts)	Output (Watts)	Heat Output (Watts)
231E+01	434E+01		
Total	Total		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary		Burnup Summary	
From SFD	Used	From SFD	Estimated
Reactor Moderator: Fuel Cladding: BOL HIL Constituents: BOL Enrichment %:	LIGHT WATER ALUM U 83.048	LIGHT WATER ALUM U 80 to 100	

Burnup Summary (MWD) ^a		Basis for burnup used in estimate:	
Nonfuel	From SFD	Estimated	
Bounding:	1.559 25	1.467 69	
	2.948 75	2.805 38	

Checks		Estimated EOL HIL/Chw EOL HIL	
Nonfuel	Burnup Multiplier	Given Burnup	
Bounding:	0.73	0.94	
	1.39	1.00	

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.
^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWD/KMT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U308 HEU)
 SNF ID #: 903
 Fuel Units & Descr: 97 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=29.643kg; EOL=20.777kg
 ROD Storage Site: SRS

Fuel decay start date: 1966
 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: 50 years

Estimated
 Canister usage:
 18"x10"
 2.69

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	2.9739E-09	8,396.08	16,792.17	0.00E+00	2.50E-05	4.99E-05	Avg. MeV	
Am-241	2.5986E-03	8,396.08	16,792.17	0.00E+00	2.18E+01	4.36E+01	0.0150	8.652E+14
Am-242m	3.7010E-07	8,396.08	16,792.17	0.00E+00	3.11E-03	6.21E-03	0.0250	1.796E+14
Am-243	1.4858E-06	8,396.08	16,792.17	0.00E+00	1.25E-02	2.50E-02	0.0375	1.561E+14
C-14	5.8944E-09	8,396.08	16,792.17	0.00E+00	4.78E-05	9.56E-05	0.0575	1.681E+14
Ci-36	1.3124E-32	8,396.08	16,792.17	0.00E+00	1.10E-28	2.20E-28	0.0850	1.012E+14
Cm-243	7.9303E-08	8,396.08	16,792.17	0.00E+00	6.66E-04	1.33E-03	0.1250	6.811E+13
Cm-244	9.3083E-06	8,396.08	16,792.17	0.00E+00	7.82E-02	1.56E-01	0.2250	8.728E+13
Co-60	1.0310E-07	8,396.08	16,792.17	0.00E+00	8.66E-04	1.73E-03	0.3750	3.802E+13
Cs-134	1.3254E-07	8,396.08	16,792.17	0.00E+00	1.11E-03	2.23E-03	0.5750	6.352E+14
Cs-135	3.4477E-06	8,396.08	16,792.17	0.00E+00	2.89E-02	5.79E-02	0.8500	6.805E+12
Cs-137	1.0161E+00	8,396.08	16,792.17	0.00E+00	8.53E+03	1.71E+04	1.2500	2.752E+12
Eu-154	2.1879E-03	8,396.08	16,792.17	0.00E+00	1.84E+01	3.67E+01	1.7500	1.803E+11
Eu-155	7.2930E-05	8,396.08	16,792.17	0.00E+00	6.12E-01	1.22E+00	2.2500	1.749E+07
Fe-55	4.1912E-08	8,396.08	16,792.17	0.00E+00	3.52E-04	7.04E-04	2.7500	2.065E+07
H-3	8.4913E-04	8,396.08	16,792.17	0.00E+00	7.13E+00	1.43E+01	3.5000	1.133E+04
I-129	7.5300E-07	8,396.08	16,792.17	0.00E+00	6.32E-03	1.26E-02	5.0000	4.605E+03
Kr-85	1.5615E-02	8,396.08	16,792.17	0.00E+00	1.31E+02	2.62E+02	7.0000	5.007E+02
Np-237	9.5861E-06	8,396.08	16,792.17	0.00E+00	8.05E-02	1.61E-01	11.0000	5.562E+01
Pa-231	5.0790E-09	8,396.08	16,792.17	0.00E+00	4.26E-05	8.53E-05		
Pb-210	6.6176E-10	8,396.08	16,792.17	0.00E+00	5.56E-06	1.11E-05		
Pm-147	1.7606E-05	8,396.08	16,792.17	0.00E+00	1.48E-01	2.96E-01		
Pu-238	1.4406E-02	8,396.08	16,792.17	0.00E+00	1.21E+02	2.42E+02		
Pu-239	4.2783E-04	8,396.08	16,792.17	0.00E+00	3.59E+00	7.18E+00		
Pu-240	2.4297E-04	8,396.08	16,792.17	0.00E+00	2.04E+00	4.08E+00		
Pu-241	7.8949E-03	8,396.08	16,792.17	0.00E+00	6.63E+01	1.33E+02		
Pu-242	3.6329E-07	8,396.08	16,792.17	0.00E+00	3.05E-03	6.10E-03		
Ra-226	1.5169E-09	8,396.08	16,792.17	0.00E+00	1.27E-05	2.55E-05		
Ra-228	4.2429E-14	8,396.08	16,792.17	0.00E+00	3.56E-10	7.12E-10		
Ru-106	7.0833E-15	8,396.08	16,792.17	0.00E+00	5.95E-11	1.19E-10		
Se-79	1.2928E-05	8,396.08	16,792.17	0.00E+00	1.09E-01	2.17E-01		
Sr-126	1.1571E-05	8,396.08	16,792.17	0.00E+00	9.72E-02	1.94E-01		
Sr-90	9.4308E-01	8,396.08	16,792.17	0.00E+00	7.92E+03	1.58E+04		
Tc-99	4.2239E-04	8,396.08	16,792.17	0.00E+00	3.55E+00	7.09E+00		
Th-229	1.7968E-11	8,396.08	16,792.17	0.00E+00	1.51E-07	3.02E-07		
Th-230	1.0855E-07	8,396.08	16,792.17	0.00E+00	9.11E-04	1.82E-03		
Th-232	4.9809E-14	8,396.08	16,792.17	0.00E+00	4.18E-10	8.36E-10		
Ti-208	3.4995E-08	8,396.08	16,792.17	0.00E+00	2.94E-04	5.88E-04		
U-232	9.4798E-08	8,396.08	16,792.17	0.00E+00	7.96E-04	1.59E-03	Thermal Power	
U-233	4.2538E-09	8,396.08	16,792.17	0.00E+00	3.57E-05	7.14E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8617E-04	8,396.08	16,792.17	0.00E+00	1.56E+00	3.13E+00		
U-235	-2.7235E-06	8,396.08	0.00	5.97E-02	3.68E-02	5.97E-02		
U-236	1.5493E-05	8,396.08	16,792.17	0.00E+00	1.30E-01	2.60E-01	8.95E+01	1.99E+02
U-238	-4.2851E-09	8,396.08	0.00	6.82E-04	6.46E-04	6.82E-04	Total	Total
Y-90	9.4308E-01	8,396.08	16,792.17	0.00E+00	7.92E+03	1.58E+04		
Other Radionuclides					8.14E+03	1.63E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15626243	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		8,396.08
Bounding:		16,792.17

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:	0.90	
Bounding:	1.80	

Estimated EOL HM/Given EOL HM
 1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3O8 HEU)

SNF ID #: 753

Fuel Units & Descr: 4 - 19 CURVED PLATES

Heavy Metal Mass: BOL=0.716kg; EOL=0.308kg

ROD Storage Slic: SRS

¹Fuel decay start date: 1986

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: 50 years

Estimated
Canister usage:
18"x10"
0.11

II. Estimates

	m	x ₀	x ₀	b	y ₀	y ₀	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	2.9739E-09	386.76	678.07	0.00E+00	1.15E-06	2.02E-06	Avg. MeV	
Am-241	2.5986E-03	386.76	678.07	0.00E+00	1.01E+00	1.76E+00	0.0150	3.494E+13
Am-242m	3.7010E-07	386.76	678.07	0.00E+00	1.43E-04	2.51E-04	0.0250	7.252E+12
Am-243	1.4858E-06	386.76	678.07	0.00E+00	5.75E-04	1.01E-03	0.0375	6.302E+12
C-14	5.6944E-09	386.76	678.07	0.00E+00	2.20E-06	3.86E-06	0.0675	6.789E+12
Cl-36	1.3124E-32	386.76	678.07	0.00E+00	5.08E-30	8.90E-30	0.0850	4.086E+12
Cm-243	7.9303E-06	386.76	678.07	0.00E+00	3.07E-05	5.38E-05	0.1250	2.670E+12
Cm-244	9.3083E-06	386.76	678.07	0.00E+00	3.60E-03	6.31E-03	0.2250	3.524E+12
Co-60	1.0310E-07	386.76	678.07	0.00E+00	3.99E-05	6.99E-05	0.3750	1.535E+12
Cs-134	1.3254E-07	386.76	678.07	0.00E+00	5.13E-05	8.99E-05	0.5750	2.565E+13
Cs-135	3.4477E-06	386.76	678.07	0.00E+00	1.33E-03	2.34E-03	0.8500	2.748E+11
Cs-137	1.0161E+00	386.76	678.07	0.00E+00	3.93E+02	6.89E+02	1.2500	1.111E+11
Eu-154	2.1879E-03	386.76	678.07	0.00E+00	8.46E-01	1.48E+00	1.7500	7.280E+09
Eu-155	7.2930E-05	386.76	678.07	0.00E+00	2.82E-02	4.95E-02	2.2500	7.061E+05
Fe-55	4.1912E-08	386.76	678.07	0.00E+00	1.62E-05	2.84E-05	2.7500	8.337E+05
H-3	8.4913E-04	386.76	678.07	0.00E+00	3.28E-01	5.76E-01	3.5000	4.572E+02
I-129	7.5300E-07	386.76	678.07	0.00E+00	2.91E-04	5.11E-04	5.0000	1.859E+02
Kr-85	1.5615E-02	386.76	678.07	0.00E+00	6.04E+00	1.06E+01	7.0000	2.021E+01
Np-237	9.5861E-06	386.76	678.07	0.00E+00	3.71E-03	6.50E-03	11.0000	2.245E+00
Pa-231	5.0790E-09	386.76	678.07	0.00E+00	1.96E-06	3.44E-06		
Pb-210	6.6176E-10	386.76	678.07	0.00E+00	2.56E-07	4.49E-07		
Pm-147	1.7606E-05	386.76	678.07	0.00E+00	6.81E-03	1.19E-02		
Pu-238	1.4406E-02	386.76	678.07	0.00E+00	5.57E+00	9.77E+00		
Pu-239	4.2783E-04	386.76	678.07	0.00E+00	1.65E-01	2.90E-01		
Pu-240	2.4297E-04	386.76	678.07	0.00E+00	9.40E-02	1.65E-01		
Pu-241	7.8949E-03	386.76	678.07	0.00E+00	3.05E+00	5.35E+00		
Pu-242	3.6329E-07	386.76	678.07	0.00E+00	1.41E-04	2.46E-04		
Ra-226	1.5169E-09	386.76	678.07	0.00E+00	5.87E-07	1.03E-06		
Ra-228	4.2429E-14	386.76	678.07	0.00E+00	1.84E-11	2.88E-11		
Ru-106	7.0833E-15	386.76	678.07	0.00E+00	2.74E-12	4.80E-12		
Se-79	1.2928E-05	386.76	678.07	0.00E+00	5.00E-03	8.77E-03		
Sn-126	1.1571E-05	386.76	678.07	0.00E+00	4.48E-03	7.85E-03		
Sr-90	9.4308E-01	386.76	678.07	0.00E+00	3.65E+02	6.39E+02		
Tc-99	4.2239E-04	386.76	678.07	0.00E+00	1.63E-01	2.86E-01		
Th-229	1.7968E-11	386.76	678.07	0.00E+00	6.95E-09	1.22E-08		
Th-230	1.0855E-07	386.76	678.07	0.00E+00	4.20E-05	7.36E-05		
Th-232	4.9809E-14	386.76	678.07	0.00E+00	1.93E-11	3.38E-11		
Ti-208	3.4995E-08	386.76	678.07	0.00E+00	1.35E-05	2.37E-05		
U-232	9.4798E-08	386.76	678.07	0.00E+00	3.67E-05	6.43E-05		
U-233	4.2538E-09	386.76	678.07	0.00E+00	1.65E-06	2.88E-06		
U-234	1.8617E-04	386.76	678.07	0.00E+00	7.20E-02	1.26E-01		
U-235	-2.7235E-06	386.76	0.00	1.44E-03	3.90E-04	1.44E-03		
U-236	1.5493E-05	386.76	678.07	0.00E+00	5.99E-03	1.05E-02		
U-238	-4.2851E-09	386.76	0.00	1.61E-05	1.45E-05	1.61E-05		
Y-90	9.4308E-01	386.76	678.07	0.00E+00	3.65E+02	6.39E+02		
Other Radionuclides					3.75E+02	6.58E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.59E+08	8.04E+08
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.29608939	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		386.76
Bounding:		678.07

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.72	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM
1.08

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3Si2 LEU)
 SNF ID #: 165
 Fuel Units & Descr: 52 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=67.953kg; EOL=63.294kg
 ROD Storage Site: SRS

Fuel decay start date: 1987
 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"
 1.44

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	2.0068E-09	4,412.35	8,824.71	0.00E+00	8.85E-06	1.77E-05	Avg. MeV	
Am-241	2.5251E-03	4,412.35	8,824.71	0.00E+00	1.11E+01	2.23E+01	0.0150	6.499E+14
Am-242m	3.9624E-07	4,412.35	8,824.71	0.00E+00	1.75E-03	3.50E-03	0.0250	1.350E+14
Am-243	1.4880E-06	4,412.35	8,824.71	0.00E+00	6.57E-03	1.31E-02	0.0375	1.173E+14
C-14	5.7053E-09	4,412.35	8,824.71	0.00E+00	2.52E-05	5.03E-05	0.0575	1.263E+14
Ci-36	1.3124E-32	4,412.35	8,824.71	0.00E+00	5.79E-29	1.16E-28	0.0850	7.808E+13
Cm-243	1.1419E-07	4,412.35	8,824.71	0.00E+00	5.04E-04	1.01E-03	0.1250	5.025E+13
Cm-244	1.6522E-05	4,412.35	8,824.71	0.00E+00	7.29E-02	1.46E-01	0.2250	6.568E+13
Co-60	7.4047E-07	4,412.35	8,824.71	0.00E+00	3.27E-03	6.53E-03	0.3750	2.857E+13
Cs-134	2.0455E-05	4,412.35	8,824.71	0.00E+00	9.03E-02	1.81E-01	0.5750	4.722E+14
Cs-135	3.4477E-06	4,412.35	8,824.71	0.00E+00	1.52E-02	3.04E-02	0.8500	6.768E+12
Cs-137	1.4365E+00	4,412.35	8,824.71	0.00E+00	6.34E+03	1.27E+04	1.2500	2.790E+12
Eu-154	7.3230E-03	4,412.35	8,824.71	0.00E+00	3.23E+01	6.46E+01	1.7500	1.570E+11
Eu-155	5.9259E-04	4,412.35	8,824.71	0.00E+00	2.61E+00	5.23E+00	2.2500	1.313E+07
Fe-55	2.2791E-06	4,412.35	8,824.71	0.00E+00	1.01E-02	2.01E-02	2.7500	1.253E+07
H-3	1.9698E-03	4,412.35	8,824.71	0.00E+00	8.69E+00	1.74E+01	3.5000	7.384E+03
I-129	7.5300E-07	4,412.35	8,824.71	0.00E+00	3.32E-03	6.64E-03	5.0000	3.020E+03
Kr-85	4.1176E-02	4,412.35	8,824.71	0.00E+00	1.82E+02	3.63E+02	7.0000	3.308E+02
Np-237	9.5752E-06	4,412.35	8,824.71	0.00E+00	4.22E-02	8.45E-02	11.0000	3.690E+01
Pa-231	3.9379E-09	4,412.35	8,824.71	0.00E+00	1.74E-05	3.48E-05		
Pb-210	3.3115E-10	4,412.35	8,824.71	0.00E+00	1.46E-06	2.92E-06		
Pm-147	9.2402E-04	4,412.35	8,824.71	0.00E+00	4.08E+00	8.15E+00		
Pu-238	1.6217E-02	4,412.35	8,824.71	0.00E+00	7.16E+01	1.43E+02		
Pu-239	4.2810E-04	4,412.35	8,824.71	0.00E+00	1.89E+00	3.78E+00		
Pu-240	2.4333E-04	4,412.35	8,824.71	0.00E+00	1.07E+00	2.15E+00		
Pu-241	1.6242E-02	4,412.35	8,824.71	0.00E+00	7.17E+01	1.43E+02		
Pu-242	3.6329E-07	4,412.35	8,824.71	0.00E+00	1.60E-03	3.21E-03		
Ra-226	9.0114E-10	4,412.35	8,824.71	0.00E+00	3.98E-06	7.95E-06		
Ra-228	3.1019E-14	4,412.35	8,824.71	0.00E+00	1.37E-10	2.74E-10		
Ru-106	2.1225E-10	4,412.35	8,824.71	0.00E+00	9.37E-07	1.87E-06		
Se-79	1.2930E-05	4,412.35	8,824.71	0.00E+00	5.71E-02	1.14E-01		
Sn-126	1.1571E-05	4,412.35	8,824.71	0.00E+00	5.11E-02	1.02E-01		
Sr-90	1.3472E+00	4,412.35	8,824.71	0.00E+00	5.94E+03	1.19E+04		
Tc-99	4.2238E-04	4,412.35	8,824.71	0.00E+00	1.85E+00	3.73E+00		
Th-229	1.2407E-11	4,412.35	8,824.71	0.00E+00	5.47E-08	1.09E-07		
Th-230	8.3497E-08	4,412.35	8,824.71	0.00E+00	3.68E-04	7.37E-04		
Th-232	3.6371E-14	4,412.35	8,824.71	0.00E+00	1.69E-10	3.39E-10		
Ti-208	4.0414E-08	4,412.35	8,824.71	0.00E+00	1.78E-04	3.57E-04		
U-232	1.0948E-07	4,412.35	8,824.71	0.00E+00	4.83E-04	9.66E-04		
U-233	3.6275E-09	4,412.35	8,824.71	0.00E+00	1.60E-05	3.20E-05		
U-234	1.8562E-04	4,412.35	8,824.71	0.00E+00	8.19E-01	1.64E+00		
U-235	-2.7235E-06	4,412.35	0.00	3.81E-02	2.61E-02	3.81E-02		
U-236	1.5493E-05	4,412.35	8,824.71	0.00E+00	6.84E-02	1.37E-01		
U-238	-4.2851E-09	4,412.35	0.00	2.36E-02	2.36E-02	2.36E-02		
Y-90	1.3475E+00	4,412.35	8,824.71	0.00E+00	5.95E+03	1.19E+04		
Other Radionuclides					6.04E+03	1.21E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.03831236	80 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)³

	From SFD	Estimated
Nominal:		4,412.35
Bounding:		8,824.71

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:	0.16	
Bounding:	0.32	

Estimated EOL HM/Given EOL HM
 1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (JSS2 LEU)
SNF ID #: 850
Fuel Units & Descr: 11 - ASSEMBLY
Heavy Metal Mass: BOL=11.076kg; EOL=9.908kg
ROD Storage Site: SRS

Fuel decay start date: 1986
Estimates as of: 2030
Template: ATR (Light Water, Alum., 80 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.31

II. Estimates	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.9739E-09	1,106.31	2,212.62	0.00E+00	3.29E-06	6.58E-06	Avg. MeV	
Am-241	2.5986E-03	1,106.31	2,212.62	0.00E+00	2.87E+00	5.75E+00	0.0150	1.140E+14
Am-242m	3.7010E-07	1,106.31	2,212.62	0.00E+00	4.09E-04	8.19E-04	0.0250	2.366E+13
Am-243	1.4858E-06	1,106.31	2,212.62	0.00E+00	1.64E-03	3.29E-03	0.0375	2.056E+13
C-14	5.6944E-09	1,106.31	2,212.62	0.00E+00	6.30E-06	1.26E-05	0.0575	2.215E+13
Cl-36	1.3124E-32	1,106.31	2,212.62	0.00E+00	1.45E-29	2.90E-29	0.0850	1.333E+13
Cm-243	7.9303E-08	1,106.31	2,212.62	0.00E+00	8.77E-05	1.75E-04	0.1250	8.711E+12
Cm-244	9.3083E-06	1,106.31	2,212.62	0.00E+00	1.03E-02	2.06E-02	0.2250	1.150E+13
Co-60	1.0310E-07	1,106.31	2,212.62	0.00E+00	1.14E-04	2.28E-04	0.3750	5.010E+12
Cs-134	1.3254E-07	1,106.31	2,212.62	0.00E+00	1.47E-04	2.93E-04	0.5750	8.370E+13
Cs-135	3.4477E-06	1,106.31	2,212.62	0.00E+00	3.81E-03	7.63E-03	0.8500	8.967E+11
Cs-137	1.0161E+00	1,106.31	2,212.62	0.00E+00	1.12E+03	2.25E+03	1.2500	3.626E+11
Eu-154	2.1879E-03	1,106.31	2,212.62	0.00E+00	2.42E+00	4.84E+00	1.7500	2.375E+10
Eu-155	7.2930E-05	1,106.31	2,212.62	0.00E+00	8.07E-02	1.61E-01	2.2500	2.304E+06
Fe-55	4.1912E-08	1,106.31	2,212.62	0.00E+00	4.64E-05	9.27E-05	2.7500	2.721E+06
H-3	8.4913E-04	1,106.31	2,212.62	0.00E+00	9.39E-01	1.88E+00	3.5000	1.508E+03
I-129	7.5300E-07	1,106.31	2,212.62	0.00E+00	8.33E-04	1.67E-03	5.0000	6.134E+02
Kr-85	1.5615E-02	1,106.31	2,212.62	0.00E+00	1.73E+01	3.46E+01	7.0000	8.674E+01
Np-237	9.5861E-08	1,106.31	2,212.62	0.00E+00	1.06E-02	2.12E-02	11.0000	7.416E+00
Pa-231	5.0790E-09	1,106.31	2,212.62	0.00E+00	5.62E-06	1.12E-05		
Pb-210	6.6176E-10	1,106.31	2,212.62	0.00E+00	7.32E-07	1.46E-06		
Pm-147	1.7606E-05	1,106.31	2,212.62	0.00E+00	1.95E-02	3.90E-02		
Pu-238	1.4408E-02	1,106.31	2,212.62	0.00E+00	1.59E+01	3.19E+01		
Pu-239	4.2783E-04	1,106.31	2,212.62	0.00E+00	4.73E-01	9.47E-01		
Pu-240	2.4297E-04	1,106.31	2,212.62	0.00E+00	2.69E-01	5.38E-01		
Pu-241	7.8949E-03	1,106.31	2,212.62	0.00E+00	8.73E+00	1.75E+01		
Pu-242	3.6329E-07	1,106.31	2,212.62	0.00E+00	4.02E-04	8.04E-04		
Ra-226	1.5169E-09	1,106.31	2,212.62	0.00E+00	1.68E-06	3.36E-06		
Ra-228	4.2429E-14	1,106.31	2,212.62	0.00E+00	4.69E-11	9.39E-11		
Ru-106	7.0833E-15	1,106.31	2,212.62	0.00E+00	7.84E-12	1.57E-11		
Se-79	1.2928E-05	1,106.31	2,212.62	0.00E+00	1.43E-02	2.86E-02		
Sn-126	1.1571E-05	1,106.31	2,212.62	0.00E+00	1.28E-02	2.56E-02		
Sr-90	9.4308E-01	1,106.31	2,212.62	0.00E+00	1.04E+03	2.09E+03		
Tc-99	4.2239E-04	1,106.31	2,212.62	0.00E+00	4.67E-01	9.35E-01		
Th-229	1.7968E-11	1,106.31	2,212.62	0.00E+00	1.99E-08	3.98E-08		
Th-230	1.0855E-07	1,106.31	2,212.62	0.00E+00	1.20E-04	2.40E-04		
Th-232	4.9809E-14	1,106.31	2,212.62	0.00E+00	5.51E-11	1.10E-10		
Ti-206	3.4995E-06	1,106.31	2,212.62	0.00E+00	3.87E-05	7.74E-05		
U-232	9.4798E-06	1,106.31	2,212.62	0.00E+00	1.05E-04	2.10E-04	Thermal Power	
U-233	4.2538E-09	1,106.31	2,212.62	0.00E+00	4.71E-06	9.41E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8617E-04	1,106.31	2,212.62	0.00E+00	2.06E-01	4.12E-01	1.31E+01	2.62E+01
U-235	-2.7235E-06	1,106.31	0.00	4.74E-03	1.73E-03	4.74E-03	Total	Total
U-236	1.5493E-05	1,106.31	2,212.62	0.00E+00	1.71E-02	3.43E-02		
U-238	-4.2851E-09	1,106.31	0.00	2.99E-03	2.98E-03	2.99E-03		
Y-90	9.4308E-01	1,106.31	2,212.62	0.00E+00	1.04E+03	2.09E+03		
Other Radionuclides					1.07E+03	2.15E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.81328831	80 to 100	

Burnup Summary (MWd)^a

	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:		1,106.31	
Bounding:		2,212.62	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.01
Nominal:	0.32		
Bounding:	0.63		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be 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 (U3S2 LEU)
 SNF ID #: 944
 Fuel Units & Descr: 33 - 19 CURVED PLATES
 Heavy Metal Mass: BOL=56.539kg; EOL=53.655kg
 ROD Storage Site: SRS

Fuel decay start date: 1987
 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"
 1.38

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	2,731.39	5,462.79	0.00E+00	5.48E-06	1.10E-05	Avg. MeV	
Am-241	2.5251E-03	2,731.39	5,462.79	0.00E+00	6.90E+00	1.38E+01	0.0150	4.023E+14
Am-242m	3.9624E-07	2,731.39	5,462.79	0.00E+00	1.08E-03	2.16E-03	0.0250	8.355E+13
Am-243	1.4880E-06	2,731.39	5,462.79	0.00E+00	4.06E-03	8.13E-03	0.0375	7.262E+13
C-14	5.7053E-09	2,731.39	5,462.79	0.00E+00	1.56E-05	3.12E-05	0.0575	7.816E+13
Cl-36	1.3124E-32	2,731.39	5,462.79	0.00E+00	3.58E-29	7.17E-29	0.0850	4.710E+13
Cm-243	1.1419E-07	2,731.39	5,462.79	0.00E+00	3.12E-04	6.24E-04	0.1250	3.111E+13
Cm-244	1.6522E-05	2,731.39	5,462.79	0.00E+00	4.51E-02	9.03E-02	0.2250	4.066E+13
Co-60	7.4047E-07	2,731.39	5,462.79	0.00E+00	2.02E-03	4.05E-03	0.3750	1.789E+13
Cs-134	2.0455E-05	2,731.39	5,462.79	0.00E+00	5.59E-02	1.12E-01	0.5750	2.923E+14
Cs-135	3.4477E-06	2,731.39	5,462.79	0.00E+00	9.42E-03	1.88E-02	0.8500	3.571E+12
Cs-137	1.4365E+00	2,731.39	5,462.79	0.00E+00	3.92E+03	7.85E+03	1.2500	1.727E+12
Eu-154	7.3230E-03	2,731.39	5,462.79	0.00E+00	2.00E+01	4.00E+01	1.7500	9.720E+10
Eu-155	5.8259E-04	2,731.39	5,462.79	0.00E+00	1.62E+00	3.24E+00	2.2500	8.127E+06
Fe-55	2.2791E-06	2,731.39	5,462.79	0.00E+00	6.23E-03	1.25E-02	2.7500	7.757E+06
H-3	1.9698E-03	2,731.39	5,462.79	0.00E+00	5.38E+00	1.08E+01	3.5000	4.574E+03
I-129	7.5300E-07	2,731.39	5,462.79	0.00E+00	2.06E-03	4.11E-03	5.0000	1.871E+03
Kr-85	4.1176E-02	2,731.39	5,462.79	0.00E+00	1.12E+02	2.25E+02	7.0000	2.049E+02
Np-237	9.5752E-06	2,731.39	5,462.79	0.00E+00	2.62E-02	5.23E-02	11.0000	2.286E+01
Pa-231	3.9379E-09	2,731.39	5,462.79	0.00E+00	1.08E-05	2.15E-05		
Pb-210	3.3115E-10	2,731.39	5,462.79	0.00E+00	9.05E-07	1.81E-06		
Pm-147	9.2402E-04	2,731.39	5,462.79	0.00E+00	2.52E+00	5.05E+00		
Pu-238	1.6217E-02	2,731.39	5,462.79	0.00E+00	4.43E+01	8.86E+01		
Pu-239	4.2810E-04	2,731.39	5,462.79	0.00E+00	1.17E+00	2.34E+00		
Pu-240	2.4333E-04	2,731.39	5,462.79	0.00E+00	6.65E-01	1.33E+00		
Pu-241	1.6242E-02	2,731.39	5,462.79	0.00E+00	4.44E+01	8.87E+01		
Pu-242	3.6329E-07	2,731.39	5,462.79	0.00E+00	9.92E-04	1.98E-03		
Ra-226	9.0114E-10	2,731.39	5,462.79	0.00E+00	2.46E-06	4.92E-06		
Ra-228	3.1019E-14	2,731.39	5,462.79	0.00E+00	8.47E-11	1.69E-10		
Ru-106	2.1225E-10	2,731.39	5,462.79	0.00E+00	5.80E-07	1.16E-06		
Se-79	1.2930E-05	2,731.39	5,462.79	0.00E+00	3.53E-02	7.06E-02		
Sn-126	1.1571E-05	2,731.39	5,462.79	0.00E+00	3.18E-02	6.32E-02		
Sr-90	1.3472E+00	2,731.39	5,462.79	0.00E+00	3.68E+03	7.36E+03		
Tc-99	4.2239E-04	2,731.39	5,462.79	0.00E+00	1.15E+00	2.31E+00		
Th-229	1.2407E-11	2,731.39	5,462.79	0.00E+00	3.39E-08	6.78E-08		
Th-230	8.3497E-08	2,731.39	5,462.79	0.00E+00	2.28E-04	4.56E-04		
Th-232	3.8371E-14	2,731.39	5,462.79	0.00E+00	1.05E-10	2.10E-10		
Th-208	4.0414E-08	2,731.39	5,462.79	0.00E+00	1.10E-04	2.21E-04		
U-232	1.0948E-07	2,731.39	5,462.79	0.00E+00	2.99E-04	5.98E-04		
U-233	3.6275E-09	2,731.39	5,462.79	0.00E+00	9.91E-06	1.98E-05		
U-234	1.8562E-04	2,731.39	5,462.79	0.00E+00	5.07E-01	1.01E+00		
U-235	-2.7235E-06	2,731.39	0.00	2.42E-02	1.68E-02	2.42E-02		
U-236	1.5493E-05	2,731.39	5,462.79	0.00E+00	4.23E-02	8.46E-02		
U-238	-4.2851E-09	2,731.39	0.00	1.52E-02	1.52E-02	1.52E-02		
Y-90	1.3475E+00	2,731.39	5,462.79	0.00E+00	3.68E+03	7.36E+03		
Other Radionuclides					3.74E+03	7.48E+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	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.818	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		2,731.39	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		5,462.79	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.15		1.00
Bounding:	0.31		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR SPECIAL

SNF ID #: 163

Fuel Units & Descr: 11 - 19 CURVED PLATES

Heavy Metal Mass: BOL=22.045kg; EOL=18.48kg

ROD Storage Site: SRS

¹Fuel decay start date: 1966

Estimate 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: 50 years

Estimated

Canister usage:

18"x10"

0.31

II. Estimates

Radionuclide	m	x ₀	x _b	b	y ₀	y _b	Gamma Sources	
	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.9739E-09	3,376.22	6,752.44	0.00E+00	1.00E-05	2.01E-05	Avg. MeV	
Am-241	2.5986E-03	3,376.22	6,752.44	0.00E+00	8.77E+00	1.75E+01	0.0150	3.479E+14
Am-242m	3.7010E-07	3,376.22	6,752.44	0.00E+00	1.25E-03	2.50E-03	0.0250	7.221E+13
Am-243	1.4858E-06	3,376.22	6,752.44	0.00E+00	5.02E-03	1.00E-02	0.0375	6.276E+13
C-14	5.6944E-09	3,376.22	6,752.44	0.00E+00	1.92E-05	3.85E-05	0.0575	6.760E+13
Cl-36	1.3124E-32	3,376.22	6,752.44	0.00E+00	4.43E-29	8.86E-29	0.0850	4.069E+13
Cm-243	7.9303E-08	3,376.22	6,752.44	0.00E+00	2.68E-04	5.36E-04	0.1250	2.658E+13
Cm-244	9.3083E-06	3,376.22	6,752.44	0.00E+00	3.14E-02	6.29E-02	0.2250	3.510E+13
Co-60	1.0310E-07	3,376.22	6,752.44	0.00E+00	3.48E-04	6.96E-04	0.3750	1.529E+13
Cs-134	1.3254E-07	3,376.22	6,752.44	0.00E+00	4.47E-04	8.95E-04	0.5750	2.564E+14
Cs-135	3.4477E-08	3,376.22	6,752.44	0.00E+00	1.16E-02	2.33E-02	0.8500	2.737E+12
Cs-137	1.0161E+00	3,376.22	6,752.44	0.00E+00	3.43E+03	6.86E+03	1.2500	1.107E+12
Eu-154	2.1879E-03	3,376.22	6,752.44	0.00E+00	7.39E+00	1.48E+01	1.7500	7.249E+10
Eu-155	7.2930E-06	3,376.22	6,752.44	0.00E+00	2.46E-01	4.92E-01	2.2500	7.031E+08
Fe-55	4.1912E-08	3,376.22	6,752.44	0.00E+00	1.42E-04	2.83E-04	2.7500	8.302E+06
H-3	8.4913E-04	3,376.22	6,752.44	0.00E+00	2.87E+00	5.73E+00	3.5000	4.582E+03
I-129	7.5300E-07	3,376.22	6,752.44	0.00E+00	2.54E-03	5.08E-03	5.0000	1.864E+03
Kr-85	1.5615E-02	3,376.22	6,752.44	0.00E+00	5.27E+01	1.05E+02	7.0000	2.027E+02
Np-237	9.5861E-06	3,376.22	6,752.44	0.00E+00	3.24E-02	6.47E-02	11.0000	2.253E+01
Pa-231	5.0790E-09	3,376.22	6,752.44	0.00E+00	1.71E-05	3.43E-05		
Pb-210	6.6176E-10	3,376.22	6,752.44	0.00E+00	2.23E-08	4.47E-08		
Pm-147	1.7606E-05	3,376.22	6,752.44	0.00E+00	5.94E-02	1.19E-01		
Pu-238	1.4406E-02	3,376.22	6,752.44	0.00E+00	4.86E+01	9.73E+01		
Pu-239	4.2783E-04	3,376.22	6,752.44	0.00E+00	1.44E+00	2.89E+00		
Pu-240	2.4297E-04	3,376.22	6,752.44	0.00E+00	8.20E-01	1.64E+00		
Pu-241	7.8949E-03	3,376.22	6,752.44	0.00E+00	2.67E+01	5.33E+01		
Pu-242	3.6329E-07	3,376.22	6,752.44	0.00E+00	1.23E-03	2.45E-03		
Ra-226	1.5169E-09	3,376.22	6,752.44	0.00E+00	5.12E-08	1.02E-07		
Ra-228	4.2429E-14	3,376.22	6,752.44	0.00E+00	1.43E-10	2.87E-10		
Ru-106	7.0833E-15	3,376.22	6,752.44	0.00E+00	2.39E-11	4.78E-11		
Se-79	1.2928E-05	3,376.22	6,752.44	0.00E+00	4.36E-02	8.73E-02		
Sn-126	1.1571E-05	3,376.22	6,752.44	0.00E+00	3.91E-02	7.81E-02		
Sr-90	9.4308E-01	3,376.22	6,752.44	0.00E+00	3.18E+03	6.37E+03		
Tc-99	4.2239E-04	3,376.22	6,752.44	0.00E+00	1.43E+00	2.85E+00		
Th-229	1.7968E-11	3,376.22	6,752.44	0.00E+00	6.07E-08	1.21E-07		
Th-230	1.0855E-07	3,376.22	6,752.44	0.00E+00	3.66E-04	7.33E-04		
Th-232	4.9809E-14	3,376.22	6,752.44	0.00E+00	1.68E-10	3.36E-10		
Th-208	3.4995E-08	3,376.22	6,752.44	0.00E+00	1.18E-04	2.36E-04		
U-232	9.4798E-08	3,376.22	6,752.44	0.00E+00	3.20E-04	6.40E-04		
U-233	4.2538E-09	3,376.22	6,752.44	0.00E+00	1.44E-05	2.87E-05		
U-234	1.8617E-04	3,376.22	6,752.44	0.00E+00	6.29E-01	1.26E+00		
U-235	-2.7235E-06	3,376.22	0.00	1.13E-02	2.07E-03	1.13E-02		
U-236	1.5493E-05	3,376.22	6,752.44	0.00E+00	5.23E-02	1.05E-01		
U-238	-4.2851E-09	3,376.22	0.00	5.66E-03	5.64E-03	5.66E-03		
Y-90	9.4308E-01	3,376.22	6,752.44	0.00E+00	3.18E+03	6.37E+03		
Other Radionuclides					3.27E+03	6.55E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	23.64708607	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)³

	From SFD	Estimated
Nominal:		3,376.22
Bounding:		6,752.44

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

1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR-BW-1 (MOX)

SNF ID #: 160

Fuel Units & Descr: 1 - 19 CURVED PLATES

Heavy Metal Mass: BOL = 0.07kg

ROD Storage Site: INEL

Fuel decay start date: 1966

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"

0.03

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	66.52	66.52	0.00E+00	1.68E-04	1.68E-04	Avg. MeV	
Am-241	8.6432E+00	66.52	66.52	0.00E+00	5.75E+02	5.75E+02	0.0150	5.639E+13
Am-242m	1.5728E-02	66.52	66.52	0.00E+00	1.05E+00	1.05E+00	0.0250	1.114E+13
Am-243	1.6288E-02	66.52	66.52	0.00E+00	1.08E+00	1.08E+00	0.0375	9.415E+12
C-14	1.2068E-01	66.52	66.52	0.00E+00	8.03E+00	8.03E+00	0.0575	1.778E+13
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01	0.0850	5.961E+12
Cm-243	6.0144E-04	66.52	66.52	0.00E+00	4.00E-02	4.00E-02	0.1250	4.218E+12
Cm-244	9.4880E-02	66.52	66.52	0.00E+00	6.31E+00	6.31E+00	0.2250	5.159E+12
Co-60	3.9052E+00	66.52	66.52	0.00E+00	2.60E+02	2.60E+02	0.3750	2.233E+12
Cs-134	2.2139E-06	66.52	66.52	0.00E+00	1.47E-04	1.47E-04	0.5750	3.695E+13
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02	0.8500	8.094E+11
Cs-137	1.4687E+01	66.52	66.52	0.00E+00	9.90E+02	9.90E+02	1.2500	1.984E+13
Eu-154	3.7342E-01	66.52	66.52	0.00E+00	2.48E+01	2.48E+01	1.7500	2.384E+10
Eu-155	8.4893E-03	66.52	66.52	0.00E+00	5.65E-01	5.65E-01	2.2500	1.031E+08
Fe-55	5.3750E-03	66.52	66.52	0.00E+00	3.58E-01	3.58E-01	2.7500	1.775E+08
H-3	1.0472E-01	66.52	66.52	0.00E+00	6.97E+00	6.97E+00	3.5000	9.862E+04
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04	5.0000	4.083E+04
Kr-85	2.2717E-01	66.52	66.52	0.00E+00	1.51E+01	1.51E+01	7.0000	4.651E+03
Np-237	1.6400E-04	66.52	66.52	0.00E+00	1.09E-02	1.09E-02	11.0000	5.305E+02
Pa-231	2.8688E-06	66.52	66.52	0.00E+00	1.91E-04	1.91E-04		
Pb-210	4.7312E-08	66.52	66.52	0.00E+00	3.15E-06	3.15E-06		
Pm-147	3.2198E-04	66.52	66.52	0.00E+00	2.14E-02	2.14E-02		
Pu-238	-1.1924E+00	66.52	0.00	1.80E+01	0.00E+00	1.80E+01		
Pu-239	-4.8600E-02	66.52	0.00	2.18E+00	0.00E+00	2.18E+00		
Pu-240	-3.0127E-01	66.52	0.00	2.78E+00	0.00E+00	2.78E+00		
Pu-241	-1.2917E+02	66.52	0.00	7.16E+02	0.00E+00	7.16E+02		
Pu-242	-1.1381E-04	66.52	0.00	1.20E-02	4.46E-03	1.20E-02		
Ra-226	1.0760E-07	66.52	66.52	0.00E+00	7.16E-06	7.16E-06		
Ra-228	6.0160E-07	66.52	66.52	0.00E+00	4.00E-05	4.00E-05		
Ru-106	1.3388E-13	66.52	66.52	0.00E+00	8.91E-12	8.91E-12		
Se-79	1.9179E-04	66.52	66.52	0.00E+00	1.28E-02	1.28E-02		
Sn-126	1.6669E-04	66.52	66.52	0.00E+00	1.11E-02	1.11E-02		
Sr-90	1.3859E+01	66.52	66.52	0.00E+00	9.22E+02	9.22E+02		
Tc-99	6.7678E-03	66.52	66.52	0.00E+00	4.50E-01	4.50E-01		
Th-229	2.2592E-06	66.52	66.52	0.00E+00	1.50E-04	1.50E-04		
Th-230	7.5955E-06	66.52	66.52	0.00E+00	5.05E-04	5.05E-04		
Th-232	6.0208E-07	66.52	66.52	0.00E+00	4.01E-05	4.01E-05		
Th-208	7.5795E-06	66.52	66.52	0.00E+00	5.04E-03	5.04E-03		
U-232	2.0521E-04	66.52	66.52	0.00E+00	1.37E-02	1.37E-02		
U-233	3.6128E-04	66.52	66.52	0.00E+00	2.40E-02	2.40E-02		
U-234	1.2788E-02	66.52	66.52	0.00E+00	8.51E-01	8.51E-01		
U-235	5.7486E-04	66.52	66.52	6.02E-05	3.83E-02	3.83E-02		
U-236	2.3485E-04	66.52	66.52	0.00E+00	1.56E-02	1.56E-02		
U-238	1.1581E-04	66.52	66.52	7.49E-06	7.71E-03	7.71E-03		
Y-90	1.3861E+01	66.52	66.52	0.00E+00	9.22E+02	9.22E+02		
Other Radionuclides					3.42E+03	3.42E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	(Worst Case)	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)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		66.52	Nominal burnup set equal to bounding burnup.
Bounding:		66.52	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	14.21		591.64
Bounding:	14.21		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information
 Fuel Name: PRP-1 (UML4HEU) PHILIPPINES
 SNF ID #: 638
 Fuel Units & Descr: 21 - 18 FLAT PLATES
 Heavy Metal Mass: BOL-3.286kg EOL-3.286kg
 ROD Storage Site: SRS

Fuel decay start date: 1998
 Estimate as of: 2030
 Template: TRIGA-M (UML4Zr, Alun., 10 to 20%, U)
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 25 years
 6.65

Estimated
 Canister usage:
 18 "x10"
 0.88

II. Estimates	m	x ₁	x ₂	b	y ₁	y ₂	Gamma Sources
Radionuclide	CUMWD From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventory(Ci)	Bounding Fuel Inventory(Ci)	Photon Energy Group
Ac-227	3.8271E-09	62.74	125.48	0.00E+00	2.40E-07	4.90E-07	Avg. MeV
Am-241	4.4195E-03	62.74	125.48	0.00E+00	2.77E-01	5.55E-01	0.0150
Am-243m	1.8195E-06	62.74	125.48	0.00E+00	1.14E-04	2.28E-04	0.0250
Am-243	2.3278E-07	62.74	125.48	0.00E+00	1.45E-05	2.82E-05	0.0075
C-14	4.3203E-05	62.74	125.48	0.00E+00	2.71E-03	5.42E-03	0.0575
Ci-36	4.3023E-08	62.74	125.48	0.00E+00	2.70E-06	5.40E-06	0.0650
Co-243	1.6872E-07	62.74	125.48	0.00E+00	1.06E-05	2.12E-05	0.1250
Co-244	1.4680E-08	62.74	125.48	0.00E+00	9.20E-05	1.84E-04	0.2250
Co-60	2.2370E-03	62.74	125.48	0.00E+00	1.40E-01	2.81E-01	0.3750
Co-134	1.2525E-04	62.74	125.48	0.00E+00	7.88E-03	1.57E-02	0.5750
Co-136	3.1549E-05	62.74	125.48	0.00E+00	1.09E-03	3.09E-03	0.8500
Co-137	2.6947E-01	62.74	125.48	0.00E+00	1.69E-01	3.38E-01	1.2500
Eu-154	2.6857E-02	62.74	125.48	0.00E+00	1.69E-03	3.37E-03	1.7500
Eu-155	4.2105E-05	62.74	125.48	0.00E+00	2.64E-03	5.28E-03	2.7500
Fe-55	3.5173E-03	62.74	125.48	0.00E+00	2.21E-01	4.41E-01	2.5000
H-3	7.3805E-07	62.74	125.48	0.00E+00	4.63E-05	9.26E-05	5.0000
K-48	6.9263E-02	62.74	125.48	0.00E+00	4.35E+00	8.69E+00	7.0000
Np-237	1.4752E-06	62.74	125.48	0.00E+00	9.26E-05	1.85E-04	11.0000
Pa-231	8.3970E-09	62.74	125.48	0.00E+00	5.27E-07	1.05E-06	
Pb-210	1.4895E-13	62.74	125.48	0.00E+00	9.41E-12	1.88E-11	
Pm-147	1.0587E-02	62.74	125.48	0.00E+00	6.63E-01	1.33E+00	
Pu-238	1.1543E-03	62.74	125.48	0.00E+00	7.24E-02	1.45E-01	
Pu-239	5.6817E-03	62.74	125.48	0.00E+00	3.57E-01	7.14E-01	
Pu-240	2.2602E-03	62.74	125.48	0.00E+00	1.42E-01	2.84E-01	
Pu-241	4.8045E-02	62.74	125.48	0.00E+00	3.01E+00	6.03E+00	
Pu-242	3.0602E-07	62.74	125.48	0.00E+00	1.92E-05	3.84E-05	
Re-226	5.1293E-13	62.74	125.48	0.00E+00	3.22E-11	6.44E-11	
Re-228	2.3323E-10	62.74	125.48	0.00E+00	1.46E-08	2.93E-08	
Ru-108	1.0075E-07	62.74	125.48	0.00E+00	6.32E-08	1.26E-07	
Sr-79	1.2835E-05	62.74	125.48	0.00E+00	8.12E-04	1.62E-03	
Sr-128	1.2239E-05	62.74	125.48	0.00E+00	7.69E-04	1.54E-03	
Sr-90	1.6165E+00	62.74	125.48	0.00E+00	1.01E+02	2.03E+02	
Tc-99	4.4120E-04	62.74	125.48	0.00E+00	2.77E-02	5.54E-02	
Th-229	4.5684E-10	62.74	125.48	0.00E+00	2.87E-08	5.73E-08	
Th-230	6.8271E-11	62.74	125.48	0.00E+00	4.29E-09	8.57E-09	
Th-232	2.3744E-10	62.74	125.48	0.00E+00	1.49E-09	2.98E-09	
Th-236	1.7358E-06	62.74	125.48	0.00E+00	1.09E-06	2.18E-06	
U-232	4.6787E-08	62.74	125.48	0.00E+00	2.94E-08	5.87E-08	
U-233	1.3148E-07	62.74	125.48	0.00E+00	8.25E-06	1.65E-05	
U-234	2.5729E-07	62.74	125.48	0.00E+00	1.61E-05	3.23E-05	
U-235	-2.6159E-06	62.74	0.00	6.82E-03	8.45E-03	6.82E-03	
U-236	1.2719E-05	62.74	125.48	0.00E+00	7.98E-04	1.60E-03	
U-238	-3.8857E-06	62.74	0.00	7.57E-05	7.33E-05	7.57E-05	
Y-90	1.6165E+00	62.74	125.48	0.00E+00	1.01E+02	2.03E+02	

Thermal Power	Bounding Heat Output (Watts)
Nominal Heat Output (Watts)	1.40E+08
Total	2.75E+08

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary
 Basis for Parameter Differences:
 The Template was used for the following reasons:
 The fuel matches on all parameters except enrichment.

From SFD	Used
Reactor Moderator: LW AND U ZIRC HYDROGE	ALUM
Fuel Cladding: ALUM	ALUM
BOL HMI Constituents: U	U
BOL Enrichment %: 93.14680552	10 to 20.1

Burnup Summary (MWd) ²	From SFD	Estimated
Nominal:	62.74	62.74
Bounding:	125.48	125.48

Basis for burnup used in estimate:
 Nominal burnup assumed to be 2% of BOL heavy metal mass.
 Bounding burnup assumed to be twice nominal burnup.

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.92	
Bounding:	1.03	

Estimated EOL HMI/Given EOL HMI
 0.93

Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.
 Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MHT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PRR-1 (UALX-LEU) PHILIPPINES

SNF ID #: 558

Fuel Units & Descr: 30 - 17 FLAT PLATES

Heavy Metal Mass: BOL=20.328kg; EOL=19.713kg

ROD Storage Site: SRS

*Fuel decay start date: 1998

Estimates as of: 2030

Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)

*Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 25 years

Estimated
Canister usage:

18"x10"

1.25

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 Avg. MeV Total Photons/sec (bounding)
Ac-227	3.8271E-09	587.03	1,174.06	0.00E+00	2.25E-06	4.49E-06	0.0150 1.061E+14
Am-241	4.4195E-03	587.03	1,174.06	0.00E+00	2.59E+00	5.19E+00	0.0250 2.192E+13
Am-242m	1.8195E-06	587.03	1,174.06	0.00E+00	1.07E-03	2.14E-03	0.0375 2.195E+13
Am-243	2.3278E-07	587.03	1,174.06	0.00E+00	1.37E-04	2.73E-04	0.0575 2.105E+13
C-14	4.3203E-05	587.03	1,174.06	0.00E+00	2.54E-02	5.07E-02	0.0850 1.266E+13
Cl-36	4.3023E-08	587.03	1,174.06	0.00E+00	2.53E-05	5.06E-05	0.1250 1.287E+13
Cm-243	1.6872E-07	587.03	1,174.06	0.00E+00	9.90E-05	1.98E-04	0.2250 1.146E+13
Cm-244	1.4660E-06	587.03	1,174.06	0.00E+00	8.61E-04	1.72E-03	0.3750 4.765E+12
Co-60	2.2376E-03	587.03	1,174.06	0.00E+00	1.31E+00	2.63E+00	0.5750 7.707E+13
Cs-134	1.2525E-04	587.03	1,174.06	0.00E+00	7.35E-02	1.47E-01	0.8500 6.361E+12
Cs-135	3.1549E-05	587.03	1,174.06	0.00E+00	1.85E-02	3.70E-02	1.2500 6.674E+12
Cs-137	1.7368E+00	587.03	1,174.06	0.00E+00	1.02E+03	2.04E+03	1.7500 2.043E+11
Eu-154	2.6947E-01	587.03	1,174.06	0.00E+00	1.58E+02	3.16E+02	2.2500 3.135E+06
Eu-155	2.6857E-02	587.03	1,174.06	0.00E+00	1.58E+01	3.15E+01	2.7500 7.219E+05
Fe-55	4.2105E-05	587.03	1,174.06	0.00E+00	2.47E-02	4.94E-02	3.5000 1.716E+03
H-3	3.5173E-03	587.03	1,174.06	0.00E+00	2.06E+00	4.13E+00	5.0000 6.706E+02
I-129	7.3805E-07	587.03	1,174.06	0.00E+00	4.33E-04	8.67E-04	7.0000 7.566E+01
Kr-85	6.9263E-02	587.03	1,174.06	0.00E+00	4.07E+01	8.13E+01	11.0000 8.602E+00
Np-237	1.4752E-06	587.03	1,174.06	0.00E+00	8.66E-04	1.73E-03	
Pa-231	8.3970E-09	587.03	1,174.06	0.00E+00	4.93E-06	9.86E-06	
Pb-210	1.4935E-13	587.03	1,174.06	0.00E+00	8.80E-11	1.76E-10	
Pm-147	1.0567E-02	587.03	1,174.06	0.00E+00	6.20E+00	1.24E+01	
Pu-238	1.1543E-03	587.03	1,174.06	0.00E+00	6.78E-01	1.36E+00	
Pu-239	5.6917E-03	587.03	1,174.06	0.00E+00	3.34E+00	6.68E+00	
Pu-240	2.2602E-03	587.03	1,174.06	0.00E+00	1.33E+00	2.65E+00	
Pu-241	4.8045E-02	587.03	1,174.06	0.00E+00	2.62E+01	5.64E+01	
Pu-242	3.0602E-07	587.03	1,174.06	0.00E+00	1.80E-04	3.59E-04	
Ra-226	5.1293E-13	587.03	1,174.06	0.00E+00	3.01E-10	6.02E-10	
Ra-228	2.3323E-10	587.03	1,174.06	0.00E+00	1.37E-07	2.74E-07	
Ru-106	1.0075E-07	587.03	1,174.06	0.00E+00	5.91E-05	1.18E-04	
Se-79	1.2935E-05	587.03	1,174.06	0.00E+00	7.59E-03	1.52E-02	
Sn-126	1.2238E-05	587.03	1,174.06	0.00E+00	7.18E-03	1.44E-02	
Sr-90	1.6165E+00	587.03	1,174.06	0.00E+00	9.49E+02	1.90E+03	
Tc-99	4.4120E-04	587.03	1,174.06	0.00E+00	2.59E-01	5.18E-01	
Th-229	4.5684E-10	587.03	1,174.06	0.00E+00	2.68E-07	5.36E-07	
Th-230	6.8271E-11	587.03	1,174.06	0.00E+00	4.01E-08	8.02E-08	
Th-232	2.3744E-10	587.03	1,174.06	0.00E+00	1.39E-07	2.79E-07	
Th-208	1.7368E-08	587.03	1,174.06	0.00E+00	1.02E-06	2.04E-06	
U-232	4.6797E-08	587.03	1,174.06	0.00E+00	2.75E-05	5.49E-05	
U-233	1.3146E-07	587.03	1,174.06	0.00E+00	7.72E-05	1.54E-04	
U-234	2.5729E-07	587.03	1,174.06	0.00E+00	1.51E-04	3.02E-04	
U-235	-2.6159E-06	587.03	0.00	8.73E-03	7.20E-03	8.73E-03	
U-236	1.2719E-05	587.03	1,174.06	0.00E+00	7.47E-03	1.49E-02	
U-238	-3.8857E-08	587.03	0.00	5.47E-03	5.45E-03	5.47E-03	
Y-90	1.6165E+00	587.03	1,174.06	0.00E+00	9.49E+02	1.90E+03	
Other Radionuclides					1.10E+03	2.21E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.87821382	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		587.03
Bounding:		1,174.06

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.78	
Bounding:	1.56	

Estimated EOL HM/Given EOL HM

1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PURDUE UNIVERSITY (U-ALX HEU)

SNF ID #: 177

Fuel Units & Deser: 124 - ELEMENT

Heavy Metal Mass: BOL=2.22kg; EOL=2.22kg

ROD Storage Site: SRS

¹Fuel decay start date:

2035

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:

5 years

Estimated

Canister usage:

18"x10"

3.44

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	42.04	84.08	0.00E+00	6.11E-09	1.22E-08	Avg. MeV	
Am-241	1.1190E-03	42.04	84.08	0.00E+00	4.70E-02	9.41E-02	0.0150	1.622E+13
Am-242m	4.5425E-07	42.04	84.08	0.00E+00	1.91E-05	3.82E-05	0.0250	3.495E+12
Am-243	1.4921E-06	42.04	84.08	0.00E+00	6.27E-05	1.25E-04	0.0375	3.225E+12
C-14	5.7244E-09	42.04	84.08	0.00E+00	2.41E-07	4.81E-07	0.0575	3.171E+12
Cl-36	1.3124E-32	42.04	84.08	0.00E+00	5.52E-31	1.10E-30	0.0850	2.022E+12
Cm-243	2.3676E-07	42.04	84.08	0.00E+00	9.95E-06	1.99E-05	0.1250	1.751E+12
Cm-244	5.2042E-05	42.04	84.08	0.00E+00	2.19E-03	4.38E-03	0.2250	1.713E+12
Co-60	3.8208E-05	42.04	84.08	0.00E+00	1.61E-03	3.21E-03	0.3750	8.293E+11
Cs-134	4.8693E-01	42.04	84.08	0.00E+00	2.05E+01	4.09E+01	0.5750	1.139E+13
Cs-135	3.4477E-06	42.04	84.08	0.00E+00	1.45E-04	2.90E-04	0.8500	1.595E+12
Cs-137	2.8731E+00	42.04	84.08	0.00E+00	1.21E+02	2.42E+02	1.2500	2.968E+11
Eu-154	8.2053E-02	42.04	84.08	0.00E+00	3.45E+00	6.90E+00	1.7500	1.245E+10
Eu-155	3.9134E-02	42.04	84.08	0.00E+00	1.65E+00	3.29E+00	2.2500	2.611E+10
Fe-55	6.7429E-03	42.04	84.08	0.00E+00	2.83E-01	5.67E-01	2.7500	1.502E+08
H-3	1.0599E-02	42.04	84.08	0.00E+00	4.46E-01	8.91E-01	3.5000	1.666E+07
I-129	7.5300E-07	42.04	84.08	0.00E+00	3.17E-05	6.33E-05	5.0000	4.999E+01
Kr-85	2.8595E-01	42.04	84.08	0.00E+00	1.20E+01	2.40E+01	7.0000	5.573E+00
Np-237	9.5479E-06	42.04	84.08	0.00E+00	4.01E-04	8.03E-04	11.0000	6.282E-01
Pa-231	8.9297E-10	42.04	84.08	0.00E+00	3.75E-08	7.51E-08		
Pb-210	3.7609E-12	42.04	84.08	0.00E+00	1.58E-10	3.16E-10		
Pm-147	2.5452E+00	42.04	84.08	0.00E+00	1.07E+02	2.14E+02		
Pu-238	2.0550E-02	42.04	84.08	0.00E+00	8.64E-01	1.73E+00		
Pu-239	4.2838E-04	42.04	84.08	0.00E+00	1.80E-02	3.60E-02		
Pu-240	2.4401E-04	42.04	84.08	0.00E+00	1.03E-02	2.05E-02		
Pu-241	6.8784E-02	42.04	84.08	0.00E+00	2.89E+00	5.78E+00		
Pu-242	3.6329E-07	42.04	84.08	0.00E+00	1.53E-05	3.05E-05		
Ra-226	3.8045E-11	42.04	84.08	0.00E+00	1.60E-09	3.20E-09		
Ra-228	2.9902E-15	42.04	84.08	0.00E+00	1.26E-13	2.51E-13		
Ru-106	1.9055E-01	42.04	84.08	0.00E+00	8.01E+00	1.60E+01		
Se-79	1.2936E-05	42.04	84.08	0.00E+00	5.44E-04	1.09E-03		
Sn-126	1.1574E-05	42.04	84.08	0.00E+00	4.87E-04	9.73E-04		
Sr-90	2.7505E+00	42.04	84.08	0.00E+00	1.16E+02	2.31E+02		
Tc-99	4.2239E-04	42.04	84.08	0.00E+00	1.78E-02	3.55E-02		
Th-229	1.8848E-12	42.04	84.08	0.00E+00	7.92E-11	1.58E-10		
Th-230	1.7042E-08	42.04	84.08	0.00E+00	7.16E-07	1.43E-06		
Th-232	7.8132E-15	42.04	84.08	0.00E+00	3.28E-13	6.57E-13		
Ti-208	4.4063E-08	42.04	84.08	0.00E+00	1.85E-06	3.70E-06		
U-232	1.3151E-07	42.04	84.08	0.00E+00	5.53E-06	1.11E-05		
U-233	1.9564E-09	42.04	84.08	0.00E+00	8.22E-08	1.64E-07		
U-234	1.8371E-04	42.04	84.08	0.00E+00	7.72E-03	1.54E-02		
U-235	-2.7235E-06	42.04	0.00	4.41E-03	4.30E-03	4.41E-03		
U-236	1.5493E-05	42.04	84.08	0.00E+00	6.51E-04	1.30E-03		
U-238	-4.2851E-09	42.04	0.00	5.97E-05	5.95E-05	5.97E-05		
Y-90	2.7505E+00	42.04	84.08	0.00E+00	1.16E+02	2.31E+02		
Other Radionuclides					2.16E+02	4.32E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.00045093	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		42.04
Bounding:		84.08

Basis for burnup used in estimates:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM

0.98

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PURDUE UNIVERSITY-MTR-SI
SNF ID #: 178
Fuel Units & Descr: 16 - 10 FLAT PLATES
Heavy Metal Mass: BOL=18.182kg; EOL=18.182kg
ROD Storage Site: SRS

Fuel decay start date: 2035
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: 5 years

Estimated
Canister usage:
18"x10"
0.44

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	344.38	688.76	0.00E+00	5.01E-08	1.00E-07	Avg. MeV	
Am-241	1.1190E-03	344.38	688.76	0.00E+00	3.85E-01	7.71E-01	0.0150	1.329E+14
Am-242m	4.5425E-07	344.38	688.76	0.00E+00	1.56E-04	3.13E-04	0.0250	2.863E+13
Am-243	1.4921E-06	344.38	688.76	0.00E+00	5.14E-04	1.03E-03	0.0375	2.642E+13
C-14	5.7244E-09	344.38	688.76	0.00E+00	1.97E-06	3.94E-06	0.0575	2.598E+13
Cl-36	1.3124E-32	344.38	688.76	0.00E+00	4.52E-30	9.04E-30	0.0850	1.656E+13
Cm-243	2.3676E-07	344.38	688.76	0.00E+00	8.15E-05	1.63E-04	0.1250	1.434E+13
Cm-244	5.2042E-05	344.38	688.76	0.00E+00	1.79E-02	3.58E-02	0.2250	1.404E+13
Co-60	3.8208E-05	344.38	688.76	0.00E+00	1.32E-02	2.63E-02	0.3750	6.794E+12
Cs-134	4.8693E-01	344.38	688.76	0.00E+00	1.68E+02	3.35E+02	0.5750	9.332E+13
Cs-135	3.4477E-06	344.38	688.76	0.00E+00	1.19E-03	2.37E-03	0.8500	1.307E+13
Cs-137	2.8731E+00	344.38	688.76	0.00E+00	9.89E+02	1.98E+03	1.2500	2.431E+12
Eu-154	8.2053E-02	344.38	688.76	0.00E+00	2.83E+01	5.65E+01	1.7500	1.020E+11
Eu-155	3.9134E-02	344.38	688.76	0.00E+00	1.35E+01	2.70E+01	2.2500	2.139E+11
Fe-55	6.7429E-03	344.38	688.76	0.00E+00	2.32E+00	4.64E+00	2.7500	1.230E+09
H-3	1.0590E-02	344.38	688.76	0.00E+00	3.65E+00	7.30E+00	3.5000	1.365E+08
I-129	7.5300E-07	344.38	688.76	0.00E+00	2.59E-04	5.19E-04	5.0000	4.189E+02
Kr-85	2.8595E-01	344.38	688.76	0.00E+00	9.85E+01	1.97E+02	7.0000	4.679E+01
Np-237	9.5479E-06	344.38	688.76	0.00E+00	3.29E-03	6.58E-03	11.0000	5.277E+00
Pa-231	8.9297E-10	344.38	688.76	0.00E+00	3.08E-07	6.15E-07		
Pb-210	3.7609E-12	344.38	688.76	0.00E+00	1.30E-09	2.59E-09		
Pm-147	2.5452E+00	344.38	688.76	0.00E+00	8.77E+02	1.75E+03		
Pu-238	2.0550E-02	344.38	688.76	0.00E+00	7.08E+00	1.42E+01		
Pu-239	4.2838E-04	344.38	688.76	0.00E+00	1.48E-01	2.95E-01		
Pu-240	2.4401E-04	344.38	688.76	0.00E+00	8.40E-02	1.68E-01		
Pu-241	6.8764E-02	344.38	688.76	0.00E+00	2.37E+01	4.74E+01		
Pu-242	3.6329E-07	344.38	688.76	0.00E+00	1.25E-04	2.50E-04		
Ra-226	3.8045E-11	344.38	688.76	0.00E+00	1.31E-08	2.62E-08		
Ra-228	2.9902E-15	344.38	688.76	0.00E+00	1.03E-12	2.06E-12		
Ru-106	1.8055E-01	344.38	688.76	0.00E+00	6.56E+01	1.31E+02		
Se-79	1.2936E-05	344.38	688.76	0.00E+00	4.45E-03	8.91E-03		
Sn-126	1.1574E-05	344.38	688.76	0.00E+00	3.99E-03	7.97E-03		
Sr-90	2.7505E+00	344.38	688.76	0.00E+00	9.47E+02	1.89E+03		
Tc-99	4.2239E-04	344.38	688.76	0.00E+00	1.45E-01	2.91E-01		
Th-229	1.8848E-12	344.38	688.76	0.00E+00	6.49E-10	1.30E-09		
Th-230	1.7042E-08	344.38	688.76	0.00E+00	5.87E-06	1.17E-05		
Th-232	7.8132E-15	344.38	688.76	0.00E+00	2.69E-12	5.38E-12		
Ti-208	4.4063E-08	344.38	688.76	0.00E+00	1.52E-05	3.03E-05		
U-232	1.3151E-07	344.38	688.76	0.00E+00	4.53E-05	9.06E-05		
U-233	1.9564E-09	344.38	688.76	0.00E+00	6.74E-07	1.35E-06		
U-234	1.8371E-04	344.38	688.76	0.00E+00	6.33E-02	1.27E-01		
U-235	-2.7235E-06	344.38	0.00	7.47E-03	6.53E-03	7.47E-03		
U-236	1.5493E-05	344.38	688.76	0.00E+00	5.34E-03	1.07E-02		
U-238	-4.2851E-09	344.38	0.00	4.95E-03	4.95E-03	4.95E-03		
Y-90	2.7505E+00	344.38	688.76	0.00E+00	9.47E+02	1.89E+03		
Other Radionuclides					1.77E+03	3.54E+03		

Thermal Power
Nominal Heat Output (Watts) 1.75E+01
Bounding Heat Output (Watts) 3.49E+01
Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.0001402	60 to 100	

Burnup Summary (MWd) ^a			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:	From SFD	Estimated	
Bounding:		344.38	

Checks			Estimated EOL NM/Given EOL HM 0.98
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	0.06	0.12	

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: R-2 SVTR (U3S2 LEU) SWEDEN
SNF ID #: 942
Fuel Units & Descr: 183 - MTR TYPE
Heavy Metal Mass: BOL=351.47kg; EOL=306.977kg
ROD Storage Site: SRS

¹Fuel decay start date: 1996
Estimate as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
5.08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	40,241.32	80,482.63	0.00E+00	4.61E-05	9.23E-05	Avg. MeV	
Am-241	2.3056E-03	40,241.32	80,482.63	0.00E+00	9.28E+01	1.86E+02	0.0150	7.531E+15
Am-242m	4.1476E-07	40,241.32	80,482.63	0.00E+00	1.67E-02	3.34E-02	0.0250	1.565E+16
Am-243	1.4894E-06	40,241.32	80,482.63	0.00E+00	5.99E-02	1.20E-01	0.0375	1.363E+16
C-14	5.7108E-09	40,241.32	80,482.63	0.00E+00	2.30E-04	4.60E-04	0.0575	1.463E+15
Cl-36	1.3124E-32	40,241.32	80,482.63	0.00E+00	5.28E-28	1.06E-27	0.0850	8.828E+14
Co-243	1.4562E-07	40,241.32	80,482.63	0.00E+00	5.86E-03	1.17E-02	0.1250	5.913E+14
Co-244	2.4221E-05	40,241.32	80,482.63	0.00E+00	9.75E-01	1.95E+00	0.2250	7.622E+14
Co-60	2.7560E-06	40,241.32	80,482.63	0.00E+00	1.11E-01	2.22E-01	0.3750	3.314E+14
Cs-134	5.8851E-04	40,241.32	80,482.63	0.00E+00	2.37E+01	4.74E+01	0.5750	5.432E+15
Cs-135	3.4477E-06	40,241.32	80,482.63	0.00E+00	1.39E-01	2.77E-01	0.8500	7.828E+13
Cs-137	1.8099E+00	40,241.32	80,482.63	0.00E+00	7.28E+04	1.46E+05	1.2500	4.353E+13
Eu-154	1.6386E-02	40,241.32	80,482.63	0.00E+00	6.59E+02	1.32E+03	1.7500	2.151E+12
Eu-155	2.3957E-03	40,241.32	80,482.63	0.00E+00	9.64E+01	1.93E+02	2.2500	1.533E+08
Fe-55	3.2707E-05	40,241.32	80,482.63	0.00E+00	1.32E+00	2.63E+00	2.7500	1.255E+08
H-3	3.4504E-03	40,241.32	80,482.63	0.00E+00	1.39E+02	2.78E+02	3.5000	9.520E+04
I-129	7.5300E-07	40,241.32	80,482.63	0.00E+00	3.03E-02	6.06E-02	5.0000	3.207E+04
Kr-85	7.8540E-02	40,241.32	80,482.63	0.00E+00	3.18E+03	6.32E+03	7.0000	3.529E+03
Np-237	9.5615E-06	40,241.32	80,482.63	0.00E+00	3.85E-01	7.70E-01	11.0000	3.949E+02
Pa-231	2.7968E-09	40,241.32	80,482.63	0.00E+00	1.13E-04	2.25E-04		
Pb-210	1.2612E-10	40,241.32	80,482.63	0.00E+00	5.08E-06	1.02E-05		
Pm-147	1.2952E-02	40,241.32	80,482.63	0.00E+00	5.21E+02	1.04E+03		
Pu-238	1.7549E-02	40,241.32	80,482.63	0.00E+00	7.06E+02	1.41E+03		
Pu-239	4.2810E-04	40,241.32	80,482.63	0.00E+00	1.72E+01	3.45E+01		
Pu-240	2.4357E-04	40,241.32	80,482.63	0.00E+00	9.80E+00	1.96E+01		
Pu-241	2.6277E-02	40,241.32	80,482.63	0.00E+00	1.06E+03	2.11E+03		
Pu-242	3.6329E-07	40,241.32	80,482.63	0.00E+00	1.46E-02	2.92E-02		
Ra-226	4.4444E-10	40,241.32	80,482.63	0.00E+00	1.79E-05	3.58E-05		
Ra-228	1.9714E-14	40,241.32	80,482.63	0.00E+00	7.93E-10	1.59E-09		
Ru-106	2.0477E-07	40,241.32	80,482.63	0.00E+00	8.24E-03	1.65E-02		
Se-79	1.2933E-05	40,241.32	80,482.63	0.00E+00	5.20E-01	1.04E+00		
Sn-126	1.1574E-05	40,241.32	80,482.63	0.00E+00	4.66E-01	9.32E-01		
Sr-90	1.7092E+00	40,241.32	80,482.63	0.00E+00	6.88E+04	1.38E+05		
Tc-99	4.2239E-04	40,241.32	80,482.63	0.00E+00	1.70E+01	3.40E+01		
Th-229	7.7260E-12	40,241.32	80,482.63	0.00E+00	3.11E-07	6.22E-07		
Th-230	5.8497E-08	40,241.32	80,482.63	0.00E+00	2.35E-03	4.71E-03		
Th-232	2.6906E-14	40,241.32	80,482.63	0.00E+00	1.08E-09	2.17E-09		
Ti-208	4.4336E-08	40,241.32	80,482.63	0.00E+00	1.78E-03	3.57E-03		
U-232	1.2037E-07	40,241.32	80,482.63	0.00E+00	4.84E-03	9.69E-03		
U-233	3.0011E-09	40,241.32	80,482.63	0.00E+00	1.21E-04	2.42E-04		
U-234	1.8497E-04	40,241.32	80,482.63	0.00E+00	7.44E+00	1.49E+01		
U-235	-2.7235E-06	40,241.32	0.00	1.51E-01	4.11E-02	1.51E-01		
U-236	1.5493E-05	40,241.32	80,482.63	0.00E+00	6.23E-01	1.25E+00		
U-238	-4.2851E-09	40,241.32	0.00	9.47E-02	9.45E-02	9.47E-02		
Y-90	1.7094E+00	40,241.32	80,482.63	0.00E+00	6.88E+04	1.38E+05		
Other Radionuclides					6.93E+04	1.39E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.84262055	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		40,241.32
Bounding:		80,482.63

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.73	

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: R-2 SVTR (JALX HEU) SWEDEN
SNF ID #: 801
Fuel Units & Descr: 450 - MTR TYPE
Heavy Metal Mass: BOL=111.015kg; EOL=59.85kg
ROD Storage Site: SRS

Fuel decay start date: 1996
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: 25 years

Estimated
Canister usage:
15"x10"
12.50

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	1.1465E-09	48,454.25	96,908.50	0.00E+00	5.56E-05	1.11E-04	Avg. MeV	
Am-241	2.3056E-03	48,454.25	96,908.50	0.00E+00	1.12E+02	2.23E+02	0.0150	9.068E+15
Am-242m	4.1476E-07	48,454.25	96,908.50	0.00E+00	2.01E-02	4.02E-02	0.0250	1.884E+15
Am-243	1.4894E-06	48,454.25	96,908.50	0.00E+00	7.22E-02	1.44E-01	0.0375	1.841E+15
C-14	5.7108E-09	48,454.25	96,908.50	0.00E+00	2.77E-04	5.53E-04	0.0575	1.762E+15
Ci-36	1.3124E-32	48,454.25	96,908.50	0.00E+00	6.36E-28	1.27E-27	0.0850	1.063E+15
Cm-243	1.4562E-07	48,454.25	96,908.50	0.00E+00	7.06E-03	1.41E-02	0.1250	7.120E+14
Cm-244	2.4221E-05	48,454.25	96,908.50	0.00E+00	1.17E+00	2.35E+00	0.2250	9.177E+14
Co-60	2.7560E-06	48,454.25	96,908.50	0.00E+00	1.34E-01	2.67E-01	0.3750	3.990E+14
Cs-134	5.8851E-04	48,454.25	96,908.50	0.00E+00	2.85E+01	5.70E+01	0.5750	6.541E+15
Cs-135	3.4477E-06	48,454.25	96,908.50	0.00E+00	1.67E-01	3.34E-01	0.8500	9.425E+13
Cs-137	1.8099E+00	48,454.25	96,908.50	0.00E+00	8.77E+04	1.75E+05	1.2500	5.242E+13
Eu-154	1.6386E-02	48,454.25	96,908.50	0.00E+00	7.94E+02	1.59E+03	1.7500	2.590E+12
Eu-155	2.3957E-03	48,454.25	96,908.50	0.00E+00	1.16E+02	2.32E+02	2.2500	1.846E+08
Fe-55	3.2707E-05	48,454.25	96,908.50	0.00E+00	1.58E+00	3.17E+00	2.7500	1.511E+08
H-3	3.4504E-03	48,454.25	96,908.50	0.00E+00	1.67E+02	3.34E+02	3.5000	1.140E+05
I-129	7.5300E-07	48,454.25	96,908.50	0.00E+00	3.65E-02	7.30E-02	5.0000	3.836E+04
Kr-85	7.8540E-02	48,454.25	96,908.50	0.00E+00	3.81E+03	7.61E+03	7.0000	4.220E+03
Np-237	9.5615E-06	48,454.25	96,908.50	0.00E+00	4.63E-01	9.27E-01	11.0000	4.721E+02
Pa-231	2.7968E-09	48,454.25	96,908.50	0.00E+00	1.36E-04	2.71E-04		
Pb-210	1.2612E-10	48,454.25	96,908.50	0.00E+00	6.11E-06	1.22E-05		
Pm-147	1.2952E-02	48,454.25	96,908.50	0.00E+00	6.28E+02	1.26E+03		
Pu-238	1.7549E-02	48,454.25	96,908.50	0.00E+00	8.50E+02	1.70E+03		
Pu-239	4.2810E-04	48,454.25	96,908.50	0.00E+00	2.07E+01	4.15E+01		
Pu-240	2.4357E-04	48,454.25	96,908.50	0.00E+00	1.18E+01	2.36E+01		
Pu-241	2.6277E-02	48,454.25	96,908.50	0.00E+00	1.27E+03	2.55E+03		
Pu-242	3.6329E-07	48,454.25	96,908.50	0.00E+00	1.76E-02	3.52E-02		
Ra-226	4.4444E-10	48,454.25	96,908.50	0.00E+00	2.15E-05	4.31E-05		
Ra-228	1.9714E-14	48,454.25	96,908.50	0.00E+00	9.55E-10	1.91E-09		
Ru-106	2.0477E-07	48,454.25	96,908.50	0.00E+00	9.92E-03	1.98E-02		
Se-79	1.2933E-05	48,454.25	96,908.50	0.00E+00	6.27E-01	1.25E+00		
Sn-126	1.1574E-05	48,454.25	96,908.50	0.00E+00	5.61E-01	1.12E+00		
Sr-90	1.7092E+00	48,454.25	96,908.50	0.00E+00	8.28E+04	1.66E+05		
Tc-99	4.2239E-04	48,454.25	96,908.50	0.00E+00	2.05E+01	4.09E+01		
Th-229	7.7260E-12	48,454.25	96,908.50	0.00E+00	3.74E-07	7.49E-07		
Th-230	5.8497E-08	48,454.25	96,908.50	0.00E+00	2.83E-03	5.67E-03		
Th-232	2.6906E-14	48,454.25	96,908.50	0.00E+00	1.30E-09	2.61E-09		
Ti-208	4.4336E-08	48,454.25	96,908.50	0.00E+00	2.15E-03	4.30E-03		
U-232	1.2037E-07	48,454.25	96,908.50	0.00E+00	5.83E-03	1.17E-02		
U-233	3.0011E-09	48,454.25	96,908.50	0.00E+00	1.45E-04	2.91E-04		
U-234	1.8497E-04	48,454.25	96,908.50	0.00E+00	8.96E+00	1.79E+01		
U-235	-2.7235E-06	48,454.25	0.00	2.22E-01	9.00E-02	2.22E-01		
U-236	1.5493E-05	48,454.25	96,908.50	0.00E+00	7.51E-01	1.50E+00		
U-238	-4.2851E-09	48,454.25	0.00	2.79E-03	2.58E-03	2.79E-03		
Y-90	1.7094E+00	48,454.25	96,908.50	0.00E+00	8.28E+04	1.66E+05		
Other Radionuclides					8.35E+04	1.67E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.5168132	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:		48,454.25
Bounding:		96,908.50

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:	1.39	
Bounding:	2.77	

Estimated EOL HM/Given EOL HM

1.05

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name RA-3 (UAX+EU) (ARGENTINA)
 SWF ID # 634
 Fuel Units & Design 32 - 19 CURVED PLATES
 Heavy Metal Mass BOL=5.72kg EOL=4.595kg
 ROO Storage Site SRS

Fuel decay start date 1987
 Estimates as of: 2000
 Template: ATR (Light Water, Atom. 60 to 100% U)
 Template Burnup (MWd/t): 367.2
 Template Heavy Metal Mass (MT): 0.0016689
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18.7*10⁶
 1.33

II. Estimates

Radionuclide	CLAWD From Template	Nonfuel Fuel Burnup (MWd/t)	Bounding Fuel Burnup (MWd/t)	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0069E-09	1.068.72	2.133.45	0.00E+00	2.14E-08	4.28E-08	Avg. MxV	
Am-241	2.5251E-03	1.068.72	2.133.45	0.00E+00	2.69E+00	5.30E+00	0.0150	1.571E+14
Am-242m	3.9624E-07	1.068.72	2.133.45	0.00E+00	4.22E-04	8.45E-04	0.0250	3.263E+13
Am-243	1.4880E-06	1.068.72	2.133.45	0.00E+00	1.59E-03	3.17E-03	0.0375	2.856E+13
C-14	5.7053E-09	1.068.72	2.133.45	0.00E+00	6.09E-08	1.22E-06	0.0575	3.053E+13
C-36	1.3124E-32	1.068.72	2.133.45	0.00E+00	1.40E-29	2.80E-29	0.0850	1.859E+13
Cm-243	1.1419E-07	1.068.72	2.133.45	0.00E+00	1.22E-04	2.44E-04	0.1250	1.715E+13
Cm-244	1.6522E-05	1.068.72	2.133.45	0.00E+00	1.76E-02	3.52E-02	0.2250	1.588E+12
Co-60	7.4047E-07	1.068.72	2.133.45	0.00E+00	7.90E-04	4.36E-02	0.5750	6.808E+12
Co-134	2.0455E-05	1.068.72	2.133.45	0.00E+00	2.18E-02	4.36E-02	0.5750	1.142E+14
Co-135	3.4477E-08	1.068.72	2.133.45	0.00E+00	3.68E-03	7.38E-03	0.8500	1.359E+12
Co-137	1.4365E+00	1.068.72	2.133.45	0.00E+00	1.53E+03	3.06E+03	1.2500	6.745E+11
Eu-154	7.3230E-03	1.068.72	2.133.45	0.00E+00	7.81E+00	1.56E+01	1.7500	3.796E+10
Eu-155	5.3025E-04	1.068.72	2.133.45	0.00E+00	6.32E-01	1.26E+00	2.2500	3.174E+08
Fe-55	2.2791E-08	1.068.72	2.133.45	0.00E+00	2.43E-03	4.86E-03	2.7500	3.00E+08
H-3	1.9398E-03	1.068.72	2.133.45	0.00E+00	2.10E+00	4.20E+00	3.5000	1.756E+03
I-129	7.5300E-07	1.068.72	2.133.45	0.00E+00	8.02E-04	1.61E-03	5.0000	7.755E+02
Kr-85	4.1176E-02	1.068.72	2.133.45	0.00E+00	4.39E+01	8.78E+01	7.0000	7.855E+01
Np-237	9.5752E-08	1.068.72	2.133.45	0.00E+00	1.02E-02	2.04E-02	11.0000	8.756E+00
Pb-231	3.8789E-09	1.068.72	2.133.45	0.00E+00	4.20E-08	8.40E-08		
Pm-147	3.3151E-10	1.068.72	2.133.45	0.00E+00	3.53E-07	7.07E-07		
Pu-238	9.2402E-04	1.068.72	2.133.45	0.00E+00	9.86E-01	1.97E+00		
Pu-239	1.6217E-02	1.068.72	2.133.45	0.00E+00	1.73E+01	3.46E+01		
Pu-240	2.4333E-04	1.068.72	2.133.45	0.00E+00	4.57E-01	9.13E-01		
Pu-241	1.6242E-02	1.068.72	2.133.45	0.00E+00	2.60E-01	5.19E-01		
Pu-242	3.6239E-07	1.068.72	2.133.45	0.00E+00	1.73E+01	3.47E+01		
Pu-243	1.068.72	1.068.72	2.133.45	0.00E+00	3.89E+04	7.75E+04		
Pu-244	9.0114E-10	1.068.72	2.133.45	0.00E+00	9.81E-07	1.92E-06		
Pu-246	3.1019E-14	1.068.72	2.133.45	0.00E+00	3.31E-11	6.62E-11		
Ru-106	2.1225E-10	1.068.72	2.133.45	0.00E+00	2.28E-07	4.53E-07		
Sr-79	1.2830E-05	1.068.72	2.133.45	0.00E+00	1.38E-02	2.76E-02		
Sr-126	1.5711E-05	1.068.72	2.133.45	0.00E+00	1.23E-02	2.47E-02		
Tc-99	4.2239E-04	1.068.72	2.133.45	0.00E+00	1.44E+03	2.87E+03		
Th-229	1.2407E-11	1.068.72	2.133.45	0.00E+00	4.51E-01	9.01E-01		
Th-230	8.3497E-08	1.068.72	2.133.45	0.00E+00	1.32E-08	2.65E-08		
Th-232	3.6371E-14	1.068.72	2.133.45	0.00E+00	8.91E-05	1.78E-04		
Th-234	4.0414E-08	1.068.72	2.133.45	0.00E+00	4.09E-11	8.19E-11		
U-232	1.0948E-07	1.068.72	2.133.45	0.00E+00	1.17E-04	2.34E-04		
U-233	3.6275E-09	1.068.72	2.133.45	0.00E+00	3.87E-06	7.74E-06		
U-234	1.8562E-04	1.068.72	2.133.45	0.00E+00	1.98E-01	3.96E-01		
U-235	2.7235E-06	1.068.72	2.133.45	0.00E+00	8.22E-03	1.64E-02		
U-236	1.5483E-05	1.068.72	2.133.45	0.00E+00	1.17E-02	3.31E-02		
U-238	4.2851E-09	1.068.72	2.133.45	0.00E+00	1.93E-04	3.86E-04		
U-239	1.3475E+00	1.068.72	2.133.45	0.00E+00	1.44E+03	2.87E+03		
Y-90					1.46E+03	2.92E+03		

Thermal Heat Output (Watts)	Thermal Power
1.79E+01	3.87E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SPD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HMI Constituents:	U	U
BOL Enrichment %:	89.96231383	60 to 100

Burnup Summary (MWd/t)

Nonfuel:	From SPD	Estimated
Bounding:	1.068.72	2.133.45

Nonfuel burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

Nonfuel:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	0.59	1.01

Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

Total burnup for all fuel associated with the worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RA-3 (UALX-HEU) (ARGENTINA)
SNF ID #: 636
Fuel Units & Descr: 207 - 19 CURVED PLATES
Heavy Metal Mass: BOL=37.84kg; EOL=30.139kg
ROD Storage Site: SRS

*Fuel decay start date: 1987
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:
15"x10"
8.63

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	7,292.43	14,584.86	0.00E+00	1.46E-05	2.93E-05	Avg. MeV	
Am-241	2.5251E-03	7,292.43	14,584.86	0.00E+00	1.84E+01	3.68E+01	0.0150	1.074E+15
Am-242m	3.9624E-07	7,292.43	14,584.86	0.00E+00	2.89E-03	5.78E-03	0.0250	2.231E+14
Am-243	1.4880E-06	7,292.43	14,584.86	0.00E+00	1.09E-02	2.17E-02	0.0375	1.839E+14
C-14	5.7053E-09	7,292.43	14,584.86	0.00E+00	4.16E-05	8.32E-05	0.0575	2.087E+14
Cl-36	1.3124E-32	7,292.43	14,584.86	0.00E+00	9.57E-29	1.91E-28	0.0850	1.257E+14
Cm-243	1.1419E-07	7,292.43	14,584.86	0.00E+00	8.33E-04	1.67E-03	0.1250	8.305E+13
Cm-244	1.6522E-05	7,292.43	14,584.86	0.00E+00	1.20E-01	2.41E-01	0.2250	1.086E+14
Co-60	7.4047E-07	7,292.43	14,584.86	0.00E+00	5.40E-03	1.08E-02	0.3750	4.723E+13
Cs-134	2.0455E-05	7,292.43	14,584.86	0.00E+00	1.49E-01	2.98E-01	0.5750	7.805E+14
Cs-135	3.4477E-06	7,292.43	14,584.86	0.00E+00	2.51E-02	5.03E-02	0.8500	9.534E+12
Cs-137	1.4365E+00	7,292.43	14,584.86	0.00E+00	1.05E+04	2.10E+04	1.2500	4.611E+12
Eu-154	7.3230E-03	7,292.43	14,584.86	0.00E+00	5.34E+01	1.07E+02	1.7500	2.595E+11
Eu-155	5.9259E-04	7,292.43	14,584.86	0.00E+00	4.32E+00	8.64E+00	2.2500	2.170E+07
Fe-55	2.2791E-06	7,292.43	14,584.86	0.00E+00	1.66E-02	3.32E-02	2.7500	2.071E+07
H-3	1.9698E-03	7,292.43	14,584.86	0.00E+00	1.44E+01	2.87E+01	3.5000	1.200E+04
I-129	7.5300E-07	7,292.43	14,584.86	0.00E+00	5.49E-03	1.10E-02	5.0000	4.905E+03
Kr-85	4.1176E-02	7,292.43	14,584.86	0.00E+00	3.00E+02	6.01E+02	7.0000	5.367E+02
Np-237	9.5752E-06	7,292.43	14,584.86	0.00E+00	6.98E-02	1.40E-01	11.0000	5.985E+01
Pa-231	3.9379E-09	7,292.43	14,584.86	0.00E+00	2.87E-05	5.74E-05		
Pb-210	3.3115E-10	7,292.43	14,584.86	0.00E+00	2.41E-06	4.83E-06		
Pm-147	9.2402E-04	7,292.43	14,584.86	0.00E+00	6.74E+00	1.35E+01		
Pu-238	1.6217E-02	7,292.43	14,584.86	0.00E+00	1.18E+02	2.37E+02		
Pu-239	4.2810E-04	7,292.43	14,584.86	0.00E+00	3.12E+00	6.24E+00		
Pu-240	2.4333E-04	7,292.43	14,584.86	0.00E+00	1.77E+00	3.55E+00		
Pu-241	1.6242E-02	7,292.43	14,584.86	0.00E+00	1.18E+02	2.37E+02		
Pu-242	3.6329E-07	7,292.43	14,584.86	0.00E+00	2.65E-03	5.30E-03		
Ra-226	9.0114E-10	7,292.43	14,584.86	0.00E+00	6.57E-06	1.31E-05		
Ra-228	3.1019E-14	7,292.43	14,584.86	0.00E+00	2.26E-10	4.52E-10		
Ru-106	2.1225E-10	7,292.43	14,584.86	0.00E+00	1.55E-06	3.10E-06		
Se-79	1.2930E-05	7,292.43	14,584.86	0.00E+00	9.43E-02	1.89E-01		
Sn-126	1.1571E-05	7,292.43	14,584.86	0.00E+00	8.44E-02	1.69E-01		
Sr-90	1.3472E+00	7,292.43	14,584.86	0.00E+00	9.82E+03	1.96E+04		
Tc-99	4.2239E-04	7,292.43	14,584.86	0.00E+00	3.08E+00	6.16E+00		
Th-229	1.2407E-11	7,292.43	14,584.86	0.00E+00	9.05E-08	1.81E-07		
Th-230	8.3497E-08	7,292.43	14,584.86	0.00E+00	6.09E-04	1.22E-03		
Th-232	3.8371E-14	7,292.43	14,584.86	0.00E+00	2.80E-10	5.60E-10		
Ti-208	4.0414E-08	7,292.43	14,584.86	0.00E+00	2.95E-04	5.89E-04		
U-232	1.0948E-07	7,292.43	14,584.86	0.00E+00	7.98E-04	1.60E-03		
U-233	3.6275E-09	7,292.43	14,584.86	0.00E+00	2.65E-05	5.29E-05		
U-234	1.8562E-04	7,292.43	14,584.86	0.00E+00	1.35E+00	2.71E+00		
U-235	-2.7235E-06	7,292.43	0.00	7.36E-02	5.37E-02	7.36E-02		
U-236	1.5493E-05	7,292.43	14,584.86	0.00E+00	1.13E-01	2.26E-01		
U-238	-4.2851E-09	7,292.43	0.00	1.27E-03	1.24E-03	1.27E-03		
Y-90	1.3475E+00	7,292.43	14,584.86	0.00E+00	9.83E+03	1.97E+04		
Other Radionuclides					9.98E+03	2.00E+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 %:	89.97773401	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		7,292.43	
Bounding:		14,584.86	

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:	0.61		
Bounding:	1.22		

1.01

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RECH-1 (CHILE)
SNF ID #: 708
Fuel Units & Descr: 58 - MTR TYPE
Heavy Metal Mass: BOL=11.873kg; EOL=7.998kg
ROD Storage Site: SRS

¹Fuel decay start date: 1999
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
2.42

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	1.1465E-09	3,669.13	7,338.26	0.00E+00	4.21E-06	8.41E-06	Avg. MeV		
Am-241	2.3056E-03	3,669.13	7,338.26	0.00E+00	8.46E+00	1.69E+01	0.0150	6.867E+14	
Am-242m	4.1476E-07	3,669.13	7,338.26	0.00E+00	1.52E-03	3.04E-03	0.0250	1.427E+14	
Am-243	1.4894E-06	3,669.13	7,338.26	0.00E+00	5.46E-03	1.09E-02	0.0375	1.242E+14	
C-14	5.7108E-09	3,669.13	7,338.26	0.00E+00	2.10E-05	4.19E-05	0.0675	1.334E+14	
Cl-36	1.3124E-32	3,669.13	7,338.26	0.00E+00	4.82E-29	9.63E-29	0.0850	8.049E+13	
Cm-243	1.4562E-07	3,669.13	7,338.26	0.00E+00	5.34E-04	1.07E-03	0.1250	5.392E+13	
Cm-244	2.4221E-05	3,669.13	7,338.26	0.00E+00	8.89E-02	1.78E-01	0.2250	6.949E+13	
Co-60	2.7560E-06	3,669.13	7,338.26	0.00E+00	1.01E-02	2.02E-02	0.3750	3.021E+13	
Cs-134	5.8851E-04	3,669.13	7,338.26	0.00E+00	2.16E+00	4.32E+00	0.5750	4.953E+14	
Cs-135	3.4477E-06	3,669.13	7,338.26	0.00E+00	1.27E-02	2.53E-02	0.8500	7.137E+12	
Cs-137	1.8099E+00	3,669.13	7,338.26	0.00E+00	6.64E+03	1.33E+04	1.2500	3.969E+12	
Eu-154	1.6386E-02	3,669.13	7,338.26	0.00E+00	6.01E+01	1.20E+02	1.7500	1.981E+11	
Eu-155	2.3957E-03	3,669.13	7,338.26	0.00E+00	8.79E+00	1.76E+01	2.2500	1.396E+07	
Fe-55	3.2707E-05	3,669.13	7,338.26	0.00E+00	1.20E-01	2.40E-01	2.7500	1.144E+07	
H-3	3.4504E-03	3,669.13	7,338.26	0.00E+00	1.27E+01	2.53E+01	3.5000	8.630E+03	
I-129	7.5300E-07	3,669.13	7,338.26	0.00E+00	2.76E-03	5.53E-03	5.0000	2.906E+03	
Kr-85	7.8540E-02	3,669.13	7,338.26	0.00E+00	2.88E+02	5.76E+02	7.0000	3.197E+02	
Np-237	9.5615E-06	3,669.13	7,338.26	0.00E+00	3.51E-02	7.02E-02	11.0000	3.577E+01	
Pa-231	2.7968E-09	3,669.13	7,338.26	0.00E+00	1.03E-05	2.05E-05			
Pb-210	1.2612E-10	3,669.13	7,338.26	0.00E+00	4.63E-07	9.25E-07			
Pm-147	1.2952E-02	3,669.13	7,338.26	0.00E+00	4.75E+01	9.50E+01			
Pu-238	1.7549E-02	3,669.13	7,338.26	0.00E+00	6.44E+01	1.29E+02			
Pu-239	4.2810E-04	3,669.13	7,338.26	0.00E+00	1.57E+00	3.14E+00			
Pu-240	2.4357E-04	3,669.13	7,338.26	0.00E+00	8.94E-01	1.79E+00			
Pu-241	2.6277E-02	3,669.13	7,338.26	0.00E+00	9.64E+01	1.93E+02			
Pu-242	3.6329E-07	3,669.13	7,338.26	0.00E+00	1.33E-03	2.67E-03			
Ra-226	4.4444E-10	3,669.13	7,338.26	0.00E+00	1.63E-06	3.26E-06			
Ra-228	1.9714E-14	3,669.13	7,338.26	0.00E+00	7.23E-11	1.45E-10			
Ru-106	2.0477E-07	3,669.13	7,338.26	0.00E+00	7.51E-04	1.50E-03			
Se-79	1.2933E-05	3,669.13	7,338.26	0.00E+00	4.75E-02	9.49E-02			
Sn-126	1.1574E-05	3,669.13	7,338.26	0.00E+00	4.25E-02	8.49E-02			
Sr-90	1.7092E+00	3,669.13	7,338.26	0.00E+00	8.27E+03	1.25E+04			
Tc-99	4.2239E-04	3,669.13	7,338.26	0.00E+00	1.55E+00	3.10E+00			
Th-229	7.7280E-12	3,669.13	7,338.26	0.00E+00	2.83E-08	5.67E-08			
Th-230	5.8497E-08	3,669.13	7,338.26	0.00E+00	2.15E-04	4.29E-04			
Th-232	2.6906E-14	3,669.13	7,338.26	0.00E+00	9.87E-11	1.97E-10			
Th-208	4.4336E-06	3,669.13	7,338.26	0.00E+00	1.63E-04	3.25E-04			
U-232	1.2037E-07	3,669.13	7,338.26	0.00E+00	4.42E-04	8.83E-04			
U-233	3.0011E-09	3,669.13	7,338.26	0.00E+00	1.10E-05	2.20E-05			
U-234	1.8497E-04	3,669.13	7,338.26	0.00E+00	6.79E-01	1.36E+00			
U-235	-2.7235E-06	3,669.13	0.00	2.05E-02	1.05E-02	2.05E-02			
U-236	1.5493E-05	3,669.13	7,338.26	0.00E+00	5.68E-02	1.14E-01			
U-238	-4.2851E-09	3,669.13	0.00	7.98E-04	7.83E-04	7.98E-04			
Y-90	1.7094E+00	3,669.13	7,338.26	0.00E+00	6.27E+03	1.25E+04			
Other Radionuclides					6.32E+03	1.26E+04			

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.76E+01	1.55E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	79.9939132	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		3,669.13	
Bounding:		7,338.26	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal:	0.98		
Bounding:	1.96		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: RHF (FRANCE)
SNF ID #: 179
Fuel Units & Descr: 4 - 2 CONCENTRIC TUBES
Heavy Metal Mass: BOL=36.9kg; EOL=25.51kg
ROD Storage Site: SRS

¹Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
Canister usage:
18"x10"
0.67

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	10,786.55	21,573.10	0.00E+00	2.16E-05	4.33E-05	Avg. MeV	
Am-241	2.5251E-03	10,786.55	21,573.10	0.00E+00	2.72E+01	5.45E+01	0.0150	1.589E+15
Am-242m	3.9624E-07	10,786.55	21,573.10	0.00E+00	4.27E-03	8.55E-03	0.0250	3.299E+14
Am-243	1.4880E-06	10,786.55	21,573.10	0.00E+00	1.61E-02	3.21E-02	0.0375	2.868E+14
C-14	5.7053E-09	10,786.55	21,573.10	0.00E+00	6.15E-05	1.23E-04	0.0575	3.087E+14
Cl-36	1.3124E-32	10,786.55	21,573.10	0.00E+00	1.42E-28	2.83E-28	0.0650	1.860E+14
Cm-243	1.1419E-07	10,786.55	21,573.10	0.00E+00	1.23E-03	2.46E-03	0.1250	1.228E+14
Cm-244	1.6522E-05	10,786.55	21,573.10	0.00E+00	1.78E-01	3.56E-01	0.2250	1.806E+14
Co-60	7.4047E-07	10,786.55	21,573.10	0.00E+00	7.99E-03	1.60E-02	0.3750	6.985E+13
Cs-134	2.0455E-05	10,786.55	21,573.10	0.00E+00	2.21E-01	4.41E-01	0.5750	1.154E+15
Cs-135	3.4477E-06	10,786.55	21,573.10	0.00E+00	3.72E-02	7.44E-02	0.8500	1.410E+13
Cs-137	1.4365E+00	10,786.55	21,573.10	0.00E+00	1.55E+04	3.10E+04	1.2500	6.820E+12
Eu-154	7.3230E-03	10,786.55	21,573.10	0.00E+00	7.90E+01	1.58E+02	1.7500	3.839E+11
Eu-155	5.9259E-04	10,786.55	21,573.10	0.00E+00	6.39E+00	1.28E+01	2.2500	3.210E+07
Fe-55	2.2791E-06	10,786.55	21,573.10	0.00E+00	2.46E-02	4.92E-02	2.7500	3.063E+07
H-3	1.9698E-03	10,786.55	21,573.10	0.00E+00	2.12E+01	4.25E+01	3.5000	1.775E+04
I-129	7.5300E-07	10,786.55	21,573.10	0.00E+00	8.12E-03	1.62E-02	8.0000	7.252E+03
Kr-85	4.1176E-02	10,786.55	21,573.10	0.00E+00	4.44E+02	8.88E+02	7.0000	7.936E+02
Np-237	9.5752E-06	10,786.55	21,573.10	0.00E+00	1.03E-01	2.07E-01	11.0000	8.848E+01
Pb-210	3.9379E-09	10,786.55	21,573.10	0.00E+00	4.25E-05	8.50E-05		
Pb-210	3.3115E-10	10,786.55	21,573.10	0.00E+00	3.57E-06	7.14E-06		
Pm-147	9.2402E-04	10,786.55	21,573.10	0.00E+00	9.97E+00	1.99E+01		
Pu-238	1.6217E-02	10,786.55	21,573.10	0.00E+00	1.75E+02	3.50E+02		
Pu-239	4.2810E-04	10,786.55	21,573.10	0.00E+00	4.62E+00	9.24E+00		
Pu-240	2.4333E-04	10,786.55	21,573.10	0.00E+00	2.62E+00	5.25E+00		
Pu-241	1.6242E-02	10,786.55	21,573.10	0.00E+00	1.75E+02	3.50E+02		
Pu-242	3.6329E-07	10,786.55	21,573.10	0.00E+00	3.92E-03	7.84E-03		
Ra-226	9.0114E-10	10,786.55	21,573.10	0.00E+00	9.72E-06	1.94E-05		
Ra-228	3.1019E-14	10,786.55	21,573.10	0.00E+00	3.35E-10	6.69E-10		
Rn-106	2.1225E-10	10,786.55	21,573.10	0.00E+00	2.29E-06	4.58E-06		
Se-79	1.2930E-05	10,786.55	21,573.10	0.00E+00	1.39E-01	2.79E-01		
Sn-126	1.1571E-05	10,786.55	21,573.10	0.00E+00	1.25E-01	2.50E-01		
Sr-90	1.3472E+00	10,786.55	21,573.10	0.00E+00	1.45E+04	2.91E+04		
Tc-99	4.2239E-04	10,786.55	21,573.10	0.00E+00	4.56E+00	9.11E+00		
Th-229	1.2407E-11	10,786.55	21,573.10	0.00E+00	1.34E-07	2.68E-07		
Th-230	8.3497E-08	10,786.55	21,573.10	0.00E+00	9.01E-04	1.80E-03		
Th-232	3.8371E-14	10,786.55	21,573.10	0.00E+00	4.14E-10	8.28E-10		
Th-208	4.0414E-08	10,786.55	21,573.10	0.00E+00	4.36E-04	8.72E-04		
U-232	1.0948E-07	10,786.55	21,573.10	0.00E+00	1.18E-03	2.36E-03		
U-233	3.6275E-09	10,786.55	21,573.10	0.00E+00	3.91E-05	7.83E-05		
U-234	1.8562E-04	10,786.55	21,573.10	0.00E+00	2.00E+00	4.00E+00		
U-235	-2.7235E-06	10,786.55	0.00	7.41E-02	4.48E-02	7.41E-02		
U-236	1.5493E-05	10,786.55	21,573.10	0.00E+00	1.67E-01	3.34E-01		
U-238	-4.2851E-09	10,786.55	0.00	8.72E-04	8.26E-04	8.72E-04		
Y-90	1.3475E+00	10,786.55	21,573.10	0.00E+00	1.45E+04	2.91E+04		
Other Radionuclides					1.48E+04	2.95E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.97	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		10,786.55
Bounding:		21,573.10

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:	0.93	
Bounding:	1.86	

Estimated EOL HM/Given EOL HM
1.03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 181
Fuel Units & Descr: 44 - 18 FLAT PLATES
Heavy Metal Mass: BOL=61.12kg; EOL=60.465kg
ROD Storage Site: SRS

¹Fuel decay start date: 2005
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"
1.83

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	620.87	1,241.73	0.00E+00	9.03E-08	1.81E-07	Avg. MeV	
Am-241	1.1190E-03	620.87	1,241.73	0.00E+00	6.95E-01	1.39E+00	0.0150	2.390E+14
Am-242m	4.5425E-07	620.87	1,241.73	0.00E+00	2.82E-04	5.64E-04	0.0250	5.161E+13
Am-243	1.4921E-06	620.87	1,241.73	0.00E+00	9.26E-04	1.85E-03	0.0375	4.763E+13
C-14	5.7244E-09	620.87	1,241.73	0.00E+00	3.55E-08	7.11E-08	0.0675	4.683E+13
Cl-36	1.3124E-32	620.87	1,241.73	0.00E+00	8.15E-30	1.63E-29	0.0850	2.985E+13
Cm-243	2.3676E-07	620.87	1,241.73	0.00E+00	1.47E-04	2.94E-04	0.1250	2.585E+13
Cm-244	5.2042E-05	620.87	1,241.73	0.00E+00	3.23E-02	6.46E-02	0.2250	2.530E+13
Co-60	3.8208E-05	620.87	1,241.73	0.00E+00	2.37E-02	4.74E-02	0.3750	1.225E+13
Cs-134	4.8693E-01	620.87	1,241.73	0.00E+00	3.02E+02	6.05E+02	0.5750	1.682E+14
Cs-135	3.4477E-06	620.87	1,241.73	0.00E+00	2.14E-03	4.28E-03	0.8500	2.350E+13
Cs-137	2.8731E+00	620.87	1,241.73	0.00E+00	1.78E+03	3.57E+03	1.2500	4.383E+12
Eu-154	8.2053E-02	620.87	1,241.73	0.00E+00	5.09E+01	1.02E+02	1.7500	1.838E+11
Eu-155	3.9134E-02	620.87	1,241.73	0.00E+00	2.43E+01	4.86E+01	2.2500	3.865E+11
Fe-55	6.7429E-03	620.87	1,241.73	0.00E+00	4.19E+00	8.37E+00	2.7500	2.218E+09
H-3	1.0599E-02	620.87	1,241.73	0.00E+00	6.58E+00	1.32E+01	3.5000	2.480E+08
I-129	7.5300E-07	620.87	1,241.73	0.00E+00	4.68E-04	9.35E-04	5.0000	7.735E+02
Kr-85	2.8595E-01	620.87	1,241.73	0.00E+00	1.78E+02	3.55E+02	7.0000	8.638E+01
Np-237	9.5479E-06	620.87	1,241.73	0.00E+00	5.93E-03	1.19E-02	11.0000	9.745E+00
Pa-231	8.9297E-10	620.87	1,241.73	0.00E+00	5.54E-07	1.11E-06		
Pb-210	3.7609E-12	620.87	1,241.73	0.00E+00	2.34E-09	4.67E-09		
Pm-147	2.5452E+00	620.87	1,241.73	0.00E+00	1.58E+03	3.16E+03		
Pu-238	2.0550E-02	620.87	1,241.73	0.00E+00	1.28E+01	2.55E+01		
Pu-239	4.2838E-04	620.87	1,241.73	0.00E+00	2.66E-01	5.32E-01		
Pu-240	2.4401E-04	620.87	1,241.73	0.00E+00	1.51E-01	3.03E-01		
Pu-241	6.8764E-02	620.87	1,241.73	0.00E+00	4.27E+01	8.54E+01		
Pu-242	3.6329E-07	620.87	1,241.73	0.00E+00	2.26E-04	4.51E-04		
Ra-226	3.8045E-11	620.87	1,241.73	0.00E+00	2.36E-08	4.72E-08		
Ra-228	2.9902E-15	620.87	1,241.73	0.00E+00	1.86E-12	3.71E-12		
Ru-106	1.9055E-01	620.87	1,241.73	0.00E+00	1.18E+02	2.37E+02		
Se-79	1.2938E-05	620.87	1,241.73	0.00E+00	8.03E-03	1.61E-02		
Sm-126	1.1574E-05	620.87	1,241.73	0.00E+00	7.19E-03	1.44E-02		
Sr-90	2.7505E+00	620.87	1,241.73	0.00E+00	1.71E+03	3.42E+03		
Tc-99	4.2239E-04	620.87	1,241.73	0.00E+00	2.62E-01	5.24E-01		
Th-229	1.8848E-12	620.87	1,241.73	0.00E+00	1.17E-09	2.34E-09		
Th-230	1.7042E-08	620.87	1,241.73	0.00E+00	1.06E-05	2.12E-05		
Th-232	7.8132E-15	620.87	1,241.73	0.00E+00	4.85E-12	9.70E-12		
Th-208	4.4063E-08	620.87	1,241.73	0.00E+00	2.74E-05	5.47E-05		
U-232	1.3151E-07	620.87	1,241.73	0.00E+00	8.16E-05	1.63E-04		
U-233	1.9564E-09	620.87	1,241.73	0.00E+00	1.21E-08	2.43E-08		
U-234	1.8371E-04	620.87	1,241.73	0.00E+00	1.14E-01	2.28E-01		
U-235	-2.7235E-06	620.87	0.00	2.61E-02	2.44E-02	2.61E-02		
U-236	1.5493E-05	620.87	1,241.73	0.00E+00	9.62E-03	1.92E-02		
U-238	-4.2851E-09	620.87	0.00	1.65E-02	1.65E-02	1.65E-02		
Y-90	2.7505E+00	620.87	1,241.73	0.00E+00	1.71E+03	3.42E+03		
Other Radionuclides					3.19E+03	6.39E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.7728395	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 620.87	Estimated 620.87	
Bounding:	1,241.73	1,241.73	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 0.03	Estimated Burnup/ Given Burnup	
Bounding:	0.06		1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 180
Fuel Units & Descr: 70 - 18 FLAT PLATES
Heavy Metal Mass: BOL=9.366kg; EOL=8.496kg
ROD Storage Site: SRS

Fuel decay start date: 1992
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"
1.94

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	2.0068E-09	822.01	1,644.03	0.00E+00	1.85E-06	3.30E-06	Avg. MeV	
Am-241	2.5251E-03	822.01	1,644.03	0.00E+00	2.08E+00	4.15E+00	0.0150	1.211E+14
Am-242m	3.9624E-07	822.01	1,644.03	0.00E+00	3.26E-04	6.51E-04	0.0250	2.514E+13
Am-243	1.4880E-06	822.01	1,644.03	0.00E+00	1.22E-03	2.45E-03	0.0375	2.185E+13
C-14	5.7053E-09	822.01	1,644.03	0.00E+00	4.69E-06	9.38E-06	0.0575	2.352E+13
Cl-36	1.3124E-32	822.01	1,644.03	0.00E+00	1.08E-29	2.16E-29	0.0850	1.417E+13
Cm-243	1.1419E-07	822.01	1,644.03	0.00E+00	9.39E-05	1.88E-04	0.1250	9.362E+12
Cm-244	1.6522E-05	822.01	1,644.03	0.00E+00	1.36E-02	2.72E-02	0.2250	1.224E+13
Co-60	7.4047E-07	822.01	1,644.03	0.00E+00	6.09E-04	1.22E-03	0.3750	5.323E+12
Cs-134	2.0455E-05	822.01	1,644.03	0.00E+00	1.68E-02	3.36E-02	0.5750	8.798E+13
Cs-135	3.4477E-06	822.01	1,644.03	0.00E+00	2.83E-03	5.67E-03	0.8500	1.075E+12
Cs-137	1.4365E+00	822.01	1,644.03	0.00E+00	1.18E+03	2.36E+03	1.2500	5.198E+11
Eu-154	7.3230E-03	822.01	1,644.03	0.00E+00	6.02E+00	1.20E+01	1.7500	2.925E+10
Eu-155	5.9259E-04	822.01	1,644.03	0.00E+00	4.87E-01	9.74E-01	2.2500	2.446E+06
Fe-55	2.2791E-06	822.01	1,644.03	0.00E+00	1.87E-03	3.75E-03	2.7500	2.335E+06
H-3	1.9698E-03	822.01	1,644.03	0.00E+00	1.82E+00	3.24E+00	3.5000	1.354E+09
I-129	7.5300E-07	822.01	1,644.03	0.00E+00	6.19E-04	1.24E-03	5.0000	5.532E+02
Kr-85	4.1176E-02	822.01	1,644.03	0.00E+00	3.38E+01	6.77E+01	7.0000	6.054E+01
Np-237	9.5752E-06	822.01	1,644.03	0.00E+00	7.87E-03	1.57E-02	11.0000	6.750E+00
Pa-231	3.9379E-09	822.01	1,644.03	0.00E+00	3.24E-06	6.47E-06		
Pb-210	3.3115E-10	822.01	1,644.03	0.00E+00	2.72E-07	5.44E-07		
Pm-147	9.2402E-04	822.01	1,644.03	0.00E+00	7.60E-01	1.52E+00		
Pu-238	1.6217E-02	822.01	1,644.03	0.00E+00	1.33E+01	2.67E+01		
Pu-239	4.2810E-04	822.01	1,644.03	0.00E+00	3.52E-01	7.04E-01		
Pu-240	2.4333E-04	822.01	1,644.03	0.00E+00	2.00E-01	4.00E-01		
Pu-241	1.6242E-02	822.01	1,644.03	0.00E+00	1.34E+01	2.67E+01		
Pu-242	3.6329E-07	822.01	1,644.03	0.00E+00	2.99E-04	5.97E-04		
Ra-226	9.0114E-10	822.01	1,644.03	0.00E+00	7.41E-07	1.48E-06		
Ra-228	3.1019E-14	822.01	1,644.03	0.00E+00	2.55E-11	5.10E-11		
Ru-106	2.1225E-10	822.01	1,644.03	0.00E+00	1.74E-07	3.49E-07		
Se-79	1.2930E-05	822.01	1,644.03	0.00E+00	1.06E-02	2.13E-02		
Sn-126	1.1571E-05	822.01	1,644.03	0.00E+00	9.51E-03	1.90E-02		
Sr-90	1.3472E+00	822.01	1,644.03	0.00E+00	1.11E+03	2.21E+03		
Tc-99	4.2239E-04	822.01	1,644.03	0.00E+00	3.47E-01	6.94E-01		
Th-229	1.2407E-11	822.01	1,644.03	0.00E+00	1.02E-08	2.04E-08		
Th-230	8.3497E-08	822.01	1,644.03	0.00E+00	6.86E-05	1.37E-04		
Th-232	3.8371E-14	822.01	1,644.03	0.00E+00	3.15E-11	6.31E-11		
Ti-208	4.0414E-08	822.01	1,644.03	0.00E+00	3.32E-05	6.64E-05		
U-232	1.0948E-07	822.01	1,644.03	0.00E+00	9.00E-05	1.80E-04		
U-233	3.6275E-09	822.01	1,644.03	0.00E+00	2.98E-06	5.96E-06		
U-234	1.8562E-04	822.01	1,644.03	0.00E+00	1.53E-01	3.05E-01		
U-235	-2.7235E-06	822.01	0.00	1.89E-02	1.68E-02	1.89E-02		
U-236	1.5493E-05	822.01	1,644.03	0.00E+00	1.27E-02	2.55E-02		
U-238	-4.2851E-09	822.01	0.00	2.18E-04	2.13E-04	2.18E-04		
Y-90	1.3475E+00	822.01	1,644.03	0.00E+00	1.11E+03	2.22E+03		
Other Radionuclides					1.12E+03	2.25E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	83.13598185	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		822.01
Bounding:	37.46	1,644.03

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:	0.28	
Bounding:	0.56	43.68

Estimated EOL HM/Given EOL HM

1.01

²Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RPI (UALX-LEU) PORTUGAL
 SNF ID #: 943
 Fuel Units & Descr: 39 - ASSEMBLY
 Heavy Metal Mass: BOL=30.381kg; EOL=29.23kg
 ROD Storage Site: SRS

Fuel decay start date: 1998
 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: 25 years

Estimated
 Canister usage:
 18"x10"
 1.63

II. Estimates

Radionuclide	m	X ₀	X ₁	b	Y ₀	Y ₁	Gamma Sources	
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	1,089.55	2,179.09	0.00E+00	1.25E-06	2.50E-06	Avg. MeV	
Am-241	2.3056E-03	1,089.55	2,179.09	0.00E+00	2.51E+00	5.02E+00	0.0150	2.039E+14
Am-242m	4.1476E-07	1,089.55	2,179.09	0.00E+00	4.52E-04	9.04E-04	0.0250	4.236E+13
Am-243	1.4894E-06	1,089.55	2,179.09	0.00E+00	1.62E-03	3.25E-03	0.0375	3.689E+13
C-14	5.7108E-09	1,089.55	2,179.09	0.00E+00	6.22E-06	1.24E-05	0.0575	3.981E+13
Cl-36	1.3124E-32	1,089.55	2,179.09	0.00E+00	1.43E-29	2.86E-29	0.0850	2.390E+13
Cm-243	1.4562E-07	1,089.55	2,179.09	0.00E+00	1.59E-04	3.17E-04	0.1250	1.601E+13
Cm-244	2.4221E-05	1,089.55	2,179.09	0.00E+00	2.64E-02	5.28E-02	0.2250	2.064E+13
Co-60	2.7560E-06	1,089.55	2,179.09	0.00E+00	3.00E-03	6.01E-03	0.3750	8.972E+12
Cs-134	5.8851E-04	1,089.55	2,179.09	0.00E+00	6.41E-01	1.28E+00	0.5750	1.471E+14
Cs-135	3.4477E-06	1,089.55	2,179.09	0.00E+00	3.76E-03	7.51E-03	0.8500	2.119E+12
Cs-137	1.8099E+00	1,089.55	2,179.09	0.00E+00	1.97E+03	3.94E+03	1.2500	1.179E+12
Eu-154	1.6386E-02	1,089.55	2,179.09	0.00E+00	1.79E+01	3.57E+01	1.7500	5.823E+10
Eu-155	2.3957E-03	1,089.55	2,179.09	0.00E+00	2.61E+00	5.22E+00	2.2500	4.150E+06
Fe-55	3.2707E-05	1,089.55	2,179.09	0.00E+00	3.56E-02	7.13E-02	2.7500	3.398E+06
H-3	3.4504E-03	1,089.55	2,179.09	0.00E+00	3.78E+00	7.52E+00	3.5000	2.608E+03
I-129	7.5300E-07	1,089.55	2,179.09	0.00E+00	8.20E-04	1.64E-03	5.0000	8.812E+02
Kr-85	7.8540E-02	1,089.55	2,179.09	0.00E+00	8.56E+01	1.71E+02	7.0000	9.705E+01
Np-237	9.5615E-06	1,089.55	2,179.09	0.00E+00	1.04E-02	2.08E-02	11.0000	1.086E+01
Pa-231	2.7968E-09	1,089.55	2,179.09	0.00E+00	3.05E-06	6.09E-06		
Pb-210	1.2612E-10	1,089.55	2,179.09	0.00E+00	1.37E-07	2.75E-07		
Pm-147	1.2952E-02	1,089.55	2,179.09	0.00E+00	1.41E+01	2.82E+01		
Pu-238	1.7549E-02	1,089.55	2,179.09	0.00E+00	1.91E+01	3.82E+01		
Pu-239	4.2810E-04	1,089.55	2,179.09	0.00E+00	4.66E-01	9.33E-01		
Pu-240	2.4357E-04	1,089.55	2,179.09	0.00E+00	2.65E-01	5.31E-01		
Pu-241	2.6277E-02	1,089.55	2,179.09	0.00E+00	2.86E+01	5.73E+01		
Pu-242	3.6329E-07	1,089.55	2,179.09	0.00E+00	3.96E-04	7.92E-04		
Ra-226	4.4444E-10	1,089.55	2,179.09	0.00E+00	4.84E-07	9.68E-07		
Ra-228	1.9714E-14	1,089.55	2,179.09	0.00E+00	2.15E-11	4.30E-11		
Ru-106	2.0477E-07	1,089.55	2,179.09	0.00E+00	2.23E-04	4.46E-04		
Se-79	1.2933E-05	1,089.55	2,179.09	0.00E+00	1.41E-02	2.82E-02		
Sn-126	1.1574E-05	1,089.55	2,179.09	0.00E+00	1.26E-02	2.52E-02		
Sr-90	1.7092E+00	1,089.55	2,179.09	0.00E+00	1.86E+03	3.72E+03		
Tc-99	4.2239E-04	1,089.55	2,179.09	0.00E+00	4.60E-01	9.20E-01		
Th-229	7.7260E-12	1,089.55	2,179.09	0.00E+00	8.42E-09	1.68E-08		
Th-230	5.8497E-08	1,089.55	2,179.09	0.00E+00	6.37E-05	1.27E-04		
Th-232	2.6906E-14	1,089.55	2,179.09	0.00E+00	2.93E-11	5.86E-11		
Ti-206	4.4336E-08	1,089.55	2,179.09	0.00E+00	4.83E-05	9.66E-05		
U-232	1.2037E-07	1,089.55	2,179.09	0.00E+00	1.31E-04	2.62E-04		
U-233	3.0011E-09	1,089.55	2,179.09	0.00E+00	3.27E-06	6.54E-06		
U-234	1.8497E-04	1,089.55	2,179.09	0.00E+00	2.02E-01	4.03E-01		
U-235	-2.7235E-06	1,089.55	0.00	1.30E-02	1.01E-02	1.30E-02		
U-236	1.5493E-05	1,089.55	2,179.09	0.00E+00	1.69E-02	3.38E-02		
U-238	-4.2851E-09	1,089.55	0.00	8.19E-03	8.18E-03	8.19E-03		
Y-90	1.7094E+00	1,089.55	2,179.09	0.00E+00	1.86E+03	3.72E+03		
Other Radionuclides					1.88E+03	3.75E+03		

Thermal Power
 Nominal Heat Output (Watts) Bounding Heat Output (Watts)
 2.30E+01 4.61E+01
 Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basic for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALLUM	ALLUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.83094182	60 to 100	

Burnup Summary (MWd) ²			Basic for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		1,089.55	Nominal burnup calculated from the heavy metal mass destroyed.
		2,179.09	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.11	0.23	1.00

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RSG-GAS (U308-LEU) INDONESIA
 SNF ID #: 288
 Fuel Units & Descr: 47 - ASSEMBLY
 Heavy Metal Mass: BOL=56.188kg; EOL=51.479kg
 ROD Storage Site: SRS

Fuel decay start date: 1999
 Estimates as of: 2030
 Template: ATR (Light Water, Alum., 80 to 100%, U)
 Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 25 years

Estimated
 Canister usage:
 18"x10"
 1.96

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	4,459.89	8,919.79	0.00E+00	5.11E-06	1.02E-05	Avg. MeV	
Am-241	2.3056E-03	4,459.89	8,919.79	0.00E+00	1.03E+01	2.06E+01	0.0150	8.347E+14
Am-242m	4.1476E-07	4,459.89	8,919.79	0.00E+00	1.85E-03	3.70E-03	0.0250	1.734E+14
Am-243	1.4894E-06	4,459.89	8,919.79	0.00E+00	6.64E-03	1.33E-02	0.0375	1.510E+14
C-14	5.7108E-09	4,459.89	8,919.79	0.00E+00	2.55E-05	5.09E-05	0.0575	1.622E+14
Cf-252	1.3124E-32	4,459.89	8,919.79	0.00E+00	5.85E-29	1.17E-28	0.0850	9.784E+13
Cm-243	1.4562E-07	4,459.89	8,919.79	0.00E+00	6.49E-04	1.30E-03	0.1250	6.553E+13
Cm-244	2.4221E-05	4,459.89	8,919.79	0.00E+00	1.08E-01	2.16E-01	0.2250	8.447E+13
Co-60	2.7560E-06	4,459.89	8,919.79	0.00E+00	1.23E-02	2.46E-02	0.3750	3.672E+13
Cs-134	6.8851E-04	4,459.89	8,919.79	0.00E+00	2.62E+00	5.25E+00	0.5750	6.021E+14
Cs-135	3.4477E-06	4,459.89	8,919.79	0.00E+00	1.54E-02	3.08E-02	0.8500	8.678E+12
Cs-137	1.8099E+00	4,459.89	8,919.79	0.00E+00	8.07E+03	1.61E+04	1.2500	4.825E+12
Eu-154	1.6386E-02	4,459.89	8,919.79	0.00E+00	7.31E+01	1.46E+02	1.7500	2.384E+11
Eu-155	2.3957E-03	4,459.89	8,919.79	0.00E+00	1.07E+01	2.14E+01	2.2500	1.899E+07
Fe-55	3.2707E-06	4,459.89	8,919.79	0.00E+00	1.46E-01	2.92E-01	2.7500	1.391E+07
H-3	3.4504E-03	4,459.89	8,919.79	0.00E+00	1.54E+01	3.08E+01	3.5000	1.058E+04
I-129	7.5300E-07	4,459.89	8,919.79	0.00E+00	3.36E-03	6.72E-03	5.0000	3.565E+03
Kr-85	7.8540E-02	4,459.89	8,919.79	0.00E+00	3.50E+02	7.01E+02	7.0000	3.924E+02
Np-237	9.5615E-06	4,459.89	8,919.79	0.00E+00	4.26E-02	8.53E-02	11.0000	4.391E+01
Pa-231	2.7968E-09	4,459.89	8,919.79	0.00E+00	1.25E-05	2.49E-05		
Pb-210	1.2612E-10	4,459.89	8,919.79	0.00E+00	5.62E-07	1.12E-06		
Pm-147	1.2952E-02	4,459.89	8,919.79	0.00E+00	5.78E+01	1.16E+02		
Pu-238	1.7549E-02	4,459.89	8,919.79	0.00E+00	7.83E+01	1.57E+02		
Pu-239	4.2810E-04	4,459.89	8,919.79	0.00E+00	1.91E+00	3.82E+00		
Pu-240	2.4357E-04	4,459.89	8,919.79	0.00E+00	1.09E+00	2.17E+00		
Pu-241	2.6277E-02	4,459.89	8,919.79	0.00E+00	1.17E+02	2.34E+02		
Pu-242	3.6329E-07	4,459.89	8,919.79	0.00E+00	1.62E-03	3.24E-03		
Ra-226	4.4444E-10	4,459.89	8,919.79	0.00E+00	1.98E-06	3.96E-06		
Ra-228	1.9714E-14	4,459.89	8,919.79	0.00E+00	8.79E-11	1.76E-10		
Ru-106	2.0477E-07	4,459.89	8,919.79	0.00E+00	9.13E-04	1.83E-03		
Se-79	1.2933E-05	4,459.89	8,919.79	0.00E+00	5.77E-02	1.15E-01		
Sn-126	1.1574E-05	4,459.89	8,919.79	0.00E+00	5.18E-02	1.03E-01		
Sr-90	1.7092E+00	4,459.89	8,919.79	0.00E+00	7.62E+03	1.52E+04		
Tc-99	4.2239E-04	4,459.89	8,919.79	0.00E+00	1.88E+00	3.77E+00		
Th-229	7.7260E-12	4,459.89	8,919.79	0.00E+00	3.45E-08	6.89E-08		
Th-230	5.8497E-08	4,459.89	8,919.79	0.00E+00	2.61E-04	5.22E-04		
Th-232	2.6906E-14	4,459.89	8,919.79	0.00E+00	1.20E-10	2.40E-10		
Ti-208	4.4336E-08	4,459.89	8,919.79	0.00E+00	1.98E-04	3.95E-04		
U-232	1.2037E-07	4,459.89	8,919.79	0.00E+00	5.37E-04	1.07E-03		
U-233	3.0011E-09	4,459.89	8,919.79	0.00E+00	1.34E-05	2.68E-05		
U-234	1.8497E-04	4,459.89	8,919.79	0.00E+00	8.25E-01	1.65E+00		
U-235	-2.7235E-06	4,459.89	0.00	2.39E-02	1.18E-02	2.39E-02		
U-236	1.5493E-05	4,459.89	8,919.79	0.00E+00	6.91E-02	1.38E-01		
U-238	-4.2851E-09	4,459.89	0.00	1.52E-02	1.51E-02	1.52E-02		
Y-90	1.7094E+00	4,459.89	8,919.79	0.00E+00	7.62E+03	1.52E+04		
Other Radionuclides					7.68E+03	1.54E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.68299334	80 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		4,459.89	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		8,919.79	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.25		1.01
Bounding:	0.50		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RU-1 (UALX LEU) URAGUAY
SNF ID #: 557
Fuel Units & Descr: 4 - ASSEMBLY
Heavy Metal Mass: BOL=2.112kg; EOL=2.11kg
ROD Storage Site: SRS

Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup(MWd): 387.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.11

II. Estimates	m	x ₀	x ₀	b	y ₀	y ₀	Gamma Sources	
Radionuclide	CUMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	1.89	3.79	0.00E+00	2.17E-09	4.34E-09	Avg. MeV	
Am-241	2.3056E-03	1.89	3.79	0.00E+00	4.37E-03	8.73E-03	0.0150	3.545E+11
Am-242m	4.1476E-07	1.89	3.79	0.00E+00	7.86E-07	1.57E-06	0.0250	7.364E+10
Am-243	1.4894E-06	1.89	3.79	0.00E+00	2.82E-06	5.64E-06	0.0375	6.413E+10
C-14	5.7108E-09	1.89	3.79	0.00E+00	1.08E-08	2.16E-08	0.0575	6.896E+10
Cl-36	1.3124E-32	1.89	3.79	0.00E+00	2.49E-32	4.97E-32	0.0850	4.155E+10
Cm-243	1.4562E-07	1.89	3.79	0.00E+00	2.76E-07	5.52E-07	0.1250	2.784E+10
Cm-244	2.4221E-05	1.89	3.79	0.00E+00	4.59E-05	9.18E-05	0.2250	3.589E+10
Co-60	2.7560E-06	1.89	3.79	0.00E+00	5.22E-06	1.04E-05	0.3750	1.560E+10
Cs-134	5.8851E-04	1.89	3.79	0.00E+00	1.11E-03	2.23E-03	0.5750	2.567E+11
Cs-135	3.4477E-06	1.89	3.79	0.00E+00	6.53E-06	1.31E-05	0.8500	3.684E+09
Cs-137	1.8099E+00	1.89	3.79	0.00E+00	3.43E+00	6.86E+00	1.2500	2.049E+08
Eu-154	1.6386E-02	1.89	3.79	0.00E+00	3.10E-02	6.21E-02	1.7500	1.012E+08
Eu-155	2.3957E-03	1.89	3.79	0.00E+00	4.54E-03	9.08E-03	2.2500	7.221E+03
Fe-55	3.2707E-05	1.89	3.79	0.00E+00	6.19E-05	1.24E-04	2.7500	5.911E+03
H-3	3.4504E-03	1.89	3.79	0.00E+00	6.54E-03	1.31E-02	3.5000	7.520E+00
I-129	7.5300E-07	1.89	3.79	0.00E+00	1.43E-06	2.85E-06	5.0000	2.815E+00
Kr-85	7.8540E-02	1.89	3.79	0.00E+00	1.49E-01	2.98E-01	7.0000	3.164E-01
Np-237	9.5615E-06	1.89	3.79	0.00E+00	1.81E-05	3.62E-05	11.0000	3.587E-02
Pa-231	2.7968E-08	1.89	3.79	0.00E+00	5.30E-08	1.06E-07		
Pb-210	1.2612E-10	1.89	3.79	0.00E+00	2.39E-10	4.78E-10		
Pm-147	1.2952E-02	1.89	3.79	0.00E+00	2.45E-02	4.91E-02		
Pu-238	1.7549E-02	1.89	3.79	0.00E+00	3.32E-02	6.65E-02		
Pu-239	4.2810E-04	1.89	3.79	0.00E+00	8.11E-04	1.62E-03		
Pu-240	2.4357E-04	1.89	3.79	0.00E+00	4.61E-04	9.23E-04		
Pu-241	2.6277E-02	1.89	3.79	0.00E+00	4.98E-02	9.95E-02		
Pu-242	3.6329E-07	1.89	3.79	0.00E+00	6.88E-07	1.38E-06		
Ra-226	4.4444E-10	1.89	3.79	0.00E+00	8.42E-10	1.68E-09		
Ra-228	1.9714E-14	1.89	3.79	0.00E+00	3.73E-14	7.47E-14		
Ru-106	2.0477E-07	1.89	3.79	0.00E+00	3.88E-07	7.76E-07		
Se-79	1.2933E-05	1.89	3.79	0.00E+00	2.45E-05	4.90E-05		
Sn-126	1.1574E-05	1.89	3.79	0.00E+00	2.19E-05	4.38E-05		
Sr-90	1.7092E+00	1.89	3.79	0.00E+00	3.24E+00	6.47E+00		
Tc-99	4.2239E-04	1.89	3.79	0.00E+00	8.00E-04	1.60E-03		
Th-229	7.7260E-12	1.89	3.79	0.00E+00	1.46E-11	2.93E-11		
Th-230	5.8497E-08	1.89	3.79	0.00E+00	1.11E-07	2.22E-07		
Th-232	2.6906E-14	1.89	3.79	0.00E+00	5.10E-14	1.02E-13		
Ti-208	4.4336E-08	1.89	3.79	0.00E+00	8.40E-08	1.68E-07		
U-232	1.2037E-07	1.89	3.79	0.00E+00	2.28E-07	4.56E-07		
U-233	3.0011E-09	1.89	3.79	0.00E+00	5.68E-09	1.14E-08		
U-234	1.8497E-04	1.89	3.79	0.00E+00	3.50E-04	7.01E-04		
U-235	-2.7235E-06	1.89	0.00	9.04E-04	8.99E-04	9.04E-04		
U-236	1.5493E-05	1.89	3.79	0.00E+00	2.93E-05	5.87E-05		
U-238	-4.2851E-09	1.89	0.00	5.69E-04	5.69E-04	5.69E-04		
Y-90	1.7094E+00	1.89	3.79	0.00E+00	3.24E+00	6.48E+00		
Other Radionuclides					3.26E+00	6.53E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.81060808	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal:	0.00	1.89	
Bounding:		3.79	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.00	448.40	1.00
Bounding:	0.01		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RU-1 (UALX LEU) URUGUAY
SNF ID #: 1073
Fuel Units & Descr: 15 - ASSEMBLY
Heavy Metal Mass: BOL=7.92kg; EOL=7.912kg
ROD Storage Site: SRS

Fuel decay start date: 1998
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: 25 years

Estimated
Canister usage:
18"x10"
0.42

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	1.1465E-09	7.10	14.21	0.00E+00	8.14E-09	1.63E-08	Avg. MeV	
Am-241	2.3056E-03	7.10	14.21	0.00E+00	1.84E-02	3.28E-02	0.0150	1.329E+12
Am-242m	4.1476E-07	7.10	14.21	0.00E+00	2.95E-06	5.89E-06	0.0250	2.781E+11
Am-243	1.4894E-06	7.10	14.21	0.00E+00	1.06E-05	2.12E-05	0.0375	2.405E+11
C-14	5.7108E-09	7.10	14.21	0.00E+00	4.06E-08	8.11E-08	0.0575	2.582E+11
Ci-36	1.3124E-32	7.10	14.21	0.00E+00	9.32E-32	1.86E-31	0.0850	1.558E+11
Cm-243	1.4562E-07	7.10	14.21	0.00E+00	1.03E-06	2.07E-06	0.1250	1.044E+11
Cm-244	2.4221E-05	7.10	14.21	0.00E+00	1.72E-04	3.44E-04	0.2250	1.346E+11
Co-60	2.7560E-06	7.10	14.21	0.00E+00	1.96E-05	3.91E-05	0.3750	5.849E+10
Cs-134	5.8851E-04	7.10	14.21	0.00E+00	4.18E-03	8.36E-03	0.5750	9.588E+11
Cs-135	3.4477E-06	7.10	14.21	0.00E+00	2.45E-05	4.90E-05	0.8500	1.382E+10
Cs-137	1.8099E+00	7.10	14.21	0.00E+00	1.29E+01	2.57E+01	1.2500	7.883E+09
Eu-154	1.8386E-02	7.10	14.21	0.00E+00	1.16E-01	2.33E-01	1.7500	3.796E+08
Eu-155	2.3957E-03	7.10	14.21	0.00E+00	1.70E-02	3.40E-02	2.2500	2.708E+04
Fe-55	3.2707E-05	7.10	14.21	0.00E+00	2.32E-04	4.65E-04	2.7500	2.217E+04
H-3	3.4504E-03	7.10	14.21	0.00E+00	2.45E-02	4.90E-02	3.5000	2.820E+01
I-129	7.5300E-07	7.10	14.21	0.00E+00	5.35E-06	1.07E-05	5.0000	1.056E+01
Kr-85	7.8540E-02	7.10	14.21	0.00E+00	5.58E-01	1.12E+00	7.0000	1.187E+00
Np-237	9.5615E-06	7.10	14.21	0.00E+00	6.79E-05	1.36E-04	11.0000	1.345E-01
Pa-231	2.7968E-09	7.10	14.21	0.00E+00	1.99E-08	3.97E-08		
Pb-210	1.2612E-10	7.10	14.21	0.00E+00	8.96E-10	1.79E-09		
Pm-147	1.2952E-02	7.10	14.21	0.00E+00	9.20E-02	1.84E-01		
Pu-238	1.7549E-02	7.10	14.21	0.00E+00	1.25E-01	2.49E-01		
Pu-239	4.2810E-04	7.10	14.21	0.00E+00	3.04E-03	6.08E-03		
Pu-240	2.4357E-04	7.10	14.21	0.00E+00	1.73E-03	3.48E-03		
Pu-241	2.6277E-02	7.10	14.21	0.00E+00	1.87E-01	3.73E-01		
Pu-242	3.8329E-07	7.10	14.21	0.00E+00	2.58E-06	5.16E-06		
Ra-226	4.4444E-10	7.10	14.21	0.00E+00	3.16E-09	6.31E-09		
Ra-228	1.9714E-14	7.10	14.21	0.00E+00	1.40E-13	2.80E-13		
Ru-106	2.0477E-07	7.10	14.21	0.00E+00	1.45E-06	2.91E-06		
Se-79	1.2933E-05	7.10	14.21	0.00E+00	9.19E-05	1.84E-04		
Sn-126	1.1574E-05	7.10	14.21	0.00E+00	8.22E-05	1.64E-04		
Sr-90	1.7092E+00	7.10	14.21	0.00E+00	1.21E+01	2.43E+01		
Tc-99	4.2239E-04	7.10	14.21	0.00E+00	3.00E-03	6.00E-03		
Th-229	7.7260E-12	7.10	14.21	0.00E+00	5.49E-11	1.10E-10		
Th-230	5.8497E-08	7.10	14.21	0.00E+00	4.15E-07	8.31E-07		
Th-232	2.6906E-14	7.10	14.21	0.00E+00	1.91E-13	3.82E-13		
Ti-208	4.4336E-08	7.10	14.21	0.00E+00	3.15E-07	6.30E-07		
U-232	1.2037E-07	7.10	14.21	0.00E+00	8.55E-07	1.71E-06		
U-233	3.0011E-09	7.10	14.21	0.00E+00	2.13E-08	4.26E-08		
U-234	1.8497E-04	7.10	14.21	0.00E+00	1.31E-03	2.63E-03		
U-235	-2.7235E-06	7.10	0.00	3.39E-03	3.37E-03	3.39E-03		
U-236	1.5493E-05	7.10	14.21	0.00E+00	1.10E-04	2.20E-04		
U-238	-4.2851E-09	7.10	0.00	2.13E-03	2.13E-03	2.13E-03		
Y-90	1.7094E+00	7.10	14.21	0.00E+00	1.21E+01	2.43E+01		
Other Radionuclides					1.22E+01	2.45E+01		

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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	19.81060606	60 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:	0.02	7.10	
Bounding:		14.21	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.00
Nominal:	0.00	448.40	
Bounding:	0.01		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RV-1 (JALX LEU) VENEZUELA
SNF ID #: 816
Fuel Units & Descr: 56 - MTR TYPE
Heavy Metal Mass: BOL=39.698kg; EOL=38.713kg
ROD Storage Site: SRS

¹Fuel decay start date: 1997
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
2.33

II. Estimates

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources
							Photon Energy Group Total Photons/sec (bounding)
Ac-227	1.1465E-09	933.38	1,866.76	0.00E+00	1.07E-08	2.14E-08	Avg. MeV
Am-241	2.3056E-03	933.38	1,866.76	0.00E+00	2.15E+00	4.30E+00	0.0150 1.747E+14
Am-242m	4.1476E-07	933.38	1,866.76	0.00E+00	3.87E-04	7.74E-04	0.0250 3.629E+13
Am-243	1.4894E-06	933.38	1,866.76	0.00E+00	1.39E-03	2.78E-03	0.0375 3.160E+13
C-14	5.7108E-09	933.38	1,866.76	0.00E+00	5.33E-08	1.07E-05	0.0575 3.394E+13
Cf-252	1.3124E-32	933.38	1,866.76	0.00E+00	1.22E-29	2.45E-29	0.0850 2.048E+13
Cm-243	1.4562E-07	933.38	1,866.76	0.00E+00	1.36E-04	2.72E-04	0.1250 1.372E+13
Cm-244	2.4221E-05	933.38	1,866.76	0.00E+00	2.26E-02	4.52E-02	0.2250 1.768E+13
Co-60	2.7580E-06	933.38	1,866.76	0.00E+00	2.57E-03	5.14E-03	0.3750 7.686E+12
Cs-134	5.8851E-04	933.38	1,866.76	0.00E+00	5.49E-01	1.10E+00	0.5750 1.260E+14
Cs-135	3.4477E-06	933.38	1,866.76	0.00E+00	3.22E-03	6.44E-03	0.8500 1.816E+12
Cs-137	1.8099E+00	933.38	1,866.76	0.00E+00	1.69E+03	3.38E+03	1.2500 1.010E+12
Eu-154	1.6386E-02	933.38	1,866.76	0.00E+00	1.53E+01	3.06E+01	1.7500 4.988E+10
Eu-155	2.3957E-03	933.38	1,866.76	0.00E+00	2.24E+00	4.47E+00	2.2500 3.555E+08
Fe-55	3.2707E-05	933.38	1,866.76	0.00E+00	3.05E-02	6.11E-02	2.7500 2.911E+08
H-3	3.4504E-03	933.38	1,866.76	0.00E+00	3.22E+00	6.44E+00	3.5000 2.254E+03
I-129	7.5300E-07	933.38	1,866.76	0.00E+00	7.03E-04	1.41E-03	5.0000 7.636E+02
Kr-85	7.8540E-02	933.38	1,866.76	0.00E+00	7.33E+01	1.47E+02	7.0000 8.415E+01
Np-237	9.5615E-06	933.38	1,866.76	0.00E+00	8.92E-03	1.78E-02	11.0000 9.422E+00
Pa-231	2.7968E-08	933.38	1,866.76	0.00E+00	2.81E-06	5.22E-06	
Pb-210	1.2612E-10	933.38	1,866.76	0.00E+00	1.18E-07	2.35E-07	
Pm-147	1.2952E-02	933.38	1,866.76	0.00E+00	1.21E+01	2.42E+01	
Pu-238	1.7549E-02	933.38	1,866.76	0.00E+00	1.64E+01	3.28E+01	
Pu-239	4.2810E-04	933.38	1,866.76	0.00E+00	4.00E-01	7.99E-01	
Pu-240	2.4357E-04	933.38	1,866.76	0.00E+00	2.27E-01	4.55E-01	
Pu-241	2.6277E-02	933.38	1,866.76	0.00E+00	2.45E+01	4.91E+01	
Pu-242	3.6329E-07	933.38	1,866.76	0.00E+00	3.39E-04	6.78E-04	
Ra-226	4.4444E-10	933.38	1,866.76	0.00E+00	4.15E-07	8.30E-07	
Ra-228	1.9714E-14	933.38	1,866.76	0.00E+00	1.84E-11	3.68E-11	
Ru-106	2.0477E-07	933.38	1,866.76	0.00E+00	1.91E-04	3.82E-04	
Se-79	1.2933E-05	933.38	1,866.76	0.00E+00	1.21E-02	2.41E-02	
Sn-126	1.1574E-05	933.38	1,866.76	0.00E+00	1.08E-02	2.16E-02	
Sr-90	1.7092E+00	933.38	1,866.76	0.00E+00	1.60E+03	3.19E+03	
Tc-99	4.2239E-04	933.38	1,866.76	0.00E+00	3.94E-01	7.88E-01	
Th-229	7.7260E-12	933.38	1,866.76	0.00E+00	7.21E-09	1.44E-08	
Th-230	5.8497E-08	933.38	1,866.76	0.00E+00	5.46E-05	1.09E-04	
Th-232	2.6906E-14	933.38	1,866.76	0.00E+00	2.51E-11	5.02E-11	
Ti-206	4.4336E-08	933.38	1,866.76	0.00E+00	4.14E-05	8.28E-05	
U-232	1.2037E-07	933.38	1,866.76	0.00E+00	1.12E-04	2.25E-04	
U-233	3.0011E-08	933.38	1,866.76	0.00E+00	2.80E-06	5.60E-06	
U-234	1.8497E-04	933.38	1,866.76	0.00E+00	1.73E-01	3.45E-01	
U-235	-2.7235E-06	933.38	0.00	1.64E-02	1.39E-02	1.64E-02	
U-236	1.5493E-05	933.38	1,866.76	0.00E+00	1.45E-02	2.89E-02	
U-238	-4.2851E-09	933.38	0.00	1.08E-02	1.08E-02	1.08E-02	
Y-90	1.7094E+00	933.38	1,866.76	0.00E+00	1.60E+03	3.19E+03	
Other Radionuclides					1.61E+03	3.22E+03	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.1126847	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		933.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,866.76	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.07		1.00
Bounding:	0.15		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR U3Si2-LEU (SWITZERLAND)
 SNF ID #: 443
 Fuel Units & Descr: 39 - MTR TYPE
 Heavy Metal Mass: BOL=79.732kg; EOL=71.191kg
 ROD Storage Site: SRS

Fuel decay start date: 1993
 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"
 1.63

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	8,088.49	16,176.99	0.00E+00	1.62E-05	3.25E-05	Avg. MeV	
Am-241	2.5251E-03	8,088.49	16,176.99	0.00E+00	2.04E+01	4.08E+01	0.0150	1.191E+15
Am-242m	3.9624E-07	8,088.49	16,176.99	0.00E+00	3.20E-03	6.41E-03	0.0250	2.474E+14
Am-243	1.4880E-06	8,088.49	16,176.99	0.00E+00	1.20E-02	2.41E-02	0.0375	2.150E+14
C-14	5.7053E-09	8,088.49	16,176.99	0.00E+00	4.61E-05	9.23E-05	0.0575	2.315E+14
Cl-36	1.3124E-32	8,088.49	16,176.99	0.00E+00	1.06E-28	2.12E-28	0.0850	1.395E+14
Cm-243	1.1419E-07	8,088.49	16,176.99	0.00E+00	9.24E-04	1.85E-03	0.1250	9.212E+13
Cm-244	1.6522E-05	8,088.49	16,176.99	0.00E+00	1.34E-01	2.67E-01	0.2250	1.204E+14
Co-60	7.4047E-07	8,088.49	16,176.99	0.00E+00	5.99E-03	1.20E-02	0.3750	5.238E+13
Cs-134	2.0455E-05	8,088.49	16,176.99	0.00E+00	1.65E-01	3.31E-01	0.5750	8.657E+14
Cs-135	3.4477E-06	8,088.49	16,176.99	0.00E+00	2.79E-02	5.58E-02	0.8500	1.057E+13
Cs-137	1.4365E+00	8,088.49	16,176.99	0.00E+00	1.16E+04	2.32E+04	1.2500	5.114E+12
Eu-154	7.3230E-03	8,088.49	16,176.99	0.00E+00	5.92E+01	1.18E+02	1.7500	2.878E+11
Eu-155	5.9259E-04	8,088.49	16,176.99	0.00E+00	4.79E+00	9.59E+00	2.2500	2.407E+07
Fe-55	2.2791E-06	8,088.49	16,176.99	0.00E+00	1.84E-02	3.69E-02	2.7500	2.297E+07
H-3	1.9698E-03	8,088.49	16,176.99	0.00E+00	1.59E+01	3.19E+01	3.5000	1.342E+04
I-129	7.5300E-07	8,088.49	16,176.99	0.00E+00	6.08E-03	1.22E-02	5.0000	5.486E+03
Kr-85	4.1176E-02	8,088.49	16,176.99	0.00E+00	3.33E+02	6.66E+02	7.0000	8.006E+02
Np-237	9.5752E-06	8,088.49	16,176.99	0.00E+00	7.74E-02	1.55E-01	11.0000	6.698E+01
Pa-231	3.9379E-09	8,088.49	16,176.99	0.00E+00	3.19E-05	6.37E-05		
Pb-210	3.3115E-10	8,088.49	16,176.99	0.00E+00	2.68E-06	5.36E-06		
Pm-147	9.2402E-04	8,088.49	16,176.99	0.00E+00	7.47E+00	1.49E+01		
Pu-238	1.6217E-02	8,088.49	16,176.99	0.00E+00	1.31E+02	2.62E+02		
Pu-239	4.2810E-04	8,088.49	16,176.99	0.00E+00	3.46E+00	6.93E+00		
Pu-240	2.4333E-04	8,088.49	16,176.99	0.00E+00	1.97E+00	3.94E+00		
Pu-241	1.6242E-02	8,088.49	16,176.99	0.00E+00	1.31E+02	2.63E+02		
Pu-242	3.6329E-07	8,088.49	16,176.99	0.00E+00	2.94E-03	5.88E-03		
Ra-226	9.0114E-10	8,088.49	16,176.99	0.00E+00	7.29E-06	1.46E-05		
Ra-228	3.1019E-14	8,088.49	16,176.99	0.00E+00	2.51E-10	5.02E-10		
Ru-106	2.1225E-10	8,088.49	16,176.99	0.00E+00	1.72E-06	3.43E-06		
Se-79	1.2930E-05	8,088.49	16,176.99	0.00E+00	1.05E-01	2.09E-01		
Sn-126	1.1571E-05	8,088.49	16,176.99	0.00E+00	9.36E-02	1.87E-01		
Sr-90	1.3472E+00	8,088.49	16,176.99	0.00E+00	1.09E+04	2.18E+04		
Tc-99	4.2239E-04	8,088.49	16,176.99	0.00E+00	3.42E+00	6.83E+00		
Th-229	1.2407E-11	8,088.49	16,176.99	0.00E+00	1.00E-07	2.01E-07		
Th-230	8.3497E-08	8,088.49	16,176.99	0.00E+00	6.75E-04	1.35E-03		
Th-232	3.6371E-14	8,088.49	16,176.99	0.00E+00	3.10E-10	6.21E-10		
Ti-208	4.0414E-08	8,088.49	16,176.99	0.00E+00	3.27E-04	6.54E-04		
U-232	1.0948E-07	8,088.49	16,176.99	0.00E+00	8.86E-04	1.77E-03		
U-233	3.6275E-09	8,088.49	16,176.99	0.00E+00	2.93E-05	5.87E-05		
U-234	1.8562E-04	8,088.49	16,176.99	0.00E+00	1.50E+00	3.00E+00		
U-235	-2.7235E-06	8,088.49	0.00	3.42E-02	1.22E-02	3.42E-02		
U-236	1.5493E-05	8,088.49	16,176.99	0.00E+00	1.25E-01	2.51E-01		
U-238	-4.2651E-09	8,088.49	0.00	2.15E-02	2.14E-02	2.15E-02		
Y-90	1.3475E+00	8,088.49	16,176.99	0.00E+00	1.09E+04	2.18E+04		
Other Radionuclides					1.11E+04	2.21E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.83740991	80 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:		8,088.49	
Bounding:		16,176.99	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.32		
Bounding:	0.64		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR UALX-HEU (SWITZERLAND)
SNF ID #: 444
Fuel Units & Descr: 76 - MTR TYPE
Heavy Metal Mass: BOL=21.447kg, EOL=12kg
ROD Storage Site: SRS

Fuel decay start date: 1993
Estimate 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"
3.17

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	8,948.30	17,892.61	0.00E+00	1.80E-05	3.59E-05	Avg. MeV	
Am-241	2.5251E-03	8,948.30	17,892.61	0.00E+00	2.26E+01	4.52E+01	0.0150	1.318E+15
Am-242m	3.9624E-07	8,948.30	17,892.61	0.00E+00	3.54E-03	7.09E-03	0.0250	2.736E+14
Am-243	1.4880E-08	8,948.30	17,892.61	0.00E+00	1.33E-02	2.66E-02	0.0375	2.379E+14
C-14	5.7053E-09	8,948.30	17,892.61	0.00E+00	5.10E-05	1.02E-04	0.0575	2.580E+14
Cl-36	1.3124E-32	8,948.30	17,892.61	0.00E+00	1.17E-28	2.35E-28	0.0850	1.543E+14
Cm-243	1.1419E-07	8,948.30	17,892.61	0.00E+00	1.02E-03	2.04E-03	0.1250	1.019E+14
Cm-244	1.6522E-05	8,948.30	17,892.61	0.00E+00	1.48E-01	2.96E-01	0.2250	1.332E+14
Co-60	7.4047E-07	8,948.30	17,892.61	0.00E+00	6.62E-03	1.32E-02	0.3750	5.794E+13
Cs-134	2.0455E-05	8,948.30	17,892.61	0.00E+00	1.83E-01	3.66E-01	0.5750	9.575E+14
Cs-135	3.4477E-08	8,948.30	17,892.61	0.00E+00	3.08E-02	6.17E-02	0.8500	1.170E+13
Cs-137	1.4365E+00	8,948.30	17,892.61	0.00E+00	1.29E+04	2.57E+04	1.2500	5.657E+12
Eu-154	7.3230E-03	8,948.30	17,892.61	0.00E+00	6.55E+01	1.31E+02	1.7500	3.184E+11
Eu-155	5.9259E-04	8,948.30	17,892.61	0.00E+00	5.30E+00	1.06E+01	2.2500	2.662E+07
Fe-55	2.2791E-08	8,948.30	17,892.61	0.00E+00	2.04E-02	4.08E-02	2.7500	2.541E+07
H-3	1.9698E-03	8,948.30	17,892.61	0.00E+00	1.76E+01	3.52E+01	3.5000	1.472E+04
I-129	7.5300E-07	8,948.30	17,892.61	0.00E+00	6.74E-03	1.35E-02	5.0000	6.015E+03
Kr-85	4.1176E-02	8,948.30	17,892.61	0.00E+00	3.68E+02	7.37E+02	7.0000	6.582E+02
Np-237	9.5752E-06	8,948.30	17,892.61	0.00E+00	8.57E-02	1.71E-01	11.0000	7.338E+01
Pa-231	3.9379E-09	8,948.30	17,892.61	0.00E+00	3.52E-05	7.05E-05		
Pb-210	3.3115E-10	8,948.30	17,892.61	0.00E+00	2.96E-06	5.93E-06		
Pm-147	9.2402E-04	8,948.30	17,892.61	0.00E+00	8.27E+00	1.65E+01		
Pu-238	1.6217E-02	8,948.30	17,892.61	0.00E+00	1.45E+02	2.90E+02		
Pu-239	4.2810E-04	8,948.30	17,892.61	0.00E+00	3.83E+00	7.66E+00		
Pu-240	2.4333E-04	8,948.30	17,892.61	0.00E+00	2.18E+00	4.35E+00		
Pu-241	1.6242E-02	8,948.30	17,892.61	0.00E+00	1.45E+02	2.91E+02		
Pu-242	3.6329E-07	8,948.30	17,892.61	0.00E+00	3.25E-03	6.50E-03		
Ra-226	9.0114E-10	8,948.30	17,892.61	0.00E+00	8.06E-06	1.61E-05		
Ra-228	3.1019E-14	8,948.30	17,892.61	0.00E+00	2.78E-10	5.55E-10		
Ru-106	2.1225E-10	8,948.30	17,892.61	0.00E+00	1.90E-06	3.80E-06		
Se-79	1.2930E-05	8,948.30	17,892.61	0.00E+00	1.16E-01	2.31E-01		
Sm-126	1.1571E-05	8,948.30	17,892.61	0.00E+00	1.04E-01	2.07E-01		
Sr-90	1.3472E+00	8,948.30	17,892.61	0.00E+00	1.21E+04	2.41E+04		
Tc-99	4.2239E-04	8,948.30	17,892.61	0.00E+00	3.78E+00	7.56E+00		
Th-229	1.2407E-11	8,948.30	17,892.61	0.00E+00	1.11E-07	2.22E-07		
Th-230	8.3497E-08	8,948.30	17,892.61	0.00E+00	7.47E-04	1.49E-03		
Th-232	3.8371E-14	8,948.30	17,892.61	0.00E+00	3.43E-10	6.87E-10		
Ti-206	4.0414E-08	8,948.30	17,892.61	0.00E+00	3.62E-04	7.23E-04		
U-232	1.0948E-07	8,948.30	17,892.61	0.00E+00	9.79E-04	1.96E-03		
U-233	3.6275E-09	8,948.30	17,892.61	0.00E+00	3.25E-05	6.49E-05		
U-234	1.8562E-04	8,948.30	17,892.61	0.00E+00	1.66E+00	3.32E+00		
U-235	2.7235E-06	8,948.30	0.00	4.20E-02	1.76E-02	4.20E-02		
U-236	1.5493E-05	8,948.30	17,892.61	0.00E+00	1.39E-01	2.77E-01		
U-238	4.2851E-09	8,948.30	0.00	6.76E-04	6.38E-04	6.76E-04		
Y-90	1.3475E+00	8,948.30	17,892.61	0.00E+00	1.21E+04	2.41E+04		
Other Radionuclides								
Total								

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.50E+02	2.99E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	90.62318257	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:	8,948.30	17,892.61	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks		
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup
Bounding:	1.33	1.05
	2.65	

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR ULAX MEU (SWITZERLAND)
 SNF ID #: 945
 Fuel Units & Descr: 52 - MTR TYPE
 Heavy Metal Mass: BOL=35.984kg; EOL=28.806kg
 ROD Storage Site: SRS

Fuel decay start date: 1993
 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"
 2.17

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	6,795.81	13,591.62	0.00E+00	1.36E-05	2.73E-05	Avg. MeV	
Am-241	2.5251E-03	6,795.81	13,591.62	0.00E+00	1.72E+01	3.43E+01	0.0150	1.001E+16
Am-242m	3.9624E-07	6,795.81	13,591.62	0.00E+00	2.69E-03	5.39E-03	0.0250	2.079E+14
Am-243	1.4880E-06	6,795.81	13,591.62	0.00E+00	1.01E-02	2.02E-02	0.0375	1.807E+14
C-14	5.7053E-09	6,795.81	13,591.62	0.00E+00	3.88E-05	7.75E-05	0.0575	1.945E+14
Cl-36	1.3124E-32	6,795.81	13,591.62	0.00E+00	8.92E-29	1.78E-28	0.0850	1.172E+14
Cm-243	1.1419E-07	6,795.81	13,591.62	0.00E+00	7.76E-04	1.55E-03	0.1250	7.740E+13
Cm-244	1.6522E-05	6,795.81	13,591.62	0.00E+00	1.12E-01	2.25E-01	0.2250	1.012E+14
Co-60	7.4047E-07	6,795.81	13,591.62	0.00E+00	5.03E-03	1.01E-02	0.3750	4.401E+13
Cs-134	2.0455E-05	6,795.81	13,591.62	0.00E+00	1.39E-01	2.78E-01	0.5750	7.273E+14
Cs-135	3.4477E-06	6,795.81	13,591.62	0.00E+00	2.34E-02	4.69E-02	0.8500	8.884E+12
Cs-137	1.4365E+00	6,795.81	13,591.62	0.00E+00	9.76E+03	1.95E+04	1.2500	4.297E+12
Eu-154	7.3230E-03	6,795.81	13,591.62	0.00E+00	4.98E+01	9.95E+01	1.7500	2.418E+11
Eu-155	5.9259E-04	6,795.81	13,591.62	0.00E+00	4.03E+00	8.05E+00	2.2500	2.022E+07
Fe-55	2.2791E-06	6,795.81	13,591.62	0.00E+00	1.55E-02	3.10E-02	2.7500	1.930E+07
H-3	1.9698E-03	6,795.81	13,591.62	0.00E+00	1.34E+01	2.68E+01	3.5000	1.121E+04
I-129	7.5300E-07	6,795.81	13,591.62	0.00E+00	5.12E-03	1.02E-02	5.0000	4.583E+03
Kr-85	4.1176E-02	6,795.81	13,591.62	0.00E+00	2.80E+02	5.60E+02	7.0000	5.016E+02
Np-237	9.5752E-06	6,795.81	13,591.62	0.00E+00	6.51E-02	1.30E-01	11.0000	5.593E+01
Pa-231	3.8379E-09	6,795.81	13,591.62	0.00E+00	2.68E-05	5.35E-05		
Pb-210	3.3115E-10	6,795.81	13,591.62	0.00E+00	2.25E-06	4.50E-06		
Pm-147	9.2402E-04	6,795.81	13,591.62	0.00E+00	6.28E+00	1.26E+01		
Pu-238	1.6217E-02	6,795.81	13,591.62	0.00E+00	1.10E+02	2.20E+02		
Pu-239	4.2810E-04	6,795.81	13,591.62	0.00E+00	2.91E+00	5.82E+00		
Pu-240	2.4333E-04	6,795.81	13,591.62	0.00E+00	1.65E+00	3.31E+00		
Pu-241	1.6242E-02	6,795.81	13,591.62	0.00E+00	1.10E+02	2.21E+02		
Pu-242	3.6329E-07	6,795.81	13,591.62	0.00E+00	2.47E-03	4.94E-03		
Ra-226	9.0114E-10	6,795.81	13,591.62	0.00E+00	6.12E-06	1.22E-05		
Ra-228	3.1019E-14	6,795.81	13,591.62	0.00E+00	2.11E-10	4.22E-10		
Ru-106	2.1225E-10	6,795.81	13,591.62	0.00E+00	1.44E-06	2.88E-06		
Se-79	1.2930E-05	6,795.81	13,591.62	0.00E+00	8.79E-02	1.76E-01		
Sn-126	1.1571E-05	6,795.81	13,591.62	0.00E+00	7.86E-02	1.57E-01		
Sr-90	1.3472E+00	6,795.81	13,591.62	0.00E+00	9.16E+03	1.83E+04		
Tc-99	4.2239E-04	6,795.81	13,591.62	0.00E+00	2.67E+00	5.74E+00		
Th-229	1.2407E-11	6,795.81	13,591.62	0.00E+00	8.43E-08	1.69E-07		
Th-230	8.3497E-08	6,795.81	13,591.62	0.00E+00	5.67E-04	1.13E-03		
Th-232	3.8371E-14	6,795.81	13,591.62	0.00E+00	2.61E-10	5.22E-10		
Ti-208	4.0414E-08	6,795.81	13,591.62	0.00E+00	2.75E-04	5.49E-04		
U-232	1.0948E-07	6,795.81	13,591.62	0.00E+00	7.44E-04	1.49E-03		
U-233	3.6275E-09	6,795.81	13,591.62	0.00E+00	2.47E-05	4.93E-05		
U-234	1.8562E-04	6,795.81	13,591.62	0.00E+00	1.26E+00	2.52E+00		
U-235	2.7235E-06	6,795.81	0.00	3.50E-02	1.65E-02	3.50E-02		
U-236	1.5493E-05	6,795.81	13,591.62	0.00E+00	1.05E-01	2.11E-01		
U-238	4.2851E-09	6,795.81	0.00	6.64E-03	6.61E-03	6.64E-03		
Y-90	1.3475E+00	6,795.81	13,591.62	0.00E+00	9.16E+03	1.83E+04		
Other Radionuclides								
							9.30E+03	1.86E+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 ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	45.07146122	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		6,795.81	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		13,591.62	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.60		1.01
Bounding:	1.20		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (MOX SST)
SNF ID #: 883
Fuel Units & Descr: 25 - ELEMENT
Heavy Metal Mass: BOL = : EOL=95.588kg
ROD Storage Site: INEL

Fuel decay start date: 1972
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"
0.78

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	2.5200E-06	95.69	95.69	0.00E+00	2.41E-04	2.41E-04	Avg. MeV	
Am-241	8.6432E+00	95.69	95.69	0.00E+00	8.27E+02	8.27E+02	0.0150	1.798E+14
Am-242m	1.5728E-02	95.69	95.69	0.00E+00	1.50E+00	1.50E+00	0.0250	1.602E+13
Am-243	1.6288E-02	95.69	95.69	0.00E+00	1.56E+00	1.56E+00	0.0375	1.375E+13
C-14	1.2068E-01	95.69	95.69	0.00E+00	1.15E+01	1.15E+01	0.0675	2.562E+13
Cl-36	2.2849E-03	95.69	95.69	0.00E+00	2.19E-01	2.19E-01	0.0850	8.615E+12
Cm-243	6.0144E-04	95.69	95.69	0.00E+00	5.76E-02	5.76E-02	0.1250	6.076E+12
Cm-244	9.4880E-02	95.69	95.69	0.00E+00	9.08E+00	9.08E+00	0.2250	7.428E+12
Co-60	3.9052E+00	95.69	95.69	0.00E+00	3.74E+02	3.74E+02	0.3750	3.216E+12
Cs-134	2.2139E-06	95.69	95.69	0.00E+00	2.12E-04	2.12E-04	0.5750	5.315E+13
Cs-135	4.3976E-04	95.69	95.69	0.00E+00	4.21E-02	4.21E-02	0.8500	1.164E+12
Cs-137	1.4887E+01	95.69	95.69	0.00E+00	1.42E+03	1.42E+03	1.2500	2.854E+13
Eu-154	3.7342E-01	95.69	95.69	0.00E+00	3.57E+01	3.57E+01	1.7500	3.430E+10
Eu-155	8.4893E-03	95.69	95.69	0.00E+00	8.12E-01	8.12E-01	2.2500	1.518E+08
Fe-55	5.3750E-03	95.69	95.69	0.00E+00	5.14E-01	5.14E-01	2.7500	2.573E+08
H-3	1.0472E-01	95.69	95.69	0.00E+00	1.00E+01	1.00E+01	3.5000	1.945E+08
I-129	1.0618E-05	95.69	95.69	0.00E+00	1.02E-03	1.02E-03	5.0000	8.206E+05
Kr-85	2.2717E-01	95.69	95.69	0.00E+00	2.17E+01	2.17E+01	7.0000	9.287E+04
Np-237	1.6400E-04	95.69	95.69	0.00E+00	1.57E-02	1.57E-02	11.0000	1.058E+04
Pa-231	2.8688E-06	95.69	95.69	0.00E+00	2.75E-04	2.75E-04		
Pb-210	4.7312E-08	95.69	95.69	0.00E+00	4.53E-06	4.53E-06		
Pm-147	3.2198E-04	95.69	95.69	0.00E+00	3.08E-02	3.08E-02		
Pu-238	-1.1924E+00	95.69	0.00	1.23E+04	1.22E+04	1.23E+04		
Pu-239	-4.8600E-02	95.69	0.00	1.49E+03	1.48E+03	1.49E+03		
Pu-240	-3.0127E-01	95.69	0.00	1.90E+03	1.87E+03	1.90E+03		
Pu-241	-1.2917E+02	95.69	0.00	4.89E+05	4.77E+05	4.89E+05		
Pu-242	-1.1381E-04	95.69	0.00	8.22E+00	8.21E+00	8.22E+00		
Ra-226	1.0760E-07	95.69	95.69	0.00E+00	1.03E-05	1.03E-05		
Ra-228	6.0160E-07	95.69	95.69	0.00E+00	5.76E-05	5.76E-05		
Ru-106	1.3388E-13	95.69	95.69	0.00E+00	1.28E-11	1.28E-11		
Se-79	1.9179E-04	95.69	95.69	0.00E+00	1.84E-02	1.84E-02		
Sn-126	1.6669E-04	95.69	95.69	0.00E+00	1.59E-02	1.59E-02		
Sr-90	1.3859E+01	95.69	95.69	0.00E+00	1.33E+03	1.33E+03		
Tc-99	6.7678E-03	95.69	95.69	0.00E+00	6.48E-01	6.48E-01		
Th-229	2.2592E-06	95.69	95.69	0.00E+00	2.16E-04	2.16E-04		
Th-230	7.5955E-06	95.69	95.69	0.00E+00	7.27E-04	7.27E-04		
Th-232	6.0208E-07	95.69	95.69	0.00E+00	5.76E-05	5.76E-05		
Th-208	7.5795E-05	95.69	95.69	0.00E+00	7.25E-03	7.25E-03		
U-232	2.0521E-04	95.69	95.69	0.00E+00	1.96E-02	1.96E-02		
U-233	3.6128E-04	95.69	95.69	0.00E+00	3.46E-02	3.46E-02		
U-234	1.2788E-02	95.69	95.69	0.00E+00	1.22E+00	1.22E+00		
U-235	5.7486E-04	95.69	95.69	4.12E-02	9.62E-02	9.62E-02		
U-238	2.3485E-04	95.69	95.69	0.00E+00	2.25E-02	2.25E-02		
U-238	1.1581E-04	95.69	95.69	5.12E-03	1.62E-02	1.62E-02		
Y-90	1.3861E+01	95.69	95.69	0.00E+00	1.33E+03	1.33E+03		
Other Radionuclides					4.92E+03	4.92E+03		

Thermal Power		
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)	
6.74E+02	6.79E+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:		95.69
Bounding:		95.69

Basis for burnup used in estimates:

Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=95.688kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM

1.40

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (MOX ZR)
SNF ID #: 787
Fuel Units & Descr: 43 - ELEMENT
Heavy Metal Mass: BOL = 239.88kg
ROD Storage Site: INEEL

Fuel decay start date: 1972
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"
1.34

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.5200E-06	240.13	240.13	0.00E+00	6.05E-04	6.05E-04	Avg. MeV	
Am-241	8.6432E+00	240.13	240.13	0.00E+00	2.08E+03	2.08E+03	0.0150	4.512E+14
Am-242m	1.5728E-02	240.13	240.13	0.00E+00	3.78E+00	3.78E+00	0.0250	4.020E+13
Am-243	1.6288E-02	240.13	240.13	0.00E+00	3.91E+00	3.91E+00	0.0375	3.451E+13
C-14	1.2068E-01	240.13	240.13	0.00E+00	2.90E+01	2.90E+01	0.0575	6.429E+13
Cl-36	2.2849E-03	240.13	240.13	0.00E+00	5.49E-01	5.49E-01	0.0850	2.162E+13
Cm-243	6.0144E-04	240.13	240.13	0.00E+00	1.44E-01	1.44E-01	0.1250	1.525E+13
Cm-244	9.4880E-02	240.13	240.13	0.00E+00	2.28E+01	2.28E+01	0.2250	1.864E+13
Co-60	3.9052E+00	240.13	240.13	0.00E+00	9.38E+02	9.38E+02	0.3750	8.070E+12
Cs-134	2.2139E-06	240.13	240.13	0.00E+00	5.32E-04	5.32E-04	0.5750	1.334E+14
Cs-135	4.3976E-04	240.13	240.13	0.00E+00	1.06E-01	1.06E-01	0.8500	2.922E+12
Cs-137	1.4887E+01	240.13	240.13	0.00E+00	3.57E+03	3.57E+03	1.2500	7.161E+13
Eu-154	3.7342E-01	240.13	240.13	0.00E+00	8.97E+01	8.97E+01	1.7500	8.608E+10
Eu-155	8.4893E-03	240.13	240.13	0.00E+00	2.04E+00	2.04E+00	2.2500	3.810E+08
Fe-55	5.3750E-03	240.13	240.13	0.00E+00	1.29E+00	1.29E+00	2.7500	6.457E+08
H-3	1.0472E-01	240.13	240.13	0.00E+00	2.51E+01	2.51E+01	3.5000	4.880E+06
I-129	1.0618E-05	240.13	240.13	0.00E+00	2.55E-03	2.55E-03	5.0000	2.059E+06
Kr-85	2.2717E-01	240.13	240.13	0.00E+00	5.46E+01	5.46E+01	7.0000	2.331E+05
Np-237	1.6400E-04	240.13	240.13	0.00E+00	3.94E-02	3.94E-02	11.0000	2.654E+04
Pa-231	2.8688E-06	240.13	240.13	0.00E+00	6.89E-04	6.89E-04		
Pb-210	4.7312E-08	240.13	240.13	0.00E+00	1.14E-05	1.14E-05		
Pm-147	3.2198E-04	240.13	240.13	0.00E+00	7.73E-02	7.73E-02		
Pu-238	-1.1924E+00	240.13	0.00	3.09E+04	3.06E+04	3.09E+04		
Pu-239	-4.8600E-02	240.13	0.00	3.73E+03	3.72E+03	3.73E+03		
Pu-240	-3.0127E-01	240.13	0.00	4.77E+03	4.70E+03	4.77E+03		
Pu-241	-1.2917E+02	240.13	0.00	1.23E+06	1.20E+06	1.23E+06		
Pu-242	-1.1381E-04	240.13	0.00	2.06E+01	2.06E+01	2.06E+01		
Ra-226	1.0760E-07	240.13	240.13	0.00E+00	2.58E-05	2.58E-05		
Ra-228	6.0160E-07	240.13	240.13	0.00E+00	1.44E-04	1.44E-04		
Ru-106	1.3388E-13	240.13	240.13	0.00E+00	3.21E-11	3.21E-11		
Se-79	1.9179E-04	240.13	240.13	0.00E+00	4.61E-02	4.61E-02		
Sn-126	1.6669E-04	240.13	240.13	0.00E+00	4.00E-02	4.00E-02		
Sr-90	1.3859E+01	240.13	240.13	0.00E+00	3.33E+03	3.33E+03		
Tc-99	6.7678E-03	240.13	240.13	0.00E+00	1.63E+00	1.63E+00		
Th-229	2.2592E-06	240.13	240.13	0.00E+00	5.43E-04	5.43E-04		
Th-230	7.5955E-06	240.13	240.13	0.00E+00	1.82E-03	1.82E-03		
Th-232	6.0208E-07	240.13	240.13	0.00E+00	1.45E-04	1.45E-04		
Ti-208	7.5795E-05	240.13	240.13	0.00E+00	1.82E-02	1.82E-02		
U-232	2.0521E-04	240.13	240.13	0.00E+00	4.93E-02	4.93E-02		
U-233	3.6128E-04	240.13	240.13	0.00E+00	8.68E-02	8.68E-02		
U-234	1.2788E-02	240.13	240.13	0.00E+00	3.07E+00	3.07E+00		
U-235	5.7486E-04	240.13	240.13	1.03E-01	2.41E-01	2.41E-01		
U-236	2.3485E-04	240.13	240.13	0.00E+00	5.84E-02	5.84E-02		
U-238	1.1581E-04	240.13	240.13	1.29E-02	4.07E-02	4.07E-02		
Y-90	1.3861E+01	240.13	240.13	0.00E+00	3.33E+03	3.33E+03		
Other Radionuclides					1.23E+04	1.23E+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	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used.
BOL HM Constituents:	ZIRC	SST/Inconel	
BOL Enrichment %:	Pu and U	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		240.13	Nominal burnup set equal to bounding burnup
		240.13	Bounding burnup taken from SFD and converted to MWd using BOL=240.132kg

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.03	0.03	1.40

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (UO2 SST)

SNF ID #: 882

Fuel Units & Descr: 20 - ELEMENT

Heavy Metal Mass: BOL= : EOL=10.402kg

ROD Storage Site: INEEL

Fuel decay start date: 1972

Estimates as of: 2030

Template: Pathfinder (Light Water, SST, 80 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"

0.69

II. Estimates

	m	X ₀	X ₀	b	Y ₀	Y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	16.67	16.67	0.00E+00	5.71E-07	5.71E-07	Avg. MeV	
Am-241	1.1458E-04	16.67	16.67	0.00E+00	1.91E-03	1.91E-03	0.0150	8.698E+11
Am-242m	7.9468E-09	16.67	16.67	0.00E+00	1.32E-07	1.32E-07	0.0250	1.807E+11
Am-243	9.8386E-10	16.67	16.67	0.00E+00	1.64E-08	1.64E-08	0.0375	1.566E+11
C-14	2.2978E-04	16.67	16.67	0.00E+00	3.83E-03	3.83E-03	0.0575	1.688E+11
Cl-36	1.2261E-06	16.67	16.67	0.00E+00	2.04E-05	2.04E-05	0.0850	1.018E+11
Cm-243	1.7271E-10	16.67	16.67	0.00E+00	2.88E-09	2.88E-09	0.1250	6.614E+10
Cm-244	1.3058E-09	16.67	16.67	0.00E+00	2.18E-08	2.18E-08	0.2250	8.812E+10
Co-60	9.8636E-03	16.67	16.67	0.00E+00	1.64E-01	1.64E-01	0.3750	3.825E+10
Cs-134	1.9617E-08	16.67	16.67	0.00E+00	3.27E-07	3.27E-07	0.5750	6.369E+11
Cs-135	3.0316E-05	16.67	16.67	0.00E+00	5.05E-04	5.05E-04	0.8500	6.288E+09
Cs-137	1.0263E+00	16.67	16.67	0.00E+00	1.71E+01	1.71E+01	1.2500	1.432E+10
Eu-154	2.0017E-04	16.67	16.67	0.00E+00	3.34E-03	3.34E-03	1.7500	1.619E+08
Eu-155	8.5957E-05	16.67	16.67	0.00E+00	1.43E-03	1.43E-03	2.2500	8.208E+04
Fe-55	2.2846E-05	16.67	16.67	0.00E+00	3.78E-04	3.78E-04	2.7500	1.118E+04
H-3	1.0835E-03	16.67	16.67	0.00E+00	1.81E-02	1.81E-02	3.5000	2.892E+00
I-129	7.3195E-07	16.67	16.67	0.00E+00	1.22E-05	1.22E-05	5.0000	1.208E+00
Kr-85	1.5661E-02	16.67	16.67	0.00E+00	2.61E-01	2.61E-01	7.0000	1.352E-01
Np-237	1.1494E-06	16.67	16.67	0.00E+00	1.92E-05	1.92E-05	11.0000	1.529E-02
Pa-231	5.8070E-08	16.67	16.67	0.00E+00	9.68E-07	9.68E-07		
Pb-210	1.2985E-12	16.67	16.67	0.00E+00	2.16E-11	2.16E-11		
Pm-147	2.2196E-05	16.67	16.67	0.00E+00	3.70E-04	3.70E-04		
Pu-238	2.6223E-04	16.67	16.67	0.00E+00	4.37E-03	4.37E-03		
Pu-239	6.6739E-04	16.67	16.67	0.00E+00	1.11E-02	1.11E-02		
Pu-240	8.6705E-05	16.67	16.67	0.00E+00	1.45E-03	1.45E-03		
Pu-241	3.4759E-04	16.67	16.67	0.00E+00	5.79E-03	5.79E-03		
Pu-242	1.9717E-09	16.67	16.67	0.00E+00	3.29E-08	3.29E-08		
Ra-226	3.0000E-12	16.67	16.67	0.00E+00	5.00E-11	5.00E-11		
Ra-228	8.3328E-12	16.67	16.67	0.00E+00	1.39E-10	1.39E-10		
Ru-106	6.1464E-15	16.67	16.67	0.00E+00	1.02E-13	1.02E-13		
Se-79	1.3221E-05	16.67	16.67	0.00E+00	2.20E-04	2.20E-04		
Sn-126	1.1491E-05	16.67	16.67	0.00E+00	1.92E-04	1.92E-04		
Sr-90	9.5541E-01	16.67	16.67	0.00E+00	1.59E+01	1.59E+01		
Tc-99	4.6656E-04	16.67	16.67	0.00E+00	7.78E-03	7.78E-03		
Th-229	1.9085E-11	16.67	16.67	0.00E+00	3.18E-10	3.18E-10		
Th-230	2.1913E-10	16.67	16.67	0.00E+00	3.65E-09	3.65E-09		
Th-232	8.3478E-12	16.67	16.67	0.00E+00	1.39E-10	1.39E-10		
Th-230	1.8752E-08	16.67	16.67	0.00E+00	3.13E-07	3.13E-07		
U-232	5.0782E-08	16.67	16.67	0.00E+00	8.47E-07	8.47E-07		
U-233	3.2596E-09	16.67	16.67	0.00E+00	5.43E-08	5.43E-08		
U-234	3.9817E-07	16.67	16.67	0.00E+00	6.64E-06	6.64E-06		
U-235	2.7761E-06	16.67	0.00	2.10E-02	2.10E-02	2.10E-02		
U-236	1.6190E-05	16.67	16.67	0.00E+00	2.70E-04	2.70E-04		
U-238	2.8547E-09	16.67	0.00	2.28E-04	2.27E-04	2.28E-04		
Y-90	9.5557E-01	16.67	16.67	0.00E+00	1.59E+01	1.59E+01		
Other Radionuclides					2.03E+01	2.03E+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:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	SST	SST	
BOL HM Constituents:	U	U	
BOL Enrichment %:		60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		16.67	
Bounding:		16.67	Nominal burnup set equal to bounding burnup Bounding burnup taken from SFD and converted to MWd using BOL=10.42kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.03		
Bounding:	0.03		1.00

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (UO2 ZR)
SNF ID #: 788
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=41.482kg
ROD Storage Site: INEEL

Fuel decay start date: 1972
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5% U)
*Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176811
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
0.31

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	66.48	66.48	0.00E+00	7.14E-08	7.14E-08	Avg. MeV	
Am-241	1.4751E-01	66.48	66.48	0.00E+00	9.81E+00	9.81E+00	0.0150	2.530E+12
Am-242m	2.6809E-04	66.48	66.48	0.00E+00	1.78E-02	1.78E-02	0.0250	5.070E+11
Am-243	6.2484E-04	66.48	66.48	0.00E+00	4.15E-02	4.15E-02	0.0375	4.777E+11
C-14	4.7820E-05	66.48	66.48	0.00E+00	3.18E-03	3.18E-03	0.0575	5.978E+11
Ci-36	8.0297E-07	66.48	66.48	0.00E+00	5.34E-05	5.34E-05	0.0850	2.793E+11
Cm-243	1.7426E-04	66.48	66.48	0.00E+00	1.16E-02	1.16E-02	0.1250	1.858E+11
Cm-244	2.7616E-02	66.48	66.48	0.00E+00	1.84E+00	1.84E+00	0.2250	2.385E+11
Co-60	3.5610E-04	66.48	66.48	0.00E+00	2.37E-02	2.37E-02	0.3750	1.030E+11
Cs-134	2.6260E-07	66.48	66.48	0.00E+00	1.75E-05	1.75E-05	0.5750	2.425E+12
Cs-135	1.4433E-05	66.48	66.48	0.00E+00	9.80E-04	9.80E-04	0.8500	2.368E+10
Cs-137	9.8870E-01	66.48	66.48	0.00E+00	6.57E+01	6.57E+01	1.2500	1.507E+10
Eu-154	6.0320E-03	66.48	66.48	0.00E+00	4.01E-01	4.01E-01	1.7500	6.625E+08
Eu-155	2.1770E-04	66.48	66.48	0.00E+00	1.45E-02	1.45E-02	2.2500	1.090E+05
Fe-55	7.9296E-07	66.48	66.48	0.00E+00	5.27E-05	5.27E-05	2.7500	3.899E+05
H-3	8.9486E-03	66.48	66.48	0.00E+00	5.95E-01	5.95E-01	3.5000	2.745E+04
I-129	9.8288E-07	66.48	66.48	0.00E+00	6.53E-05	6.53E-05	5.0000	1.173E+04
Kr-85	1.0707E-02	66.48	66.48	0.00E+00	7.12E-01	7.12E-01	7.0000	1.352E+03
Np-237	1.1927E-05	66.48	66.48	0.00E+00	7.93E-04	7.93E-04	11.0000	1.552E+02
Pa-231	1.4703E-09	66.48	66.48	0.00E+00	9.77E-08	9.77E-08		
Pb-210	1.6828E-10	66.48	66.48	0.00E+00	1.12E-08	1.12E-08		
Pm-147	6.9606E-06	66.48	66.48	0.00E+00	4.63E-04	4.63E-04		
Pu-238	6.6263E-02	66.48	66.48	0.00E+00	4.41E+00	4.41E+00		
Pu-239	1.1618E-02	66.48	66.48	0.00E+00	7.72E-01	7.72E-01		
Pu-240	1.5142E-02	66.48	66.48	0.00E+00	1.01E+00	1.01E+00		
Pu-241	4.3766E-01	66.48	66.48	0.00E+00	2.91E+01	2.91E+01		
Pu-242	6.4260E-05	66.48	66.48	0.00E+00	4.27E-03	4.27E-03		
Ra-226	3.8501E-10	66.48	66.48	0.00E+00	2.56E-08	2.56E-08		
Ra-228	5.2955E-12	66.48	66.48	0.00E+00	3.52E-10	3.52E-10		
Ru-106	2.0413E-14	66.48	66.48	0.00E+00	1.36E-12	1.36E-12		
Se-79	1.2376E-05	66.48	66.48	0.00E+00	8.23E-04	8.23E-04		
Sn-126	2.5210E-05	66.48	66.48	0.00E+00	1.68E-03	1.68E-03		
Sr-90	6.4163E-01	66.48	66.48	0.00E+00	4.27E+01	4.27E+01		
Tc-99	3.9357E-04	66.48	66.48	0.00E+00	2.62E-02	2.62E-02		
Th-229	1.5644E-10	66.48	66.48	0.00E+00	1.04E-08	1.04E-08		
Th-230	2.7972E-08	66.48	66.48	0.00E+00	1.86E-06	1.86E-06		
Th-232	5.3036E-12	66.48	66.48	0.00E+00	3.53E-10	3.53E-10		
Ti-208	1.5136E-07	66.48	66.48	0.00E+00	1.01E-05	1.01E-05		
U-232	4.1005E-07	66.48	66.48	0.00E+00	2.73E-05	2.73E-05		
U-233	2.5856E-08	66.48	66.48	0.00E+00	1.72E-06	1.72E-06		
U-234	5.2665E-05	66.48	66.48	0.00E+00	3.50E-03	3.50E-03		
U-235	1.4487E-06	66.48	0.00	2.87E-03	2.78E-03	2.87E-03		
U-236	7.5888E-06	66.48	66.48	0.00E+00	5.05E-04	5.05E-04		
U-238	2.6129E-07	66.48	0.00	1.35E-02	1.35E-02	1.35E-02		
Y-90	6.4180E-01	66.48	66.48	0.00E+00	4.27E+01	4.27E+01		
Other Radionuclides					6.34E+01	6.34E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown).
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ZIRC	ZIRC	
BOL Enrichment %:	U	U	
		0 to 5	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		66.48	
		66.48	Nominal burnup set equal to bounding burnup Bounding burnup taken from SFD and converted to MWd using BOL=41.552kg

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding:	0.05	0.05	
			1.00

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be 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 (RODS)
 SNF ID #: 189
 Fuel Units & Descr: 2 - ROD
 Heavy Metal Mass: BOL=16.891kg; EOL=16.108kg
 ROD Storage Site: INEEL

¹Fuel decay start date: 1959
 Estimate 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"x15"
 0.07

II. Estimates

	m	X ₀	X ₀	b	Y ₀	Y ₀	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	1.2581E-09	744.60	1,489.19	0.00E+00	9.37E-07	1.87E-06	Avg. MeV	
Am-241	1.4761E-01	744.60	1,489.19	0.00E+00	1.10E+02	2.20E+02	0.0150	4.032E+13
Am-242m	2.5032E-04	744.60	1,489.19	0.00E+00	1.86E-01	3.73E-01	0.0250	8.008E+12
Am-243	6.2387E-04	744.60	1,489.19	0.00E+00	4.65E-01	9.29E-01	0.0375	7.486E+12
C-14	4.7739E-05	744.60	1,489.19	0.00E+00	3.55E-02	7.11E-02	0.0575	1.027E+13
Cl-36	8.0297E-07	744.60	1,489.19	0.00E+00	5.98E-04	1.20E-03	0.0850	4.382E+12
Cm-243	1.2099E-04	744.60	1,489.19	0.00E+00	9.01E-02	1.80E-01	0.1250	2.859E+12
Cm-244	1.5560E-02	744.60	1,489.19	0.00E+00	1.16E+01	2.32E+01	0.2250	3.727E+12
Co-60	4.9580E-05	744.60	1,489.19	0.00E+00	3.69E-02	7.38E-02	0.3750	1.613E+12
Cs-134	1.7022E-09	744.60	1,489.19	0.00E+00	1.27E-06	2.53E-06	0.5750	3.840E+13
Cs-135	1.4433E-05	744.60	1,489.19	0.00E+00	1.07E-02	2.15E-02	0.8500	3.078E+11
Cs-137	6.9929E-01	744.60	1,489.19	0.00E+00	5.21E+02	1.04E+03	1.2500	1.439E+11
Eu-154	1.8023E-03	744.60	1,489.19	0.00E+00	1.34E+00	2.68E+00	1.7500	8.279E+09
Eu-155	2.6793E-05	744.60	1,489.19	0.00E+00	1.99E-02	3.99E-02	2.2500	1.458E+08
Fe-55	1.4580E-08	744.60	1,489.19	0.00E+00	1.09E-05	2.17E-05	2.7500	7.252E+06
H-3	3.8566E-03	744.60	1,489.19	0.00E+00	2.87E+00	5.74E+00	3.5000	3.599E+05
I-129	9.8288E-07	744.60	1,489.19	0.00E+00	7.32E-04	1.46E-03	5.0000	1.537E+05
Kr-85	4.0617E-03	744.60	1,489.19	0.00E+00	3.02E+00	6.05E+00	7.0000	1.769E+04
Np-237	1.2645E-05	744.60	1,489.19	0.00E+00	9.42E-03	1.88E-02	11.0000	2.031E+03
Pa-231	1.6376E-09	744.60	1,489.19	0.00E+00	1.22E-06	2.44E-06		
Pb-210	2.8795E-10	744.60	1,489.19	0.00E+00	2.14E-07	4.29E-07		
Pm-147	1.3284E-07	744.60	1,489.19	0.00E+00	9.88E-06	1.98E-05		
Pu-238	5.8882E-02	744.60	1,489.19	0.00E+00	4.38E+01	8.77E+01		
Pu-239	1.1613E-02	744.60	1,489.19	0.00E+00	8.65E+00	1.73E+01		
Pu-240	1.5142E-02	744.60	1,489.19	0.00E+00	1.13E+01	2.25E+01		
Pu-241	2.1269E-01	744.60	1,489.19	0.00E+00	1.58E+02	3.17E+02		
Pu-242	6.4260E-05	744.60	1,489.19	0.00E+00	4.78E-02	9.57E-02		
Ra-226	5.8689E-10	744.60	1,489.19	0.00E+00	4.37E-07	8.74E-07		
Ra-228	5.3036E-12	744.60	1,489.19	0.00E+00	3.95E-09	7.90E-09		
Ru-106	6.8136E-19	744.60	1,489.19	0.00E+00	5.07E-16	1.01E-15		
Se-79	1.2372E-05	744.60	1,489.19	0.00E+00	9.21E-03	1.84E-02		
Sn-126	2.5194E-05	744.60	1,489.19	0.00E+00	1.88E-02	3.75E-02		
Sr-90	4.4913E-01	744.60	1,489.19	0.00E+00	3.34E+02	6.69E+02		
Tc-99	3.9357E-04	744.60	1,489.19	0.00E+00	2.93E-01	5.86E-01		
Th-229	1.9331E-10	744.60	1,489.19	0.00E+00	1.44E-07	2.88E-07		
Th-230	3.5223E-08	744.60	1,489.19	0.00E+00	2.62E-05	5.25E-05		
Th-232	5.3085E-12	744.60	1,489.19	0.00E+00	3.95E-09	7.91E-09		
Ti-208	1.3102E-07	744.60	1,489.19	0.00E+00	9.76E-05	1.95E-04		
U-232	3.5497E-07	744.60	1,489.19	0.00E+00	2.64E-04	5.29E-04		
U-233	2.6647E-08	744.60	1,489.19	0.00E+00	1.98E-05	3.97E-05		
U-234	5.5023E-05	744.60	1,489.19	0.00E+00	4.10E-02	8.19E-02		
U-235	-1.4485E-06	744.60	0.00	2.60E-04	0.00E+00	2.60E-04		
U-238	7.5969E-06	744.60	1,489.19	0.00E+00	5.66E-03	1.13E-02		
U-238	-2.6129E-07	744.60	0.00	5.64E-03	5.44E-03	5.64E-03		
Y-90	4.4913E-01	744.60	1,489.19	0.00E+00	3.34E+02	6.69E+02		
Other Radionuclides					5.04E+02	1.01E+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 %:	0.71099907	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		744.60
Bounding:	304.04	1,489.19

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:	1.26	
Bounding:	2.52	4.90

Estimated EOL HM/Given EOL HM
 1.02

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SLOWPOKE (HEU) CANADA
SNF ID #: 296
Fuel Units & Descr: 1 - 297 ROD ARRAY
Heavy Metal Mass: BOL=0.875kg; EOL=0.87kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
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: 20 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	12.53	25.06	0.00E+00	8.31E-09	1.66E-08	Avg. MeV	
Am-241	2.0060E-03	12.53	25.06	0.00E+00	2.51E-02	5.03E-02	0.0150	2.645E+12
Am-242m	4.2429E-07	12.53	25.06	0.00E+00	5.32E-06	1.06E-05	0.0250	5.500E+11
Am-243	1.4899E-06	12.53	25.06	0.00E+00	1.87E-05	3.73E-05	0.0375	4.797E+11
C-14	5.7135E-09	12.53	25.06	0.00E+00	7.16E-08	1.43E-07	0.0575	5.138E+11
Cl-36	1.3124E-32	12.53	25.06	0.00E+00	1.84E-31	3.29E-31	0.0850	3.105E+11
Cm-243	1.6443E-07	12.53	25.06	0.00E+00	2.06E-06	4.12E-06	0.1250	2.101E+11
Cm-244	2.9330E-05	12.53	25.06	0.00E+00	3.67E-04	7.35E-04	0.2250	2.679E+11
Co-60	5.3186E-06	12.53	25.06	0.00E+00	6.66E-05	1.33E-04	0.3750	1.166E+11
Cs-134	3.1563E-03	12.53	25.06	0.00E+00	3.95E-02	7.91E-02	0.5750	1.902E+12
Cs-135	3.4477E-06	12.53	25.06	0.00E+00	4.32E-05	8.64E-05	0.8500	3.216E+10
Cs-137	2.0313E+00	12.53	25.06	0.00E+00	2.54E+01	5.09E+01	1.2500	1.836E+10
Eu-154	2.4513E-02	12.53	25.06	0.00E+00	3.07E-01	6.14E-01	1.7500	8.429E+08
Eu-155	4.8175E-03	12.53	25.06	0.00E+00	6.04E-02	1.21E-01	2.2500	7.394E+04
Fe-55	1.2397E-04	12.53	25.06	0.00E+00	1.55E-03	3.11E-03	2.7500	4.180E+04
H-3	4.5697E-03	12.53	25.06	0.00E+00	5.73E-02	1.15E-01	3.5000	1.822E+02
I-129	7.6300E-07	12.53	25.06	0.00E+00	9.43E-06	1.89E-05	5.0000	1.092E+01
Kr-85	1.0850E-01	12.53	25.06	0.00E+00	1.36E+00	2.72E+00	7.0000	1.205E+00
Np-237	9.5561E-06	12.53	25.06	0.00E+00	1.20E-04	2.39E-04	11.0000	1.351E-01
Pa-231	2.0359E-08	12.53	25.06	0.00E+00	2.55E-08	5.10E-08		
Pb-210	4.9728E-11	12.53	25.06	0.00E+00	6.23E-10	1.25E-09		
Pm-147	4.8502E-02	12.53	25.06	0.00E+00	6.08E-01	1.22E+00		
Pu-238	1.8254E-02	12.53	25.06	0.00E+00	2.29E-01	4.57E-01		
Pu-239	4.2810E-04	12.53	25.06	0.00E+00	5.36E-03	1.07E-02		
Pu-240	2.4368E-04	12.53	25.06	0.00E+00	3.05E-03	6.11E-03		
Pu-241	3.3415E-02	12.53	25.06	0.00E+00	4.19E-01	8.37E-01		
Pu-242	3.6329E-07	12.53	25.06	0.00E+00	4.55E-06	9.10E-06		
Ra-226	2.2854E-10	12.53	25.06	0.00E+00	2.86E-09	5.73E-09		
Ra-228	1.2426E-14	12.53	25.06	0.00E+00	1.56E-13	3.11E-13		
Ru-106	6.3589E-06	12.53	25.06	0.00E+00	7.97E-05	1.59E-04		
Se-79	1.2933E-05	12.53	25.06	0.00E+00	1.62E-04	3.24E-04		
Sn-126	1.1574E-05	12.53	25.06	0.00E+00	1.45E-04	2.90E-04		
Sr-90	1.9248E+00	12.53	25.06	0.00E+00	2.41E+01	4.82E+01		
Tc-99	4.2239E-04	12.53	25.06	0.00E+00	5.29E-03	1.06E-02		
Th-229	5.0953E-12	12.53	25.06	0.00E+00	6.38E-11	1.28E-10		
Th-230	4.1885E-08	12.53	25.06	0.00E+00	5.25E-07	1.05E-06		
Th-232	1.9270E-14	12.53	25.06	0.00E+00	2.41E-13	4.83E-13		
Ti-208	4.6024E-08	12.53	25.06	0.00E+00	5.77E-07	1.15E-06		
U-232	1.2582E-07	12.53	25.06	0.00E+00	1.58E-06	3.15E-06		
U-233	2.5825E-09	12.53	25.06	0.00E+00	3.24E-08	6.47E-08		
U-234	1.8450E-04	12.53	25.06	0.00E+00	2.31E-03	4.62E-03		
U-235	-2.7235E-06	12.53	0.00	1.78E-03	1.75E-03	1.78E-03		
U-236	1.5493E-05	12.53	25.06	0.00E+00	1.94E-04	3.88E-04		
U-238	-4.2851E-09	12.53	0.00	1.68E-05	1.68E-05	1.68E-05		
Y-90	1.9254E+00	12.53	25.06	0.00E+00	2.41E+01	4.82E+01		
Other Radionuclides					2.42E+01	4.85E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	94.28571429	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)³

	From SFD	Estimated
Nominal:	12.53	4.74
Bounding:		25.06

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:	0.05	0.36
Bounding:	0.09	

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: SLOWPOKE (HEU) CANADA
 SNF ID #: 1065
 Fuel Units & Descr: 1 - 297 ROD ARRAY
 Heavy Metal Mass: BOL=0.875kg; EOL=0.87kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimate 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: 20 years

Estimated
 Canister usage:
 18"x10"
 0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	12.53	25.06	0.00E+00	8.31E-09	1.66E-08	Avg. MeV	
Am-241	2.0060E-03	12.53	25.06	0.00E+00	2.51E-02	5.03E-02	0.0150	2.645E+12
Am-242m	4.2429E-07	12.53	25.06	0.00E+00	5.32E-06	1.06E-05	0.0250	5.500E+11
Am-243	1.4899E-06	12.53	25.06	0.00E+00	1.87E-05	3.73E-05	0.0375	4.797E+11
C-14	5.7135E-09	12.53	25.06	0.00E+00	7.16E-08	1.43E-07	0.0575	5.138E+11
Cl-36	1.3124E-32	12.53	25.06	0.00E+00	1.64E-31	3.29E-31	0.0850	3.105E+11
Cm-243	1.6443E-07	12.53	25.06	0.00E+00	2.06E-06	4.12E-06	0.1250	2.101E+11
Cm-244	2.9330E-05	12.53	25.06	0.00E+00	3.67E-04	7.35E-04	0.2250	2.679E+11
Co-60	5.3186E-06	12.53	25.06	0.00E+00	6.66E-05	1.33E-04	0.3750	1.166E+11
Cs-134	3.1563E-03	12.53	25.06	0.00E+00	3.95E-02	7.91E-02	0.5750	1.902E+12
Cs-135	3.4477E-06	12.53	25.06	0.00E+00	4.32E-05	8.64E-05	0.8500	3.216E+10
Cs-137	2.0313E+00	12.53	25.06	0.00E+00	2.54E+01	5.09E+01	1.2500	1.836E+10
Eu-154	2.4513E-02	12.53	25.06	0.00E+00	3.07E-01	6.14E-01	1.7500	8.429E+08
Eu-155	4.8175E-03	12.53	25.06	0.00E+00	6.04E-02	1.21E-01	2.2500	7.394E+04
Fe-55	1.2397E-04	12.53	25.06	0.00E+00	1.55E-03	3.11E-03	2.7500	4.180E+04
H-3	4.5697E-03	12.53	25.06	0.00E+00	5.73E-02	1.15E-01	3.5000	1.922E+02
I-129	7.5300E-07	12.53	25.06	0.00E+00	9.43E-06	1.89E-05	5.0000	1.092E+01
Kr-85	1.0850E-01	12.53	25.06	0.00E+00	1.36E+00	2.72E+00	7.0000	1.205E+00
Np-237	9.5561E-06	12.53	25.06	0.00E+00	1.20E-04	2.39E-04	11.0000	1.351E-01
Pa-231	2.0359E-09	12.53	25.06	0.00E+00	2.55E-08	5.10E-08		
Pb-210	4.9728E-11	12.53	25.06	0.00E+00	6.23E-10	1.25E-09		
Pm-147	4.8502E-02	12.53	25.06	0.00E+00	6.08E-01	1.22E+00		
Pu-238	1.8254E-02	12.53	25.06	0.00E+00	2.29E-01	4.57E-01		
Pu-239	4.2810E-04	12.53	25.06	0.00E+00	5.36E-03	1.07E-02		
Pu-240	2.4368E-04	12.53	25.06	0.00E+00	3.05E-03	6.11E-03		
Pu-241	3.3415E-02	12.53	25.06	0.00E+00	4.19E-01	8.37E-01		
Pu-242	3.6329E-07	12.53	25.06	0.00E+00	4.55E-06	9.10E-06		
Ra-226	2.2854E-10	12.53	25.06	0.00E+00	2.86E-09	5.73E-09		
Ra-228	1.2426E-14	12.53	25.06	0.00E+00	1.56E-13	3.11E-13		
Ru-106	6.3589E-06	12.53	25.06	0.00E+00	7.97E-05	1.59E-04		
Se-79	1.2933E-05	12.53	25.06	0.00E+00	1.62E-04	3.24E-04		
Sn-126	1.1574E-05	12.53	25.06	0.00E+00	1.45E-04	2.90E-04		
Sr-90	1.9248E+00	12.53	25.06	0.00E+00	2.41E+01	4.82E+01		
Tc-99	4.2239E-04	12.53	25.06	0.00E+00	5.29E-03	1.06E-02		
Th-229	5.0953E-12	12.53	25.06	0.00E+00	6.38E-11	1.28E-10		
Th-230	4.1885E-08	12.53	25.06	0.00E+00	5.25E-07	1.05E-06		
Th-232	1.9270E-14	12.53	25.06	0.00E+00	2.41E-13	4.83E-13		
Ti-208	4.6024E-08	12.53	25.06	0.00E+00	5.77E-07	1.15E-06		
U-232	1.2582E-07	12.53	25.06	0.00E+00	1.58E-06	3.15E-06		
U-233	2.5825E-09	12.53	25.06	0.00E+00	3.24E-08	6.47E-08		
U-234	1.8450E-04	12.53	25.06	0.00E+00	2.31E-03	4.62E-03		
U-235	-2.7235E-06	12.53	0.00	1.78E-03	1.75E-03	1.78E-03		
U-236	1.5493E-05	12.53	25.06	0.00E+00	1.94E-04	3.88E-04		
U-238	-4.2851E-09	12.53	0.00	1.68E-05	1.68E-05	1.68E-05		
Y-90	1.9254E+00	12.53	25.06	0.00E+00	2.41E+01	4.82E+01		
Other Radionuclides					2.42E+01	4.85E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	94.28571429	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal:	12.53	4.74
Bounding:		25.06

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:	0.05	0.38
Bounding:	0.09	

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: SPERT-III
 SNF ID #: 209
 Fuel Units & Descr: 3 - CANISTER OF SCRAP
 Heavy Metal Mass: BOL= ; EOL=9.74kg
 ROD Storage Site: INEEL

*Fuel decay start date: 1966
 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
 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) ¹	Bounding Fuel Burnup (MWd) ¹	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0733E-09	9,262.37	9,262.37	0.00E+00	9.94E-06	9.94E-06	Avg. MeV	
Am-241	1.4751E-01	9,262.37	9,262.37	0.00E+00	1.37E+03	1.37E+03	0.0150	3.524E+14
Am-242m	2.6809E-04	9,262.37	9,262.37	0.00E+00	2.48E+00	2.48E+00	0.0250	7.063E+13
Am-243	6.2484E-04	9,262.37	9,262.37	0.00E+00	5.79E+00	5.79E+00	0.0375	8.655E+13
C-14	4.7820E-05	9,262.37	9,262.37	0.00E+00	4.43E-01	4.43E-01	0.0675	8.328E+13
Cl-36	8.0297E-07	9,262.37	9,262.37	0.00E+00	7.44E-03	7.44E-03	0.0850	3.891E+13
Cm-243	1.7426E-04	9,262.37	9,262.37	0.00E+00	1.61E+00	1.61E+00	0.1250	2.589E+13
Cm-244	2.7616E-02	9,262.37	9,262.37	0.00E+00	2.56E+02	2.56E+02	0.2250	3.322E+13
Co-60	3.5610E-04	9,262.37	9,262.37	0.00E+00	3.30E+00	3.30E+00	0.3750	1.435E+13
Cs-134	2.6260E-07	9,262.37	9,262.37	0.00E+00	2.43E-03	2.43E-03	0.5750	3.370E+14
Cs-135	1.4433E-05	9,262.37	9,262.37	0.00E+00	1.34E-01	1.34E-01	0.8500	3.299E+12
Cs-137	9.8870E-01	9,262.37	9,262.37	0.00E+00	9.16E+03	9.16E+03	1.2500	2.099E+12
Eu-154	6.0320E-03	9,262.37	9,262.37	0.00E+00	5.59E+01	5.59E+01	1.7500	9.230E+10
Eu-155	2.1770E-04	9,262.37	9,262.37	0.00E+00	2.02E+00	2.02E+00	2.2500	1.517E+07
Fe-55	7.9296E-07	9,262.37	9,262.37	0.00E+00	7.34E-03	7.34E-03	2.7500	5.347E+07
H-3	8.9486E-03	9,262.37	9,262.37	0.00E+00	8.29E+01	8.29E+01	3.5000	3.815E+06
I-129	9.8288E-07	9,262.37	9,262.37	0.00E+00	9.10E-03	9.10E-03	5.0000	1.630E+06
Kr-85	1.0707E-02	9,262.37	9,262.37	0.00E+00	9.92E+01	9.92E+01	7.0000	1.878E+05
Np-237	1.1927E-05	9,262.37	9,262.37	0.00E+00	1.10E-01	1.10E-01	11.0000	2.157E+04
Pa-231	1.4703E-09	9,262.37	9,262.37	0.00E+00	1.36E-05	1.36E-05		
Pb-210	1.6828E-10	9,262.37	9,262.37	0.00E+00	1.56E-06	1.56E-06		
Pm-147	6.9606E-06	9,262.37	9,262.37	0.00E+00	6.45E-02	6.45E-02		
Pu-238	6.6263E-02	9,262.37	9,262.37	0.00E+00	6.14E+02	6.14E+02		
Pu-239	1.1618E-02	9,262.37	9,262.37	0.00E+00	1.08E+02	1.08E+02		
Pu-240	1.5142E-02	9,262.37	9,262.37	0.00E+00	1.40E+02	1.40E+02		
Pu-241	4.3766E-01	9,262.37	9,262.37	0.00E+00	4.05E+03	4.05E+03		
Pu-242	6.4260E-05	9,262.37	9,262.37	0.00E+00	5.95E-01	5.95E-01		
Ra-226	3.8501E-10	9,262.37	9,262.37	0.00E+00	3.57E-06	3.57E-06		
Ra-228	5.2955E-12	9,262.37	9,262.37	0.00E+00	4.90E-08	4.90E-08		
Ru-106	2.0413E-14	9,262.37	9,262.37	0.00E+00	1.89E-10	1.89E-10		
Se-79	1.2376E-05	9,262.37	9,262.37	0.00E+00	1.15E-01	1.15E-01		
Sn-126	2.5210E-05	9,262.37	9,262.37	0.00E+00	2.34E-01	2.34E-01		
Sr-90	6.4163E-01	9,262.37	9,262.37	0.00E+00	5.94E+03	5.94E+03		
Tc-99	3.9357E-04	9,262.37	9,262.37	0.00E+00	3.65E+00	3.65E+00		
Th-229	1.5644E-10	9,262.37	9,262.37	0.00E+00	1.45E-06	1.45E-06		
Th-230	2.7972E-08	9,262.37	9,262.37	0.00E+00	2.59E-04	2.59E-04		
Th-232	5.3036E-12	9,262.37	9,262.37	0.00E+00	4.91E-08	4.91E-08		
Ti-208	1.5136E-07	9,262.37	9,262.37	0.00E+00	1.40E-03	1.40E-03		
U-232	4.1005E-07	9,262.37	9,262.37	0.00E+00	3.80E-03	3.80E-03	Thermal Power	
U-233	2.5856E-08	9,262.37	9,262.37	0.00E+00	2.39E-04	2.39E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.2665E-05	9,262.37	9,262.37	0.00E+00	4.88E-01	4.88E-01	1.88E+02	1.88E+02
U-235	-1.4487E-06	9,262.37	0.00	1.35E-03	0.00E+00	1.35E-03	Total	Total
U-236	7.5888E-06	9,262.37	9,262.37	0.00E+00	7.03E-02	7.03E-02		
U-238	-2.6129E-07	9,262.37	0.00	6.33E-03	3.91E-03	6.33E-03		
Y-90	6.4180E-01	9,262.37	9,262.37	0.00E+00	5.94E+03	5.94E+03		
Other Radionuclides					8.83E+03	8.83E+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).
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:		0 to 5	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		9,262.37	Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Bounding:		9,262.37	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	13.58		1.58
Bounding:	13.58		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: THOR (UALX-HEU) TAIWAN

SNF ID #: 629

Fuel Units & Descr: 35 - MTR TYPE

Heavy Metal Mass: BOL=5.061kg; EOL=4.098kg

ROD Storage Site: SRS

*Fuel decay start date: 1997

Estimates as of: 2030

Template: TRIGA-AI (LWAJ-Zr, Alum., 10 to 20%, U)

*Template Burnup (MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 25 years

Estimated

Canister usage:

18"x10"

1.46

II. Estimates

Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.8271E-09	918.72	1,837.45	0.00E+00	3.52E-06	7.03E-06	Avg. MeV	
Am-241	4.4195E-03	918.72	1,837.45	0.00E+00	4.06E+00	8.12E+00	0.0150	1.661E+14
Am-242m	1.8195E-06	918.72	1,837.45	0.00E+00	1.67E-03	3.34E-03	0.0250	3.431E+13
Am-243	2.3278E-07	918.72	1,837.45	0.00E+00	2.14E-04	4.28E-04	0.0375	3.436E+13
C-14	4.3203E-05	918.72	1,837.45	0.00E+00	3.97E-02	7.94E-02	0.0575	3.295E+13
Cl-36	4.3023E-08	918.72	1,837.45	0.00E+00	3.95E-05	7.91E-05	0.0850	1.982E+13
Cm-243	1.6872E-07	918.72	1,837.45	0.00E+00	1.55E-04	3.10E-04	0.1250	2.015E+13
Cm-244	1.4660E-06	918.72	1,837.45	0.00E+00	1.35E-03	2.69E-03	0.2250	1.793E+13
Co-60	2.2376E-03	918.72	1,837.45	0.00E+00	2.06E+00	4.11E+00	0.3750	7.458E+12
Cs-134	1.2525E-04	918.72	1,837.45	0.00E+00	1.15E-01	2.30E-01	0.5750	1.206E+14
Cs-135	3.1549E-05	918.72	1,837.45	0.00E+00	2.90E-02	5.80E-02	0.8500	9.955E+12
Cs-137	1.7368E+00	918.72	1,837.45	0.00E+00	1.60E+03	3.19E+03	1.2500	1.045E+13
Eu-154	2.6947E-01	918.72	1,837.45	0.00E+00	2.48E+02	4.95E+02	1.7500	3.198E+11
Eu-155	2.6857E-02	918.72	1,837.45	0.00E+00	2.47E+01	4.93E+01	2.2500	4.906E+08
Fe-55	4.2105E-05	918.72	1,837.45	0.00E+00	3.87E-02	7.74E-02	2.7500	1.130E+08
H-3	3.5173E-03	918.72	1,837.45	0.00E+00	3.23E+00	6.46E+00	3.5000	2.640E+03
I-129	7.3805E-07	918.72	1,837.45	0.00E+00	6.78E-04	1.36E-03	5.0000	1.030E+03
Kr-85	6.9263E-02	918.72	1,837.45	0.00E+00	6.36E+01	1.27E+02	7.0000	1.162E+02
Np-237	1.4752E-06	918.72	1,837.45	0.00E+00	1.36E-03	2.71E-03	11.0000	1.321E+01
Pa-231	8.3970E-09	918.72	1,837.45	0.00E+00	7.71E-06	1.54E-05		
Pb-210	1.4995E-13	918.72	1,837.45	0.00E+00	1.38E-10	2.76E-10		
Pm-147	1.0567E-02	918.72	1,837.45	0.00E+00	9.71E+00	1.94E+01		
Pu-238	1.1543E-03	918.72	1,837.45	0.00E+00	1.06E+00	2.12E+00		
Pu-239	5.6917E-03	918.72	1,837.45	0.00E+00	5.23E+00	1.05E+01		
Pu-240	2.2602E-03	918.72	1,837.45	0.00E+00	2.08E+00	4.15E+00		
Pu-241	4.8045E-02	918.72	1,837.45	0.00E+00	4.41E+01	8.83E+01		
Pu-242	3.0602E-07	918.72	1,837.45	0.00E+00	2.81E-04	5.62E-04		
Ra-226	5.1293E-13	918.72	1,837.45	0.00E+00	4.71E-10	9.42E-10		
Ra-228	2.3323E-10	918.72	1,837.45	0.00E+00	2.14E-07	4.29E-07		
Rf-106	1.0075E-07	918.72	1,837.45	0.00E+00	9.26E-05	1.85E-04		
Se-79	1.2935E-05	918.72	1,837.45	0.00E+00	1.19E-02	2.38E-02		
Sn-126	1.2238E-05	918.72	1,837.45	0.00E+00	1.12E-02	2.25E-02		
Sr-90	1.6165E+00	918.72	1,837.45	0.00E+00	1.49E+03	2.97E+03		
Tc-99	4.4120E-04	918.72	1,837.45	0.00E+00	4.05E-01	8.11E-01		
Th-229	4.5684E-10	918.72	1,837.45	0.00E+00	4.20E-07	8.39E-07		
Th-230	6.8271E-11	918.72	1,837.45	0.00E+00	6.27E-08	1.25E-07		
Th-232	2.3744E-10	918.72	1,837.45	0.00E+00	2.18E-07	4.36E-07		
Ti-208	1.7368E-06	918.72	1,837.45	0.00E+00	1.60E-05	3.19E-05		
U-232	4.6797E-06	918.72	1,837.45	0.00E+00	4.30E-05	8.60E-05		
U-233	1.3146E-07	918.72	1,837.45	0.00E+00	1.21E-04	2.42E-04		
U-234	2.5729E-07	918.72	1,837.45	0.00E+00	2.36E-04	4.73E-04		
U-235	2.6159E-06	918.72	0.00	1.02E-02	7.79E-03	1.02E-02		
U-236	1.2719E-05	918.72	1,837.45	0.00E+00	1.17E-02	2.34E-02		
U-238	3.8857E-06	918.72	0.00	1.16E-04	8.06E-05	1.16E-04		
Y-90	1.6165E+00	918.72	1,837.45	0.00E+00	1.49E+03	2.97E+03		
Other Radionuclides					1.73E+03	3.46E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.16330808	10 to 20.1	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		918.72	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,837.45	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	4.91		1.01
Bounding:	9.83		

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRR-1 (UALX-HEU) THAILAND

SNF ID #: 633

Fuel Units & Descr: 31 - MTR TYPE

Heavy Metal Mass: BOL=5.295kg; EOL=4.771kg

ROD Storage Site: SRS

Fuel decay start date: 1998

Estimates as of: 2030

Template: TRIGA-AI (LW/U-Zr, Alum., 10 to 20%, U)

Template Burnup(MWd): 6.65

Template BOL Heavy Metal Mass (MT): 0.00018

Template Decay Time: 25 years

Estimated

Canister usage:

18"x10"

1.29

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 Avg. MeV Total Photons/sec (bounding)
Ac-227	3.8271E-09	500.07	1,000.14	0.00E+00	1.91E-06	3.83E-06	0.0150 9.039E+13
Am-241	4.4195E-03	500.07	1,000.14	0.00E+00	2.21E+00	4.42E+00	0.0250 1.867E+13
Am-242m	1.8195E-06	500.07	1,000.14	0.00E+00	9.10E-04	1.82E-03	0.0375 1.870E+13
Am-243	2.3278E-07	500.07	1,000.14	0.00E+00	1.16E-04	2.33E-04	0.0675 1.793E+13
C-14	4.3203E-05	500.07	1,000.14	0.00E+00	2.16E-02	4.32E-02	0.0850 1.079E+13
Cl-36	4.3023E-08	500.07	1,000.14	0.00E+00	2.15E-05	4.30E-05	0.1250 1.097E+13
Cm-243	1.6872E-07	500.07	1,000.14	0.00E+00	8.44E-05	1.69E-04	0.2250 9.780E+12
Cm-244	1.4660E-06	500.07	1,000.14	0.00E+00	7.33E-04	1.47E-03	0.3750 4.059E+12
Co-60	2.2376E-03	500.07	1,000.14	0.00E+00	1.12E+00	2.24E+00	0.5750 6.565E+13
Cs-134	1.2525E-04	500.07	1,000.14	0.00E+00	6.26E-02	1.25E-01	0.8500 5.419E+12
Cs-135	3.1549E-05	500.07	1,000.14	0.00E+00	1.58E-02	3.16E-02	1.2500 5.696E+12
Cs-137	1.7368E+00	500.07	1,000.14	0.00E+00	8.69E+02	1.74E+03	1.7500 1.741E+11
Eu-154	2.6947E-01	500.07	1,000.14	0.00E+00	1.35E+02	2.70E+02	2.2500 2.670E+06
Eu-155	2.6857E-02	500.07	1,000.14	0.00E+00	1.34E+01	2.69E+01	2.7500 6.150E+05
Fe-55	4.2105E-05	500.07	1,000.14	0.00E+00	2.11E-02	4.21E-02	3.5000 1.438E+03
H-3	3.5173E-03	500.07	1,000.14	0.00E+00	1.76E+00	3.52E+00	5.0000 5.610E+02
I-129	7.3805E-07	500.07	1,000.14	0.00E+00	3.69E-04	7.38E-04	7.0000 6.327E+01
Kr-85	6.9263E-02	500.07	1,000.14	0.00E+00	3.46E+01	6.93E+01	11.0000 7.192E+00
Np-237	1.4752E-06	500.07	1,000.14	0.00E+00	7.38E-04	1.48E-03	
Pa-231	8.3970E-09	500.07	1,000.14	0.00E+00	4.20E-06	8.40E-06	
Pb-210	1.4995E-13	500.07	1,000.14	0.00E+00	7.50E-11	1.50E-10	
Pm-147	1.0567E-02	500.07	1,000.14	0.00E+00	5.28E+00	1.06E+01	
Pu-238	1.1543E-03	500.07	1,000.14	0.00E+00	5.77E-01	1.15E+00	
Pu-239	5.6917E-03	500.07	1,000.14	0.00E+00	2.85E+00	5.69E+00	
Pu-240	2.2602E-03	500.07	1,000.14	0.00E+00	1.13E+00	2.26E+00	
Pu-241	4.8045E-02	500.07	1,000.14	0.00E+00	2.40E+01	4.81E+01	
Pu-242	3.0602E-07	500.07	1,000.14	0.00E+00	1.53E-04	3.06E-04	
Ra-226	5.1293E-13	500.07	1,000.14	0.00E+00	2.57E-10	5.13E-10	
Ra-228	2.3323E-10	500.07	1,000.14	0.00E+00	1.17E-07	2.33E-07	
Ru-106	1.0075E-07	500.07	1,000.14	0.00E+00	5.04E-05	1.01E-04	
Se-79	1.2935E-05	500.07	1,000.14	0.00E+00	6.47E-03	1.29E-02	
Sn-126	1.2238E-05	500.07	1,000.14	0.00E+00	6.12E-03	1.22E-02	
Sr-90	1.6165E+00	500.07	1,000.14	0.00E+00	8.08E+02	1.62E+03	
Tc-99	4.4120E-04	500.07	1,000.14	0.00E+00	2.21E-01	4.41E-01	
Th-229	4.5684E-10	500.07	1,000.14	0.00E+00	2.28E-07	4.57E-07	
Th-230	6.8271E-11	500.07	1,000.14	0.00E+00	3.41E-08	6.83E-08	
Th-232	2.3744E-10	500.07	1,000.14	0.00E+00	1.19E-07	2.37E-07	
Th-208	1.7368E-08	500.07	1,000.14	0.00E+00	8.69E-06	1.74E-05	
U-232	4.6797E-08	500.07	1,000.14	0.00E+00	2.34E-05	4.68E-05	
U-233	1.3146E-07	500.07	1,000.14	0.00E+00	6.57E-05	1.31E-04	
U-234	2.5729E-07	500.07	1,000.14	0.00E+00	1.29E-04	2.57E-04	
U-235	-2.6159E-06	500.07	0.00	1.03E-02	8.98E-03	1.03E-02	
U-236	1.2719E-05	500.07	1,000.14	0.00E+00	6.36E-03	1.27E-02	
U-238	-3.8857E-08	500.07	0.00	1.80E-04	1.80E-04	1.80E-04	
Y-90	1.6165E+00	500.07	1,000.14	0.00E+00	8.08E+02	1.62E+03	
Other Radionuclides					9.41E+02	1.88E+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:	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	89.90758798	10 to 20.1	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		500.07	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,000.14	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	2.56		1.00
Bounding:	5.11		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UMRA (HEU) ROLLA
SNF ID #: 881
Fuel Units & Descr: 28 - 24 CURVED PLATES
Heavy Metal Mass: BOL=5.09kg; EOL=4.771kg
ROD Storage Site: SRS

Fuel decay start date: 1998
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: 25 years

Estimated
Canister usage:
18"x10"
1.17

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	1.1465E-09	307.59	615.18	0.00E+00	3.53E-07	7.05E-07	0.0150
Am-241	2.3056E-03	307.59	615.18	0.00E+00	7.09E-01	1.42E+00	0.0250
Am-242m	4.1476E-07	307.59	615.18	0.00E+00	1.28E-04	2.55E-04	0.0375
Am-243	1.4894E-06	307.59	615.18	0.00E+00	4.58E-04	9.16E-04	0.0575
C-14	5.7108E-09	307.59	615.18	0.00E+00	1.76E-06	3.51E-06	0.0850
Cl-36	1.3124E-32	307.59	615.18	0.00E+00	4.04E-30	8.07E-30	0.1250
Cm-243	1.4562E-07	307.59	615.18	0.00E+00	4.48E-05	8.96E-05	0.2250
Cm-244	2.4221E-06	307.59	615.18	0.00E+00	7.45E-03	1.49E-02	0.3750
Co-60	2.7560E-06	307.59	615.18	0.00E+00	8.48E-04	1.70E-03	0.5750
Cs-134	5.8851E-04	307.59	615.18	0.00E+00	1.81E-01	3.62E-01	0.8500
Cs-135	3.4477E-06	307.59	615.18	0.00E+00	1.06E-03	2.12E-03	1.2500
Cs-137	1.8099E+00	307.59	615.18	0.00E+00	5.57E+02	1.11E+03	1.7500
Eu-154	1.6386E-02	307.59	615.18	0.00E+00	5.04E+00	1.01E+01	2.2500
Eu-155	2.3957E-03	307.59	615.18	0.00E+00	7.37E-01	1.47E+00	2.7500
Fe-55	3.2707E-05	307.59	615.18	0.00E+00	1.01E-02	2.01E-02	3.5000
H-3	3.4504E-03	307.59	615.18	0.00E+00	1.06E+00	2.12E+00	5.0000
I-129	7.5300E-07	307.59	615.18	0.00E+00	2.32E-04	4.63E-04	7.0000
Kr-85	7.8540E-02	307.59	615.18	0.00E+00	2.42E+01	4.83E+01	11.0000
Np-237	9.5615E-06	307.59	615.18	0.00E+00	2.94E-03	5.88E-03	
Pa-231	2.7968E-09	307.59	615.18	0.00E+00	8.60E-07	1.72E-06	
Pb-210	1.2612E-10	307.59	615.18	0.00E+00	3.88E-08	7.76E-08	
Pm-147	1.2962E-02	307.59	615.18	0.00E+00	3.98E+00	7.97E+00	
Pu-238	1.7549E-02	307.59	615.18	0.00E+00	5.40E+00	1.08E+01	
Pu-239	4.2810E-04	307.59	615.18	0.00E+00	1.32E-01	2.63E-01	
Pu-240	2.4357E-04	307.59	615.18	0.00E+00	7.49E-02	1.50E-01	
Pu-241	2.6277E-02	307.59	615.18	0.00E+00	8.08E+00	1.62E+01	
Pu-242	3.6329E-07	307.59	615.18	0.00E+00	1.12E-04	2.23E-04	
Ra-226	4.4444E-10	307.59	615.18	0.00E+00	1.37E-07	2.73E-07	
Ra-228	1.9714E-14	307.59	615.18	0.00E+00	6.06E-12	1.21E-11	
Ru-106	2.0477E-07	307.59	615.18	0.00E+00	6.30E-05	1.26E-04	
Se-79	1.2933E-05	307.59	615.18	0.00E+00	3.98E-03	7.96E-03	
Sn-126	1.1574E-05	307.59	615.18	0.00E+00	3.56E-03	7.12E-03	
Sr-90	1.7092E+00	307.59	615.18	0.00E+00	5.26E+02	1.05E+03	
Tc-99	4.2239E-04	307.59	615.18	0.00E+00	1.30E-01	2.60E-01	
Th-229	7.7260E-12	307.59	615.18	0.00E+00	2.38E-09	4.75E-09	
Th-230	5.8497E-08	307.59	615.18	0.00E+00	1.80E-05	3.60E-05	
Th-232	2.6906E-14	307.59	615.18	0.00E+00	8.28E-12	1.66E-11	
Ti-208	4.4336E-08	307.59	615.18	0.00E+00	1.36E-05	2.73E-05	
U-232	1.2037E-07	307.59	615.18	0.00E+00	3.70E-05	7.40E-05	
U-233	3.0011E-09	307.59	615.18	0.00E+00	9.23E-07	1.85E-06	
U-234	1.8497E-04	307.59	615.18	0.00E+00	5.69E-02	1.14E-01	
U-235	-2.7235E-08	307.59	0.00	1.03E-02	9.45E-03	1.03E-02	
U-236	1.5493E-05	307.59	615.18	0.00E+00	4.77E-03	9.53E-03	
U-238	-4.2851E-09	307.59	0.00	1.13E-04	1.12E-04	1.13E-04	
Y-90	1.7094E+00	307.59	615.18	0.00E+00	5.26E+02	1.05E+03	
Other Radionuclides					5.30E+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:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.40659341	60 to 100	

Burnup Summary (MWd) ^a			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		307.59	
Bounding:		615.18	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:	0.19		
Bounding:	0.38		1.00

^aReactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^bTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UMRR (LEU) ROLLA

SNF ID #: 146

Fuel Units & Descr: 28 - 24 CURVED PLATES

Heavy Metal Mass: BOL=31.898kg; EOL=26.46kg

ROD Storage Site: SRS

*Fuel decay start date:

2035

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:

5 years

Estimated

Canister usage:

18"x10"

0.78

II. Estimates

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)	Gamma Sources
Ac-227	1.4545E-10	5,149.51	10,299.02	0.00E+00	7.49E-07	1.50E-06	Photon Energy Group
Am-241	1.1190E-03	5,149.51	10,299.02	0.00E+00	5.76E+00	1.15E+01	Total Photons/sec (bounding)
Am-242m	4.5425E-07	5,149.51	10,299.02	0.00E+00	2.34E-03	4.68E-03	Avg. MeV
Am-243	1.4921E-06	5,149.51	10,299.02	0.00E+00	7.88E-03	1.54E-02	0.0150
C-14	5.7244E-09	5,149.51	10,299.02	0.00E+00	2.95E-05	5.90E-05	0.0250
Cl-36	1.3124E-32	5,149.51	10,299.02	0.00E+00	6.76E-29	1.35E-28	0.0375
Cm-243	2.3676E-07	5,149.51	10,299.02	0.00E+00	1.22E-03	2.44E-03	0.0575
Cm-244	5.2042E-05	5,149.51	10,299.02	0.00E+00	2.68E-01	5.36E-01	0.0650
Co-60	3.8208E-05	5,149.51	10,299.02	0.00E+00	1.97E-01	3.94E-01	0.1250
Cs-134	4.8693E-01	5,149.51	10,299.02	0.00E+00	2.51E+03	5.01E+03	0.2250
Cs-135	3.4477E-06	5,149.51	10,299.02	0.00E+00	1.78E-02	3.55E-02	0.3750
Cs-137	2.8731E+00	5,149.51	10,299.02	0.00E+00	1.48E+04	2.96E+04	0.5750
Eu-154	8.2053E-02	5,149.51	10,299.02	0.00E+00	4.23E+02	8.45E+02	0.8500
Eu-155	3.9134E-02	5,149.51	10,299.02	0.00E+00	2.02E+02	4.03E+02	1.2500
Fe-55	6.7429E-03	5,149.51	10,299.02	0.00E+00	3.47E+01	6.94E+01	1.7500
H-3	1.0599E-02	5,149.51	10,299.02	0.00E+00	5.46E+01	1.09E+02	2.7500
I-129	7.5300E-07	5,149.51	10,299.02	0.00E+00	3.88E-03	7.76E-03	3.5000
Kr-85	2.8595E-01	5,149.51	10,299.02	0.00E+00	1.47E+03	2.94E+03	5.0000
Np-237	9.5479E-06	5,149.51	10,299.02	0.00E+00	4.92E-02	9.83E-02	7.0000
Pa-231	8.9297E-10	5,149.51	10,299.02	0.00E+00	4.80E-06	9.20E-06	11.0000
Pb-210	3.7609E-12	5,149.51	10,299.02	0.00E+00	1.94E-08	3.87E-08	
Pm-147	2.5452E+00	5,149.51	10,299.02	0.00E+00	1.31E+04	2.62E+04	
Pu-238	2.0550E-02	5,149.51	10,299.02	0.00E+00	1.06E+02	2.12E+02	
Pu-239	4.2838E-04	5,149.51	10,299.02	0.00E+00	2.21E+00	4.41E+00	
Pu-240	2.4401E-04	5,149.51	10,299.02	0.00E+00	1.26E+00	2.51E+00	
Pu-241	6.8764E-02	5,149.51	10,299.02	0.00E+00	3.54E+02	7.08E+02	
Pu-242	3.6329E-07	5,149.51	10,299.02	0.00E+00	1.87E-03	3.74E-03	
Ra-226	3.8045E-11	5,149.51	10,299.02	0.00E+00	1.96E-07	3.92E-07	
Ra-228	2.9902E-15	5,149.51	10,299.02	0.00E+00	1.54E-11	3.08E-11	
Ru-106	1.9055E-01	5,149.51	10,299.02	0.00E+00	9.81E+02	1.96E+03	
Se-79	1.2936E-05	5,149.51	10,299.02	0.00E+00	6.66E-02	1.33E-01	
Sn-126	1.1574E-05	5,149.51	10,299.02	0.00E+00	5.96E-02	1.19E-01	
Sr-90	2.7505E+00	5,149.51	10,299.02	0.00E+00	1.42E+04	2.83E+04	
Tc-99	4.2239E-04	5,149.51	10,299.02	0.00E+00	2.18E+00	4.35E+00	
Th-229	1.8848E-12	5,149.51	10,299.02	0.00E+00	9.71E-09	1.94E-08	
Th-230	1.7042E-08	5,149.51	10,299.02	0.00E+00	8.78E-05	1.76E-04	
Th-232	7.8132E-15	5,149.51	10,299.02	0.00E+00	4.02E-11	8.05E-11	
Ti-208	4.4063E-08	5,149.51	10,299.02	0.00E+00	2.27E-04	4.54E-04	
U-232	1.3151E-07	5,149.51	10,299.02	0.00E+00	6.77E-04	1.35E-03	
U-233	1.9564E-09	5,149.51	10,299.02	0.00E+00	1.01E-05	2.01E-05	
U-234	1.8371E-04	5,149.51	10,299.02	0.00E+00	9.46E-01	1.89E+00	
U-235	-2.7235E-06	5,149.51	0.00	1.36E-02	0.00E+00	1.36E-02	
U-236	1.5493E-05	5,149.51	10,299.02	0.00E+00	7.98E-02	1.60E-01	
U-238	-4.2851E-09	5,149.51	0.00	8.60E-03	8.58E-03	8.60E-03	
Y-90	2.7505E+00	5,149.51	10,299.02	0.00E+00	1.42E+04	2.83E+04	
Other Radionuclides					2.65E+04	5.30E+04	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.7500078	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		5,149.51	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		10,299.02	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.51		1.02
Bounding:	1.03		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

³Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNV OF FLORIDA (ARGONAUT) HEU

SNF ID #: 272

Fuel Units & Descr: 259 - ELEMENT

Heavy Metal Mass: BOL=4.144kg; EOL=4.092kg

ROD Storage Site: SRS

Fuel decay start date: 2035

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: 5 years

Estimated

Canister usage:

18"x10"

7.19

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CU/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	49.06	98.11	0.00E+00	7.14E-09	1.43E-08	Avg. MeV	
Am-241	1.1190E-03	49.06	98.11	0.00E+00	5.49E-02	1.10E-01	0.0150	1.893E+13
Am-242m	4.5425E-07	49.06	98.11	0.00E+00	2.23E-05	4.46E-05	0.0250	4.078E+12
Am-243	1.4921E-06	49.06	98.11	0.00E+00	7.32E-05	1.46E-04	0.0375	3.763E+12
C-14	5.7244E-09	49.06	98.11	0.00E+00	2.81E-07	5.62E-07	0.0575	3.700E+12
Cf-252	1.3124E-32	49.06	98.11	0.00E+00	6.44E-31	1.29E-30	0.0850	2.359E+12
Cm-243	2.3676E-07	49.06	98.11	0.00E+00	1.16E-05	2.32E-05	0.1250	2.043E+12
Cm-244	5.2042E-05	49.06	98.11	0.00E+00	2.55E-03	5.11E-03	0.2250	1.999E+12
Co-60	3.8208E-05	49.06	98.11	0.00E+00	1.87E-03	3.75E-03	0.3750	9.677E+11
Cs-134	4.8693E-01	49.06	98.11	0.00E+00	2.39E+01	4.78E+01	0.5750	1.329E+13
Cs-135	3.4477E-06	49.06	98.11	0.00E+00	1.69E-04	3.38E-04	0.8500	1.862E+12
Cs-137	2.8731E+00	49.06	98.11	0.00E+00	1.41E+02	2.82E+02	1.2500	3.463E+11
Eu-154	8.2053E-02	49.06	98.11	0.00E+00	4.03E+00	8.05E+00	1.7500	1.452E+10
Eu-155	3.9134E-02	49.06	98.11	0.00E+00	1.92E+00	3.84E+00	2.2500	3.046E+10
Fe-55	6.7429E-03	49.06	98.11	0.00E+00	3.31E-01	6.62E-01	2.7500	1.753E+08
H-3	1.0599E-02	49.06	98.11	0.00E+00	5.20E-01	1.04E+00	3.5000	1.944E+07
I-129	7.5300E-07	49.06	98.11	0.00E+00	3.69E-05	7.39E-05	5.0000	5.844E+01
Kr-85	2.8595E-01	49.06	98.11	0.00E+00	1.40E+01	2.81E+01	7.0000	6.515E+00
Np-237	9.5479E-06	49.06	98.11	0.00E+00	4.68E-04	9.37E-04	11.0000	7.344E-01
Pa-231	8.9297E-10	49.06	98.11	0.00E+00	4.38E-08	8.76E-08		
Pb-210	3.7609E-12	49.06	98.11	0.00E+00	1.84E-10	3.69E-10		
Pm-147	2.5452E+00	49.06	98.11	0.00E+00	1.25E+02	2.50E+02		
Pu-238	2.0550E-02	49.06	98.11	0.00E+00	1.01E+00	2.02E+00		
Pu-239	4.2838E-04	49.06	98.11	0.00E+00	2.10E-02	4.20E-02		
Pu-240	2.4401E-04	49.06	98.11	0.00E+00	1.20E-02	2.39E-02		
Pu-241	6.8764E-02	49.06	98.11	0.00E+00	3.37E+00	6.75E+00		
Pu-242	3.6329E-07	49.06	98.11	0.00E+00	1.78E-05	3.56E-05		
Ra-226	3.8045E-11	49.06	98.11	0.00E+00	1.87E-09	3.73E-09		
Ra-228	2.9902E-15	49.06	98.11	0.00E+00	1.47E-13	2.93E-13		
Ru-106	1.9055E-01	49.06	98.11	0.00E+00	9.35E+00	1.87E+01		
Se-79	1.2936E-05	49.06	98.11	0.00E+00	6.35E-04	1.27E-03		
Sn-126	1.1574E-05	49.06	98.11	0.00E+00	5.68E-04	1.14E-03		
Sr-90	2.7505E+00	49.06	98.11	0.00E+00	1.35E+02	2.70E+02		
Tc-99	4.2239E-04	49.06	98.11	0.00E+00	2.07E-02	4.14E-02		
Th-229	1.8848E-12	49.06	98.11	0.00E+00	9.25E-11	1.85E-10		
Th-230	1.7042E-06	49.06	98.11	0.00E+00	8.36E-07	1.67E-06		
Th-232	7.8132E-15	49.06	98.11	0.00E+00	3.83E-13	7.67E-13		
Ti-206	4.4063E-08	49.06	98.11	0.00E+00	2.16E-06	4.32E-06		
U-232	1.3151E-07	49.06	98.11	0.00E+00	6.45E-06	1.29E-05		
U-233	1.9564E-09	49.06	98.11	0.00E+00	9.60E-08	1.92E-07		
U-234	1.8371E-04	49.06	98.11	0.00E+00	9.01E-03	1.80E-02		
U-235	-2.7235E-06	49.06	0.00	8.34E-03	8.21E-03	8.34E-03		
U-236	1.5493E-05	49.06	98.11	0.00E+00	7.60E-04	1.52E-03		
U-238	-4.2851E-09	49.06	0.00	9.54E-05	9.52E-05	9.54E-05		
Y-90	2.7505E+00	49.06	98.11	0.00E+00	1.35E+02	2.70E+02		
Other Radionuclides					2.52E+02	5.05E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.49E+09	4.97E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)^a

	From SFD	Estimated
Nominal:	28.18	49.06
Bounding:		98.11

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:	0.04	1.74
Bounding:	0.08	

Estimated EOL HM/Given EOL HM
1.00

^a Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

^a Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF FLORIDA (ARGONAUT) LEU
SNF ID #: 273
Fuel Units & Descr: 14 - ELEMENT
Heavy Metal Mass: BOL=0.995kg; EOL=0.995kg
ROD Storage Site: SRS

Fuel decay start date: 2035
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: 5 years

Estimated
Canister usage:
16"x10"
0.58

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	0.60	1.19	0.00E+00	8.69E-11	1.74E-10	Avg. MeV	
Am-241	1.1190E-03	0.60	1.19	0.00E+00	6.68E-04	1.34E-03	0.0150	2.305E+11
Am-242m	4.5425E-07	0.60	1.19	0.00E+00	2.71E-07	5.43E-07	0.0250	4.965E+10
Am-243	1.4921E-06	0.60	1.19	0.00E+00	8.91E-07	1.78E-06	0.0375	4.581E+10
C-14	5.7244E-09	0.60	1.19	0.00E+00	3.42E-09	6.84E-09	0.0675	4.505E+10
Cl-36	1.3124E-32	0.60	1.19	0.00E+00	7.84E-33	1.57E-32	0.0850	2.872E+10
Cm-243	2.3676E-07	0.60	1.19	0.00E+00	1.41E-07	2.83E-07	0.1250	2.487E+10
Cm-244	5.2042E-05	0.60	1.19	0.00E+00	3.11E-05	6.22E-05	0.2250	2.435E+10
Co-60	3.8208E-05	0.60	1.19	0.00E+00	2.28E-05	4.56E-05	0.3750	1.178E+10
Cs-134	4.8693E-01	0.60	1.19	0.00E+00	2.91E-01	5.82E-01	0.5750	1.818E+11
Cs-135	3.4477E-06	0.60	1.19	0.00E+00	2.06E-06	4.12E-06	0.8500	2.266E+10
Cs-137	2.8731E+00	0.60	1.19	0.00E+00	1.72E+00	3.43E+00	1.2500	4.217E+09
Eu-154	8.2053E-02	0.60	1.19	0.00E+00	4.90E-02	9.80E-02	1.7500	1.788E+08
Eu-155	3.9134E-02	0.60	1.19	0.00E+00	2.34E-02	4.67E-02	2.2500	3.709E+08
Fe-55	6.7429E-03	0.60	1.19	0.00E+00	4.03E-03	8.05E-03	2.7500	2.134E+06
H-3	1.0599E-02	0.60	1.19	0.00E+00	6.33E-03	1.27E-02	3.5000	2.366E+05
I-129	7.5300E-07	0.60	1.19	0.00E+00	4.50E-07	8.99E-07	6.0000	1.327E+00
Kr-85	2.8595E-01	0.60	1.19	0.00E+00	1.71E-01	3.42E-01	7.0000	1.502E-01
Np-237	9.5479E-06	0.60	1.19	0.00E+00	5.70E-06	1.14E-05	11.0000	1.710E-02
Pa-231	8.9297E-10	0.60	1.19	0.00E+00	5.33E-10	1.07E-09		
Pb-210	3.7609E-12	0.60	1.19	0.00E+00	2.25E-12	4.49E-12		
Pm-147	2.5452E+00	0.60	1.19	0.00E+00	1.52E+00	3.04E+00		
Pu-238	2.0550E-02	0.60	1.19	0.00E+00	1.23E-02	2.45E-02		
Pu-239	4.2838E-04	0.60	1.19	0.00E+00	2.56E-04	5.12E-04		
Pu-240	2.4401E-04	0.60	1.19	0.00E+00	1.46E-04	2.91E-04		
Pu-241	6.8764E-02	0.60	1.19	0.00E+00	4.11E-02	8.21E-02		
Pu-242	3.6329E-07	0.60	1.19	0.00E+00	2.17E-07	4.34E-07		
Ra-226	3.8045E-11	0.60	1.19	0.00E+00	2.27E-11	4.54E-11		
Ra-228	2.9902E-15	0.60	1.19	0.00E+00	1.79E-15	3.57E-15		
Ru-106	1.9055E-01	0.60	1.19	0.00E+00	1.14E-01	2.28E-01		
Se-79	1.2936E-05	0.60	1.19	0.00E+00	7.73E-06	1.55E-05		
Sn-126	1.1574E-05	0.60	1.19	0.00E+00	6.91E-06	1.38E-05		
Sr-90	2.7505E+00	0.60	1.19	0.00E+00	1.64E+00	3.29E+00		
Tc-99	4.2239E-04	0.60	1.19	0.00E+00	2.52E-04	5.05E-04		
Th-229	1.8848E-12	0.60	1.19	0.00E+00	1.13E-12	2.25E-12		
Th-230	1.7042E-08	0.60	1.19	0.00E+00	1.02E-08	2.04E-08		
Th-232	7.8132E-15	0.60	1.19	0.00E+00	4.67E-15	9.33E-15		
Ti-208	4.4063E-08	0.60	1.19	0.00E+00	2.63E-08	5.26E-08		
U-232	1.3151E-07	0.60	1.19	0.00E+00	7.85E-08	1.57E-07		
U-233	1.9564E-09	0.60	1.19	0.00E+00	1.17E-09	2.34E-09		
U-234	1.8371E-04	0.60	1.19	0.00E+00	1.10E-04	2.19E-04		
U-235	2.7235E-06	0.60	0.00	4.27E-04	4.25E-04	4.27E-04		
U-236	1.5493E-05	0.60	1.19	0.00E+00	9.25E-06	1.85E-05		
U-238	4.2851E-09	0.60	0.00	2.68E-04	2.68E-04	2.68E-04		
Y-90	2.7505E+00	0.60	1.19	0.00E+00	1.64E+00	3.29E+00		
Other Radionuclides					3.07E+00	6.14E+00		

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:	ALUM	ALUM	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.8359342	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal:	From SFD 0.60	Estimated	
Bounding:		1.19	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 0.00	Estimated Burnup/ Given Burnup 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: UNIV OF MASS-LOWELL (HEU)
SNF ID #: 274
Fuel Units & Descr: 34 - 18 FLAT PLATES
Heavy Metal Mass: BOL=4.784kg; EOL=4.498kg
ROD Storage Sht: SRS

Fuel decay start date: 2035
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: 5 years

Estimated
Canister usage:
18"x10"
0.94

II. Estimates	m	x ₀	x ₁	b	y ₀	y ₁	Gamma Sources	
Radionuclide	C/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	1.4545E-10	270.47	540.94	0.00E+00	3.93E-08	7.87E-08	Avg. MeV	
Am-241	1.1190E-03	270.47	540.94	0.00E+00	3.03E-01	6.05E-01	0.0150	1.044E+14
Am-242m	4.5425E-07	270.47	540.94	0.00E+00	1.23E-04	2.46E-04	0.0250	2.248E+13
Am-243	1.4921E-08	270.47	540.94	0.00E+00	4.04E-04	8.07E-04	0.0375	2.075E+13
C-14	5.7244E-09	270.47	540.94	0.00E+00	1.55E-06	3.10E-06	0.0575	2.040E+13
Cl-36	1.3124E-32	270.47	540.94	0.00E+00	3.55E-30	7.10E-30	0.0850	1.301E+13
Cm-243	2.3676E-07	270.47	540.94	0.00E+00	6.40E-05	1.28E-04	0.1250	1.126E+13
Cm-244	5.2042E-05	270.47	540.94	0.00E+00	1.41E-02	2.82E-02	0.2250	1.102E+13
Co-60	3.8208E-05	270.47	540.94	0.00E+00	1.03E-02	2.07E-02	0.3750	5.336E+12
Cs-134	4.8693E-01	270.47	540.94	0.00E+00	1.32E+02	2.63E+02	0.5750	7.329E+13
Cs-135	3.4477E-06	270.47	540.94	0.00E+00	9.32E-04	1.86E-03	0.8500	1.026E+13
Cs-137	2.8731E+00	270.47	540.94	0.00E+00	7.77E+02	1.55E+03	1.2500	1.910E+12
Eu-154	8.2053E-02	270.47	540.94	0.00E+00	2.22E+01	4.44E+01	1.7500	8.008E+10
Eu-155	3.9134E-02	270.47	540.94	0.00E+00	1.06E+01	2.12E+01	2.2500	1.680E+11
Fe-55	6.7429E-03	270.47	540.94	0.00E+00	1.82E+00	3.65E+00	2.7500	9.663E+08
H-3	1.0599E-02	270.47	540.94	0.00E+00	2.87E+00	5.73E+00	3.5000	1.072E+08
I-129	7.5300E-07	270.47	540.94	0.00E+00	2.04E-04	4.07E-04	5.0000	3.207E+02
Kr-85	2.8595E-01	270.47	540.94	0.00E+00	7.73E+01	1.55E+02	7.0000	3.576E+01
Np-237	9.5479E-06	270.47	540.94	0.00E+00	2.58E-03	5.16E-03	11.0000	4.030E+00
Pb-210	8.9297E-10	270.47	540.94	0.00E+00	2.42E-07	4.83E-07		
Pb-210	3.7609E-12	270.47	540.94	0.00E+00	1.02E-09	2.03E-09		
Pm-147	2.5452E+00	270.47	540.94	0.00E+00	6.88E+02	1.38E+03		
Pu-238	2.0550E-02	270.47	540.94	0.00E+00	5.56E+00	1.11E+01		
Pu-239	4.2838E-04	270.47	540.94	0.00E+00	1.16E-01	2.32E-01		
Pu-240	2.4401E-04	270.47	540.94	0.00E+00	6.60E-02	1.32E-01		
Pu-241	6.8764E-02	270.47	540.94	0.00E+00	1.86E+01	3.72E+01		
Pu-242	3.6329E-07	270.47	540.94	0.00E+00	9.83E-05	1.97E-04		
Ra-226	3.8045E-11	270.47	540.94	0.00E+00	1.03E-08	2.06E-08		
Ra-228	2.9902E-15	270.47	540.94	0.00E+00	8.09E-13	1.62E-12		
Ru-106	1.9055E-07	270.47	540.94	0.00E+00	5.15E+01	1.03E+02		
Se-79	1.2938E-05	270.47	540.94	0.00E+00	3.50E-03	7.00E-03		
Sn-126	1.1574E-05	270.47	540.94	0.00E+00	3.13E-03	6.26E-03		
Sr-90	2.7505E+00	270.47	540.94	0.00E+00	7.44E+02	1.49E+03		
Tc-99	4.2239E-04	270.47	540.94	0.00E+00	1.14E-01	2.28E-01		
Th-229	1.8848E-12	270.47	540.94	0.00E+00	5.10E-10	1.02E-09		
Th-230	1.7042E-08	270.47	540.94	0.00E+00	4.81E-06	9.22E-06		
Th-232	7.8132E-15	270.47	540.94	0.00E+00	2.11E-12	4.23E-12		
Ti-206	4.4063E-08	270.47	540.94	0.00E+00	1.19E-05	2.38E-05		
U-232	1.3151E-07	270.47	540.94	0.00E+00	3.58E-05	7.11E-05		
U-233	1.9564E-09	270.47	540.94	0.00E+00	5.29E-07	1.06E-06		
U-234	1.8371E-04	270.47	540.94	0.00E+00	4.97E-02	9.94E-02		
U-235	-2.7235E-06	270.47	0.00	9.63E-03	8.89E-03	9.63E-03		
U-236	1.5493E-05	270.47	540.94	0.00E+00	4.19E-03	8.38E-03		
U-238	-4.2851E-09	270.47	0.00	1.10E-04	1.09E-04	1.10E-04		
Y-90	2.7505E+00	270.47	540.94	0.00E+00	7.44E+02	1.49E+03		
Other Radionuclides					1.39E+03	2.78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+01	2.74E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALLUM	ALLUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.16325044	60 to 100	

Burnup Summary (MWd) ⁴			Basis for burnup used in estimate:
Nominal:	From SFD	Estimated	
Bounding:		270.47	
		540.94	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal:	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding:	0.18	0.36	
			1.00

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MASS-LOWELL (LEU)
 SNF ID #: 275
 Fuel Units & Descr: 41 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=14.321kg; EOL=14.321kg
 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"
 1.14

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	1.4545E-10	271.25	542.50	0.00E+00	3.95E-08	7.89E-08	Avg. MeV	
Am-241	1.1190E-03	271.25	542.50	0.00E+00	3.04E-01	6.07E-01	0.0150	1.047E+14
Am-242m	4.5425E-07	271.25	542.50	0.00E+00	1.23E-04	2.46E-04	0.0250	2.255E+13
Am-243	1.4921E-06	271.25	542.50	0.00E+00	4.05E-04	8.09E-04	0.0375	2.081E+13
C-14	5.7244E-09	271.25	542.50	0.00E+00	1.55E-06	3.11E-06	0.0575	2.046E+13
Cl-36	1.3124E-32	271.25	542.50	0.00E+00	3.56E-30	7.12E-30	0.0650	1.304E+13
Cm-243	2.3678E-07	271.25	542.50	0.00E+00	6.42E-05	1.28E-04	0.1250	1.130E+13
Cm-244	5.2042E-05	271.25	542.50	0.00E+00	1.41E-02	2.82E-02	0.2250	1.105E+13
Co-60	3.8208E-05	271.25	542.50	0.00E+00	1.04E-02	2.07E-02	0.3750	5.351E+12
Cs-134	4.8693E-01	271.25	542.50	0.00E+00	1.32E+02	2.64E+02	0.5750	7.350E+13
Cs-135	3.4477E-06	271.25	542.50	0.00E+00	9.35E-04	1.87E-03	0.8500	1.029E+13
Cs-137	2.8731E+00	271.25	542.50	0.00E+00	7.79E+02	1.56E+03	1.2500	1.915E+12
Eu-154	8.2053E-02	271.25	542.50	0.00E+00	2.23E+01	4.45E+01	1.7500	8.031E+10
Eu-155	3.9134E-02	271.25	542.50	0.00E+00	1.06E+01	2.12E+01	2.2500	1.684E+11
Fe-55	6.7429E-03	271.25	542.50	0.00E+00	1.83E+00	3.66E+00	2.7500	9.891E+08
H-3	1.0599E-02	271.25	542.50	0.00E+00	2.88E+00	5.75E+00	3.5000	1.075E+08
I-129	7.5300E-07	271.25	542.50	0.00E+00	2.04E-04	4.09E-04	5.0000	3.302E+02
Kr-85	2.8595E-01	271.25	542.50	0.00E+00	7.76E+01	1.55E+02	7.0000	3.684E+01
Np-237	9.5479E-06	271.25	542.50	0.00E+00	2.59E-03	5.18E-03	11.0000	4.155E+00
Pa-231	8.9297E-10	271.25	542.50	0.00E+00	2.42E-07	4.84E-07		
Pb-210	3.7609E-12	271.25	542.50	0.00E+00	1.02E-09	2.04E-09		
Pm-147	2.5452E+00	271.25	542.50	0.00E+00	6.90E+02	1.38E+03		
Pu-238	2.0550E-02	271.25	542.50	0.00E+00	5.57E+00	1.11E+01		
Pu-239	4.2838E-04	271.25	542.50	0.00E+00	1.16E-01	2.32E-01		
Pu-240	2.4401E-04	271.25	542.50	0.00E+00	6.82E-02	1.32E-01		
Pu-241	6.8784E-02	271.25	542.50	0.00E+00	1.87E+01	3.73E+01		
Pu-242	3.6329E-07	271.25	542.50	0.00E+00	9.85E-05	1.97E-04		
Ra-226	3.8045E-11	271.25	542.50	0.00E+00	1.03E-08	2.06E-08		
Ra-228	2.9902E-15	271.25	542.50	0.00E+00	8.11E-13	1.62E-12		
Ru-106	1.9055E-01	271.25	542.50	0.00E+00	5.17E+01	1.03E+02		
Se-79	1.2936E-05	271.25	542.50	0.00E+00	3.51E-03	7.02E-03		
Sn-126	1.1574E-05	271.25	542.50	0.00E+00	3.14E-03	6.28E-03		
Sr-90	2.7505E+00	271.25	542.50	0.00E+00	7.46E+02	1.49E+03		
Tc-99	4.2239E-04	271.25	542.50	0.00E+00	1.15E-01	2.29E-01		
Th-229	1.8848E-12	271.25	542.50	0.00E+00	5.11E-10	1.02E-09		
Th-230	1.7042E-08	271.25	542.50	0.00E+00	4.62E-06	9.25E-06		
Th-232	7.8132E-15	271.25	542.50	0.00E+00	2.12E-12	4.24E-12		
Ti-206	4.4063E-08	271.25	542.50	0.00E+00	1.20E-05	2.39E-05		
U-232	1.3151E-07	271.25	542.50	0.00E+00	3.57E-05	7.13E-05		
U-233	1.9564E-09	271.25	542.50	0.00E+00	5.31E-07	1.06E-06		
U-234	1.8371E-04	271.25	542.50	0.00E+00	4.98E-02	9.97E-02		
U-235	-2.7235E-06	271.25	0.00	6.10E-03	5.36E-03	6.10E-03		
U-236	1.5493E-05	271.25	542.50	0.00E+00	4.20E-03	8.40E-03		
U-238	-4.2851E-09	271.25	0.00	3.86E-03	3.86E-03	3.86E-03		
Y-90	2.7505E+00	271.25	542.50	0.00E+00	7.46E+02	1.49E+03		
Other Radionuclides					1.40E+03	2.79E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.71401492	60 to 100	

Burnup Summary (MWd)¹

	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:		271.25	
Bounding:		542.50	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.06		0.93
Bounding:	0.12		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN
SNF ID #: 276
Fuel Units & Descr: 130 - 18 CURVED PLATES
Heavy Metal Mass: BOL=100.854kg; EOL=89.882kg
ROD Storage Site: SRS

¹Fuel decay start date: 1992
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"
5.42

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	2.0068E-09	10,390.70	20,781.39	0.00E+00	2.09E-05	4.17E-05	Avg. MeV	
Am-241	2.5251E-03	10,390.70	20,781.39	0.00E+00	2.62E+01	5.25E+01	0.0150	1.531E+15
Am-242m	3.9624E-07	10,390.70	20,781.39	0.00E+00	4.12E-03	8.23E-03	0.0250	3.178E+14
Am-243	1.4880E-08	10,390.70	20,781.39	0.00E+00	1.55E-02	3.09E-02	0.0375	2.763E+14
C-14	5.7053E-09	10,390.70	20,781.39	0.00E+00	5.93E-05	1.19E-04	0.0575	2.973E+14
Cl-36	1.3124E-32	10,390.70	20,781.39	0.00E+00	1.36E-28	2.73E-28	0.0850	1.792E+14
Cm-243	1.1419E-07	10,390.70	20,781.39	0.00E+00	1.19E-03	2.37E-03	0.1250	1.183E+14
Cm-244	1.6522E-05	10,390.70	20,781.39	0.00E+00	1.72E-01	3.43E-01	0.2250	1.547E+14
Co-60	7.4047E-07	10,390.70	20,781.39	0.00E+00	7.69E-03	1.54E-02	0.3750	6.729E+13
Cs-134	2.0455E-05	10,390.70	20,781.39	0.00E+00	2.13E-01	4.25E-01	0.5750	1.112E+15
Cs-135	3.4477E-06	10,390.70	20,781.39	0.00E+00	3.58E-02	7.16E-02	0.8500	1.358E+13
Cs-137	1.4365E+00	10,390.70	20,781.39	0.00E+00	1.49E+04	2.99E+04	1.2500	6.570E+12
Eu-154	7.3230E-03	10,390.70	20,781.39	0.00E+00	7.61E+01	1.52E+02	1.7500	3.698E+11
Eu-155	5.9259E-04	10,390.70	20,781.39	0.00E+00	6.16E+00	1.23E+01	2.2500	3.092E+07
Fe-55	2.2791E-06	10,390.70	20,781.39	0.00E+00	2.37E-02	4.74E-02	2.7500	2.951E+07
H-3	1.9698E-03	10,390.70	20,781.39	0.00E+00	2.05E+01	4.09E+01	3.5000	1.724E+04
I-129	7.5300E-07	10,390.70	20,781.39	0.00E+00	7.82E-03	1.56E-02	5.0000	7.046E+03
Kr-85	4.1176E-02	10,390.70	20,781.39	0.00E+00	4.28E+02	8.56E+02	7.0000	7.714E+02
Np-237	9.5752E-06	10,390.70	20,781.39	0.00E+00	9.95E-02	1.99E-01	11.0000	8.803E+01
Pa-231	3.9379E-09	10,390.70	20,781.39	0.00E+00	4.09E-05	8.18E-05		
Pb-210	3.3115E-10	10,390.70	20,781.39	0.00E+00	3.44E-08	6.88E-08		
Pm-147	9.2402E-04	10,390.70	20,781.39	0.00E+00	9.60E+00	1.92E+01		
Pu-238	1.6217E-02	10,390.70	20,781.39	0.00E+00	1.69E+02	3.37E+02		
Pu-239	4.2810E-04	10,390.70	20,781.39	0.00E+00	4.45E+00	8.90E+00		
Pu-240	2.4333E-04	10,390.70	20,781.39	0.00E+00	2.53E+00	5.06E+00		
Pu-241	1.6242E-02	10,390.70	20,781.39	0.00E+00	1.69E+02	3.38E+02		
Pu-242	3.6329E-07	10,390.70	20,781.39	0.00E+00	3.77E-03	7.55E-03		
Ra-226	9.0114E-10	10,390.70	20,781.39	0.00E+00	9.36E-08	1.87E-05		
Ra-228	3.1019E-14	10,390.70	20,781.39	0.00E+00	3.22E-10	6.45E-10		
Ru-106	2.1225E-10	10,390.70	20,781.39	0.00E+00	2.21E-08	4.41E-08		
Se-79	1.2930E-05	10,390.70	20,781.39	0.00E+00	1.34E-01	2.69E-01		
Sn-126	1.1571E-05	10,390.70	20,781.39	0.00E+00	1.20E-01	2.40E-01		
Sr-90	1.3472E+00	10,390.70	20,781.39	0.00E+00	1.40E+04	2.80E+04		
Tc-99	4.2239E-04	10,390.70	20,781.39	0.00E+00	4.39E+00	8.78E+00		
Th-229	1.2407E-11	10,390.70	20,781.39	0.00E+00	1.29E-07	2.58E-07		
Th-230	8.3497E-08	10,390.70	20,781.39	0.00E+00	8.68E-04	1.74E-03		
Th-232	3.8371E-14	10,390.70	20,781.39	0.00E+00	3.99E-10	7.97E-10		
Tl-208	4.0414E-08	10,390.70	20,781.39	0.00E+00	4.20E-04	8.40E-04		
U-232	1.0948E-07	10,390.70	20,781.39	0.00E+00	1.14E-03	2.28E-03	Thermal Power	
U-233	3.6275E-09	10,390.70	20,781.39	0.00E+00	3.77E-05	7.54E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8562E-04	10,390.70	20,781.39	0.00E+00	1.93E+00	3.86E+00	1.74E+02	3.48E+02
U-235	-2.7235E-06	10,390.70	0.00	4.31E-02	1.48E-02	4.31E-02	Total	Total
U-236	1.5493E-05	10,390.70	20,781.39	0.00E+00	1.61E-01	3.22E-01		
U-238	-4.2851E-09	10,390.70	0.00	2.72E-02	2.71E-02	2.72E-02		
Y-90	1.3475E+00	10,390.70	20,781.39	0.00E+00	1.40E+04	2.80E+04		
Other Radionuclides					1.42E+04	2.84E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basie for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.7909823	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basie for burnup used in estimate:
Nominal:		10,390.70	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		20,781.39	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.33		1.01
Bounding:	0.65		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN (CONTROL)
SNF ID #: 1005
Fuel Units & Descr: 82 - 9 CURVED PLATES
Heavy Metal Mass: BOL=34.67kg; EOL=32.866kg
ROD Storage Site: SRS

Fuel decay start date: 2035
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: 5 years

Estimated
Canister usage:
18"x10"
3.42

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ^a	Bounding Fuel Burnup (MWd) ^a	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,708.42	3,416.85	0.00E+00	2.48E-07	4.97E-07	0.0150 6.592E+14
Am-241	1.1190E-03	1,708.42	3,416.85	0.00E+00	1.91E+00	3.82E+00	0.0250 1.420E+14
Am-242m	4.5425E-07	1,708.42	3,416.85	0.00E+00	7.76E-04	1.55E-03	0.0375 1.311E+14
Am-243	1.4921E-06	1,708.42	3,416.85	0.00E+00	2.55E-03	5.10E-03	0.0575 1.289E+14
C-14	5.7244E-09	1,708.42	3,416.85	0.00E+00	9.78E-06	1.96E-05	0.0850 8.215E+13
Cl-36	1.3124E-32	1,708.42	3,416.85	0.00E+00	2.24E-29	4.48E-29	0.1250 7.114E+13
Cm-243	2.3676E-07	1,708.42	3,416.85	0.00E+00	4.04E-04	8.08E-04	0.2250 6.963E+13
Cm-244	5.2042E-05	1,708.42	3,416.85	0.00E+00	8.89E-02	1.78E-01	0.3750 3.370E+13
Co-60	3.8208E-05	1,708.42	3,416.85	0.00E+00	6.53E-02	1.31E-01	0.5750 4.829E+14
Cs-134	4.8693E-01	1,708.42	3,416.85	0.00E+00	8.32E+02	1.66E+03	0.8500 6.483E+13
Cs-135	3.4477E-06	1,708.42	3,416.85	0.00E+00	5.89E-03	1.18E-02	1.2500 1.265E+13
Cs-137	2.8731E+00	1,708.42	3,416.85	0.00E+00	4.91E+03	9.82E+03	1.7500 5.058E+11
Eu-154	8.2053E-02	1,708.42	3,416.85	0.00E+00	1.40E+02	2.80E+02	2.2500 1.061E+12
Eu-155	3.9134E-02	1,708.42	3,416.85	0.00E+00	6.89E+01	1.34E+02	2.7500 6.104E+09
Fe-55	6.7429E-03	1,708.42	3,416.85	0.00E+00	1.15E+01	2.30E+01	3.5000 6.789E+08
H-3	1.0599E-02	1,708.42	3,416.85	0.00E+00	1.81E+01	3.62E+01	5.0000 2.045E+03
I-129	7.5300E-07	1,708.42	3,416.85	0.00E+00	1.29E-03	2.57E-03	7.0000 2.281E+02
Kr-85	2.8595E-01	1,708.42	3,416.85	0.00E+00	4.89E+02	9.77E+02	11.0000 2.571E+01
Np-237	9.5479E-06	1,708.42	3,416.85	0.00E+00	1.63E-02	3.26E-02	
Pa-231	8.9297E-10	1,708.42	3,416.85	0.00E+00	1.53E-06	3.05E-06	
Pb-210	3.7609E-12	1,708.42	3,416.85	0.00E+00	6.43E-09	1.29E-08	
Pm-147	2.5452E+00	1,708.42	3,416.85	0.00E+00	4.35E+03	8.70E+03	
Pu-238	2.0550E-02	1,708.42	3,416.85	0.00E+00	3.51E+01	7.02E+01	
Pu-239	4.2838E-04	1,708.42	3,416.85	0.00E+00	7.32E-01	1.46E+00	
Pu-240	2.4401E-04	1,708.42	3,416.85	0.00E+00	4.17E-01	8.34E-01	
Pu-241	6.8764E-02	1,708.42	3,416.85	0.00E+00	1.17E+02	2.35E+02	
Pu-242	3.6329E-07	1,708.42	3,416.85	0.00E+00	6.21E-04	1.24E-03	
Ra-226	3.8045E-11	1,708.42	3,416.85	0.00E+00	6.50E-08	1.30E-07	
Ra-228	2.9902E-15	1,708.42	3,416.85	0.00E+00	5.11E-12	1.02E-11	
Ru-106	1.9055E-01	1,708.42	3,416.85	0.00E+00	3.26E+02	6.51E+02	
Se-79	1.2936E-05	1,708.42	3,416.85	0.00E+00	2.21E-02	4.42E-02	
Sn-126	1.1574E-05	1,708.42	3,416.85	0.00E+00	1.98E-02	3.95E-02	
Sr-90	2.7505E+00	1,708.42	3,416.85	0.00E+00	4.70E+03	9.40E+03	
Tc-99	4.2239E-04	1,708.42	3,416.85	0.00E+00	7.22E-01	1.44E+00	
Th-229	1.8848E-12	1,708.42	3,416.85	0.00E+00	3.22E-09	6.44E-09	
Th-230	1.7042E-06	1,708.42	3,416.85	0.00E+00	2.91E-05	5.82E-05	
Th-232	7.8132E-15	1,708.42	3,416.85	0.00E+00	1.33E-11	2.67E-11	
Th-208	4.4063E-08	1,708.42	3,416.85	0.00E+00	7.53E-05	1.51E-04	
U-232	1.3151E-07	1,708.42	3,416.85	0.00E+00	2.25E-04	4.49E-04	
U-233	1.9564E-09	1,708.42	3,416.85	0.00E+00	3.34E-06	6.68E-06	
U-234	1.8371E-04	1,708.42	3,416.85	0.00E+00	3.14E-01	6.28E-01	
U-235	-2.7235E-06	1,708.42	0.00	1.48E-02	1.01E-02	1.48E-02	
U-236	1.5493E-05	1,708.42	3,416.85	0.00E+00	2.85E-02	5.29E-02	
U-238	-4.2851E-09	1,708.42	0.00	9.35E-03	9.34E-03	9.35E-03	
Y-90	2.7505E+00	1,708.42	3,416.85	0.00E+00	4.70E+03	9.40E+03	
Other Radionuclides					8.79E+03	1.76E+04	

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.74999113	60 to 100	

Burnup Summary (MWd)^a

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,708.42	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,416.85	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.16		1.00
Bounding:	0.31		

^aReactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

^aTotal burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN (REG)
 SNF ID #: 277
 Fuel Units & Descr: 225 - 18 CURVED PLATES
 Heavy Metal Mass: BOL=190.26kg; EOL=174.082kg
 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"
 9.38

II. Estimates

	m	X ₀	X ₀	b	Y ₀	Y ₀	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	15,320.41	30,640.81	0.00E+00	2.23E-06	4.46E-06	Avg. MeV	
Am-241	1.1190E-03	15,320.41	30,640.81	0.00E+00	1.71E+01	3.43E+01	0.0150	5.911E+15
Am-242m	4.5425E-07	15,320.41	30,640.81	0.00E+00	6.96E-03	1.39E-02	0.0250	1.274E+15
Am-243	1.4921E-06	15,320.41	30,640.81	0.00E+00	2.29E-02	4.57E-02	0.0375	1.175E+15
C-14	5.7244E-09	15,320.41	30,640.81	0.00E+00	8.77E-05	1.75E-04	0.0675	1.156E+15
Cl-36	1.3124E-32	15,320.41	30,640.81	0.00E+00	2.01E-28	4.02E-28	0.0850	7.367E+14
Cm-243	2.3676E-07	15,320.41	30,640.81	0.00E+00	3.63E-03	7.25E-03	0.1250	6.380E+14
Cm-244	5.2042E-05	15,320.41	30,640.81	0.00E+00	7.97E-01	1.59E+00	0.2250	6.244E+14
Co-60	3.8208E-05	15,320.41	30,640.81	0.00E+00	5.85E-01	1.17E+00	0.3750	3.022E+14
Cs-134	4.8693E-01	15,320.41	30,640.81	0.00E+00	7.46E+03	1.49E+04	0.5750	4.151E+15
Cs-135	3.4477E-06	15,320.41	30,640.81	0.00E+00	5.28E-02	1.06E-01	0.8500	5.814E+14
Cs-137	2.8731E+00	15,320.41	30,640.81	0.00E+00	4.40E+04	8.80E+04	1.2500	1.082E+14
Eu-154	8.2053E-02	15,320.41	30,640.81	0.00E+00	1.26E+03	2.51E+03	1.7500	4.536E+12
Eu-155	3.9134E-02	15,320.41	30,640.81	0.00E+00	6.00E+02	1.20E+03	2.2500	9.514E+12
Fe-55	6.7429E-03	15,320.41	30,640.81	0.00E+00	1.03E+02	2.07E+02	2.7500	5.474E+10
H-3	1.0599E-02	15,320.41	30,640.81	0.00E+00	1.62E+02	3.25E+02	3.5000	6.070E+09
I-129	7.5300E-07	15,320.41	30,640.81	0.00E+00	1.15E-02	2.31E-02	5.0000	1.826E+04
Kr-85	2.8595E-01	15,320.41	30,640.81	0.00E+00	4.38E+03	8.76E+03	7.0000	2.037E+03
Np-237	9.5479E-06	15,320.41	30,640.81	0.00E+00	1.46E-01	2.93E-01	11.0000	2.296E+02
Pa-231	8.9297E-10	15,320.41	30,640.81	0.00E+00	1.37E-05	2.74E-05		
Pb-210	3.7609E-12	15,320.41	30,640.81	0.00E+00	5.76E-08	1.15E-07		
Pm-147	2.5452E+00	15,320.41	30,640.81	0.00E+00	3.90E+04	7.80E+04		
Pu-238	2.0550E-02	15,320.41	30,640.81	0.00E+00	3.15E+02	6.30E+02		
Pu-239	4.2838E-04	15,320.41	30,640.81	0.00E+00	6.56E+00	1.31E+01		
Pu-240	2.4401E-04	15,320.41	30,640.81	0.00E+00	3.74E+00	7.48E+00		
Pu-241	6.8764E-02	15,320.41	30,640.81	0.00E+00	1.05E+03	2.11E+03		
Pu-242	3.6329E-07	15,320.41	30,640.81	0.00E+00	5.57E-03	1.11E-02		
Ra-226	3.8045E-11	15,320.41	30,640.81	0.00E+00	5.83E-07	1.17E-06		
Ra-228	2.9902E-15	15,320.41	30,640.81	0.00E+00	4.58E-11	9.16E-11		
Ru-106	1.9055E-01	15,320.41	30,640.81	0.00E+00	2.92E+03	5.84E+03		
Se-79	1.2936E-05	15,320.41	30,640.81	0.00E+00	1.98E-01	3.96E-01		
Sn-126	1.1574E-05	15,320.41	30,640.81	0.00E+00	1.77E-01	3.55E-01		
Sr-90	2.7505E+00	15,320.41	30,640.81	0.00E+00	4.21E+04	8.43E+04		
Tc-99	4.2239E-04	15,320.41	30,640.81	0.00E+00	6.47E+00	1.29E+01		
Th-229	1.8848E-12	15,320.41	30,640.81	0.00E+00	2.89E-08	5.78E-08		
Th-230	1.7042E-08	15,320.41	30,640.81	0.00E+00	2.61E-04	5.22E-04		
Th-232	7.8132E-15	15,320.41	30,640.81	0.00E+00	1.20E-10	2.39E-10		
Ti-208	4.4063E-08	15,320.41	30,640.81	0.00E+00	6.75E-04	1.35E-03		
U-232	1.3151E-07	15,320.41	30,640.81	0.00E+00	2.01E-03	4.03E-03		
U-233	1.9564E-09	15,320.41	30,640.81	0.00E+00	3.00E-05	5.99E-05		
U-234	1.8371E-04	15,320.41	30,640.81	0.00E+00	2.81E+00	5.63E+00		
U-235	-2.7235E-06	15,320.41	0.00	8.12E-02	3.95E-02	6.12E-02		
U-236	1.5493E-05	15,320.41	30,640.81	0.00E+00	2.37E-01	4.75E-01		
U-238	-4.2851E-09	15,320.41	0.00	5.13E-02	5.13E-02	5.13E-02		
Y-90	2.7505E+00	15,320.41	30,640.81	0.00E+00	4.21E+04	8.43E+04		
Other Radionuclides					7.88E+04	1.58E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.77E+02	1.55E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basic for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALLUM	ALLUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.74999113	60 to 100	

Burnup Summary (MWd) ²			Basic 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:		15,320.41	
Bounding:		30,640.81	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	1.01
Nominal:	0.26		
Bounding:	0.51		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF VIRGINIA (U3S2 LEU)
 SNF ID #: 952
 Fuel Units & Descr: 20 - 22 FLAT PLATES
 Heavy Metal Mass: BOL=24.31kg; EOL=23.964kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1993
 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"
 0.83

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	327.67	655.34	0.00E+00	6.58E-07	1.32E-06	Avg. MeV	
Am-241	2.5251E-03	327.67	655.34	0.00E+00	8.27E-01	1.65E+00	0.0150	4.827E+13
Am-242m	3.9624E-07	327.67	655.34	0.00E+00	1.30E-04	2.60E-04	0.0250	1.002E+13
Am-243	1.4880E-06	327.67	655.34	0.00E+00	4.88E-04	9.75E-04	0.0375	8.712E+12
C-14	5.7053E-09	327.67	655.34	0.00E+00	1.87E-06	3.74E-06	0.0575	9.377E+12
Cl-36	1.3124E-32	327.67	655.34	0.00E+00	4.30E-30	8.60E-30	0.0850	5.850E+12
Cm-243	1.1419E-07	327.67	655.34	0.00E+00	3.74E-05	7.48E-05	0.1250	3.732E+12
Cm-244	1.8522E-05	327.67	655.34	0.00E+00	5.41E-03	1.08E-02	0.2250	4.878E+12
Co-60	7.4047E-07	327.67	655.34	0.00E+00	2.43E-04	4.85E-04	0.3750	2.122E+12
Cs-134	2.0455E-05	327.67	655.34	0.00E+00	6.70E-03	1.34E-02	0.5750	3.507E+13
Cs-135	3.4477E-06	327.67	655.34	0.00E+00	1.13E-03	2.26E-03	0.8500	4.284E+11
Cs-137	1.4365E+00	327.67	655.34	0.00E+00	4.71E+02	9.41E+02	1.2500	2.072E+11
Eu-154	7.3230E-03	327.67	655.34	0.00E+00	2.40E+00	4.80E+00	1.7500	1.166E+10
Eu-155	5.9259E-04	327.67	655.34	0.00E+00	1.94E-01	3.88E-01	2.2500	9.750E+05
Fe-55	2.2791E-06	327.67	655.34	0.00E+00	7.47E-04	1.49E-03	2.7500	9.306E+05
H-3	1.9698E-03	327.67	655.34	0.00E+00	6.45E-01	1.29E+00	3.5000	5.742E+02
I-129	7.5300E-07	327.67	655.34	0.00E+00	2.47E-04	4.93E-04	5.0000	2.354E+02
Kr-85	4.1176E-02	327.67	655.34	0.00E+00	1.35E+01	2.70E+01	7.0000	2.584E+01
Np-237	9.5752E-06	327.67	655.34	0.00E+00	3.14E-03	6.27E-03	11.0000	2.887E+00
Pa-231	3.9379E-09	327.67	655.34	0.00E+00	1.29E-06	2.58E-06		
Pb-210	3.3115E-10	327.67	655.34	0.00E+00	1.09E-07	2.17E-07		
Pm-147	9.2402E-04	327.67	655.34	0.00E+00	3.03E-01	6.06E-01		
Pu-238	1.8217E-02	327.67	655.34	0.00E+00	5.31E+00	1.06E+01		
Pu-239	4.2810E-04	327.67	655.34	0.00E+00	1.40E-01	2.81E-01		
Pu-240	2.4333E-04	327.67	655.34	0.00E+00	7.97E-02	1.59E-01		
Pu-241	1.6242E-02	327.67	655.34	0.00E+00	5.32E+00	1.06E+01		
Pu-242	3.6329E-07	327.67	655.34	0.00E+00	1.19E-04	2.38E-04		
Ra-226	9.0114E-10	327.67	655.34	0.00E+00	2.95E-07	5.91E-07		
Ra-228	3.1019E-14	327.67	655.34	0.00E+00	1.02E-11	2.03E-11		
Ru-106	2.1225E-10	327.67	655.34	0.00E+00	6.95E-08	1.39E-07		
Se-79	1.2930E-05	327.67	655.34	0.00E+00	4.24E-03	8.47E-03		
Sn-126	1.1571E-05	327.67	655.34	0.00E+00	3.79E-03	7.58E-03		
Sr-90	1.3472E+00	327.67	655.34	0.00E+00	4.41E+02	8.83E+02		
Tc-99	4.2239E-04	327.67	655.34	0.00E+00	1.38E-01	2.77E-01		
Th-229	1.2407E-11	327.67	655.34	0.00E+00	4.07E-09	8.13E-09		
Th-230	8.3497E-08	327.67	655.34	0.00E+00	2.74E-05	5.47E-05		
Th-232	3.8371E-14	327.67	655.34	0.00E+00	1.26E-11	2.51E-11		
Ti-208	4.0414E-08	327.67	655.34	0.00E+00	1.32E-05	2.65E-05		
U-232	1.0948E-07	327.67	655.34	0.00E+00	3.59E-05	7.17E-05		
U-233	3.6275E-09	327.67	655.34	0.00E+00	1.19E-06	2.38E-06		
U-234	1.8562E-04	327.67	655.34	0.00E+00	6.08E-02	1.22E-01		
U-235	-2.7235E-06	327.67	0.00	1.04E-02	9.50E-03	1.04E-02		
U-236	1.5493E-05	327.67	655.34	0.00E+00	5.08E-03	1.02E-02		
U-238	-4.2851E-09	327.67	0.00	6.55E-03	6.55E-03	6.55E-03		
Y-90	1.3475E+00	327.67	655.34	0.00E+00	4.42E+02	8.83E+02		
Other Radionuclides					4.48E+02	8.97E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.77478682	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		327.67	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		655.34	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.04		1.00
Bounding:	0.09		

³Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

³Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF VIRGINIA (ULAX HEU)
SNF ID #: 279
Fuel Units & Descr: 44 - 22 FLAT PLATES
Heavy Metal Mass: BOL=7.924kg; EOL=6.855kg
ROD Storage Site: SRS

Fuel decay start date: 1988
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116589
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
1.83

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.9739E-09	1,012.55	2,025.11	0.00E+00	3.01E-06	6.02E-06	Avg. MeV	
Am-241	2.5986E-03	1,012.55	2,025.11	0.00E+00	2.63E+00	5.26E+00	0.0150	1.043E+14
Am-242m	3.7010E-07	1,012.55	2,025.11	0.00E+00	3.75E-04	7.49E-04	0.0250	2.166E+13
Am-243	1.4858E-06	1,012.55	2,025.11	0.00E+00	1.50E-03	3.01E-03	0.0375	1.882E+13
C-14	5.6944E-09	1,012.55	2,025.11	0.00E+00	5.77E-06	1.15E-05	0.0575	2.027E+13
Cl-36	1.3124E-32	1,012.55	2,025.11	0.00E+00	1.33E-29	2.66E-29	0.0850	1.220E+13
Cm-243	7.9303E-08	1,012.55	2,025.11	0.00E+00	8.03E-05	1.61E-04	0.1250	7.973E+12
Cm-244	9.3083E-06	1,012.55	2,025.11	0.00E+00	9.43E-03	1.89E-02	0.2250	1.053E+13
Co-60	1.0310E-07	1,012.55	2,025.11	0.00E+00	1.04E-04	2.09E-04	0.3750	4.585E+12
Cs-134	1.3254E-07	1,012.55	2,025.11	0.00E+00	1.34E-04	2.68E-04	0.5750	7.681E+13
Cs-135	3.4477E-06	1,012.55	2,025.11	0.00E+00	3.49E-03	6.98E-03	0.8500	8.207E+11
Cs-137	1.0181E+00	1,012.55	2,025.11	0.00E+00	1.03E+03	2.06E+03	1.2500	3.319E+11
Eu-154	2.1879E-03	1,012.55	2,025.11	0.00E+00	2.22E+00	4.43E+00	1.7500	2.174E+10
Eu-155	7.2930E-05	1,012.55	2,025.11	0.00E+00	7.38E-02	1.48E-01	2.2500	2.109E+06
Fe-55	4.1912E-08	1,012.55	2,025.11	0.00E+00	4.24E-05	8.49E-05	2.7500	2.490E+06
H-3	8.4913E-04	1,012.55	2,025.11	0.00E+00	8.60E-01	1.72E+00	3.5000	1.367E+03
I-129	7.5300E-07	1,012.55	2,025.11	0.00E+00	7.62E-04	1.52E-03	5.0000	5.557E+02
Kr-85	1.5615E-02	1,012.55	2,025.11	0.00E+00	1.58E+01	3.16E+01	7.0000	6.043E+01
Np-237	9.5861E-06	1,012.55	2,025.11	0.00E+00	9.71E-03	1.94E-02	11.0000	6.712E+00
Pa-231	5.0790E-09	1,012.55	2,025.11	0.00E+00	5.14E-06	1.03E-05		
Pb-210	6.6176E-10	1,012.55	2,025.11	0.00E+00	6.70E-07	1.34E-06		
Pm-147	1.7606E-05	1,012.55	2,025.11	0.00E+00	1.78E-02	3.57E-02		
Pu-238	1.4406E-02	1,012.55	2,025.11	0.00E+00	1.46E+01	2.92E+01		
Pu-239	4.2783E-04	1,012.55	2,025.11	0.00E+00	4.33E-01	8.66E-01		
Pu-240	2.4297E-04	1,012.55	2,025.11	0.00E+00	2.46E-01	4.92E-01		
Pu-241	7.8949E-03	1,012.55	2,025.11	0.00E+00	7.99E+00	1.60E+01		
Pu-242	3.6329E-07	1,012.55	2,025.11	0.00E+00	3.68E-04	7.36E-04		
Ra-226	1.5169E-09	1,012.55	2,025.11	0.00E+00	1.54E-06	3.07E-06		
Ra-228	4.2429E-14	1,012.55	2,025.11	0.00E+00	4.30E-11	8.59E-11		
Ru-106	7.0833E-15	1,012.55	2,025.11	0.00E+00	7.17E-12	1.43E-11		
Se-79	1.2928E-05	1,012.55	2,025.11	0.00E+00	1.31E-02	2.62E-02		
Sn-126	1.1571E-05	1,012.55	2,025.11	0.00E+00	1.17E-02	2.34E-02		
Sr-90	9.4308E-01	1,012.55	2,025.11	0.00E+00	9.55E+02	1.91E+03		
Tc-99	4.2239E-04	1,012.55	2,025.11	0.00E+00	4.28E-01	8.55E-01		
Th-229	1.7968E-11	1,012.55	2,025.11	0.00E+00	1.82E-08	3.64E-08		
Th-230	1.0855E-07	1,012.55	2,025.11	0.00E+00	1.10E-04	2.20E-04		
Th-232	4.9809E-14	1,012.55	2,025.11	0.00E+00	5.04E-11	1.01E-10		
Ti-208	3.4995E-08	1,012.55	2,025.11	0.00E+00	3.54E-05	7.09E-05		
U-232	9.4798E-08	1,012.55	2,025.11	0.00E+00	9.60E-05	1.92E-04		
U-233	4.2538E-09	1,012.55	2,025.11	0.00E+00	4.31E-06	8.61E-06		
U-234	1.8617E-04	1,012.55	2,025.11	0.00E+00	1.89E-01	3.77E-01		
U-235	-2.7235E-08	1,012.55	0.00	1.59E-02	1.32E-02	1.59E-02		
U-236	1.5493E-05	1,012.55	2,025.11	0.00E+00	1.57E-02	3.14E-02		
U-238	-4.2851E-09	1,012.55	0.00	1.88E-04	1.84E-04	1.88E-04		
Y-90	9.4308E-01	1,012.55	2,025.11	0.00E+00	9.55E+02	1.91E+03		
Other Radionuclides					9.82E+02	1.96E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.93756073	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:	230.24	1,012.55
Bounding:	280.84	2,025.11

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:	0.41	4.40
Bounding:	0.81	7.21

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: VBWR (UO2)
 SNF ID #: 855
 Fuel Units & Descr: 7 - ROD
 Heavy Metal Mass: BOL=6.578kg; EOL=4.04kg
 ROD Storage Site: INEEL

Fuel decay start date: 1962
 Estimates as of: 2030
 Template: PWR (Light Water, Zirc. 0 to 5%, U)
 Template Burnup (MWd): 61.92
 Template BOL Heavy Metal Mass (MT): 0.00178911
 Template Decay Time: 65 years

Estimated
 Canister usage:
 18"x10"
 0.19

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg. MeV Total Photons/sec (bounding)
Ac-227	1.2581E-09	2,413.71	4,827.42	0.00E+00	3.04E-06	6.07E-06	0.0150
Am-241	1.4761E-01	2,413.71	4,827.42	0.00E+00	3.56E+02	7.13E+02	0.0250
Am-242m	2.5032E-04	2,413.71	4,827.42	0.00E+00	6.04E-01	1.21E+00	0.0375
Am-243	6.2387E-04	2,413.71	4,827.42	0.00E+00	1.51E+00	3.01E+00	0.0575
C-14	4.7739E-05	2,413.71	4,827.42	0.00E+00	1.15E-01	2.30E-01	0.0850
Cf-254	8.0297E-07	2,413.71	4,827.42	0.00E+00	1.94E-03	3.88E-03	0.1250
Cm-243	1.2099E-04	2,413.71	4,827.42	0.00E+00	2.92E-01	5.84E-01	0.2250
Cm-244	1.5560E-02	2,413.71	4,827.42	0.00E+00	3.76E+01	7.51E+01	0.3750
Co-60	4.9580E-05	2,413.71	4,827.42	0.00E+00	1.20E-01	2.39E-01	0.5750
Cs-134	1.7022E-09	2,413.71	4,827.42	0.00E+00	4.11E-06	8.22E-06	0.8500
Cs-135	1.4433E-05	2,413.71	4,827.42	0.00E+00	3.48E-02	6.97E-02	1.2500
Cs-137	6.9929E-01	2,413.71	4,827.42	0.00E+00	1.69E+03	3.38E+03	1.7500
Eu-154	1.8023E-03	2,413.71	4,827.42	0.00E+00	4.35E+00	8.70E+00	2.2500
Eu-155	2.6793E-05	2,413.71	4,827.42	0.00E+00	6.47E-02	1.29E-01	2.7500
Fe-55	1.4580E-08	2,413.71	4,827.42	0.00E+00	3.52E-05	7.04E-05	3.5000
H-3	3.8566E-03	2,413.71	4,827.42	0.00E+00	9.31E+00	1.86E+01	5.0000
I-129	9.8288E-07	2,413.71	4,827.42	0.00E+00	2.37E-03	4.74E-03	7.0000
Kr-85	4.0617E-03	2,413.71	4,827.42	0.00E+00	9.80E+00	1.96E+01	11.0000
Np-237	1.2645E-05	2,413.71	4,827.42	0.00E+00	3.05E-02	6.10E-02	
Pa-231	1.6376E-09	2,413.71	4,827.42	0.00E+00	3.95E-06	7.91E-06	
Pb-210	2.8795E-10	2,413.71	4,827.42	0.00E+00	6.95E-07	1.39E-06	
Pm-147	1.3264E-07	2,413.71	4,827.42	0.00E+00	3.20E-04	6.40E-04	
Pu-238	5.8882E-02	2,413.71	4,827.42	0.00E+00	1.42E+02	2.84E+02	
Pu-239	1.1613E-02	2,413.71	4,827.42	0.00E+00	2.80E+01	5.61E+01	
Pu-240	1.5142E-02	2,413.71	4,827.42	0.00E+00	3.65E+01	7.31E+01	
Pu-241	2.1269E-01	2,413.71	4,827.42	0.00E+00	5.13E+02	1.03E+03	
Pu-242	6.4260E-05	2,413.71	4,827.42	0.00E+00	1.55E-01	3.10E-01	
Ra-226	5.8689E-10	2,413.71	4,827.42	0.00E+00	1.42E-06	2.83E-06	
Ra-228	5.3036E-12	2,413.71	4,827.42	0.00E+00	1.28E-08	2.56E-08	
Ru-106	6.8136E-19	2,413.71	4,827.42	0.00E+00	1.64E-15	3.29E-15	
Se-79	1.2372E-05	2,413.71	4,827.42	0.00E+00	2.99E-02	5.97E-02	
Sn-126	2.5194E-05	2,413.71	4,827.42	0.00E+00	6.08E-02	1.22E-01	
Sr-90	4.4913E-01	2,413.71	4,827.42	0.00E+00	1.08E+03	2.17E+03	
Tc-99	3.9357E-04	2,413.71	4,827.42	0.00E+00	9.50E-01	1.90E+00	
Th-229	1.9331E-10	2,413.71	4,827.42	0.00E+00	4.67E-07	9.33E-07	
Th-230	3.5223E-08	2,413.71	4,827.42	0.00E+00	8.50E-05	1.70E-04	
Th-232	5.3085E-12	2,413.71	4,827.42	0.00E+00	1.28E-08	2.56E-08	
Th-208	1.3102E-07	2,413.71	4,827.42	0.00E+00	3.16E-04	6.33E-04	
U-232	3.5497E-07	2,413.71	4,827.42	0.00E+00	8.57E-04	1.71E-03	
U-233	2.6647E-08	2,413.71	4,827.42	0.00E+00	6.43E-05	1.29E-04	
U-234	5.5023E-05	2,413.71	4,827.42	0.00E+00	1.33E-01	2.66E-01	
U-235	-1.4485E-06	2,413.71	0.00	3.29E-03	0.00E+00	3.29E-03	
U-236	7.5969E-06	2,413.71	4,827.42	0.00E+00	1.83E-02	3.67E-02	
U-238	-2.6129E-07	2,413.71	0.00	1.70E-03	1.07E-03	1.70E-03	
Y-90	4.4913E-01	2,413.71	4,827.42	0.00E+00	1.08E+03	2.17E+03	
Other Radionuclides					1.63E+03	3.27E+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 %:	23.16820093	0 to 5

Basis for Parameter Differences:
 This Template was used for the following reasons:
 This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal:		2,413.71
Bounding:		4,827.42

Basis for burnup used in estimate:
 Nominal burnup calculated from the heavy metal mass destroyed.
 Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.48	
Bounding:	20.97	

Estimated EOL HM/Given EOL HM
 1.03

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: WORCESTER POLY INSTITUTE
SNF ID #: 267
Fuel Units & Descr: 26 - 18 FLAT PLATES
Heavy Metal Mass: BOL=22.776kg; EOL=22.753kg
RCD Storage Site: SRS

¹Fuel decay start date: 2036
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"x18"
0.72

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	22.16	44.32	0.00E+00	3.22E-09	6.45E-09	Avg. MeV	
Am-241	1.1190E-03	22.16	44.32	0.00E+00	2.48E-02	4.96E-02	0.0150	8.551E+12
Am-242m	4.5425E-07	22.16	44.32	0.00E+00	1.01E-05	2.01E-05	0.0250	1.842E+12
Am-243	1.4921E-06	22.16	44.32	0.00E+00	3.31E-05	6.61E-05	0.0375	1.700E+12
C-14	5.7244E-09	22.16	44.32	0.00E+00	1.27E-07	2.54E-07	0.0575	1.671E+12
Cl-36	1.3124E-32	22.16	44.32	0.00E+00	2.91E-31	5.82E-31	0.0850	1.068E+12
Cm-243	2.3676E-07	22.16	44.32	0.00E+00	5.25E-08	1.05E-06	0.1250	9.228E+11
Cm-244	5.2042E-05	22.16	44.32	0.00E+00	1.15E-03	2.31E-03	0.2250	9.033E+11
Co-60	3.8208E-05	22.16	44.32	0.00E+00	8.47E-04	1.69E-03	0.3750	4.372E+11
Cs-134	4.8693E-01	22.16	44.32	0.00E+00	1.08E+01	2.16E+01	0.5750	6.005E+12
Cs-135	3.4477E-08	22.16	44.32	0.00E+00	7.64E-05	1.53E-04	0.8500	8.409E+11
Cs-137	2.8731E+00	22.16	44.32	0.00E+00	6.37E+01	1.27E+02	1.2500	1.565E+11
Eu-154	8.2053E-02	22.16	44.32	0.00E+00	1.82E+00	3.64E+00	1.7500	6.561E+09
Eu-155	3.9134E-02	22.16	44.32	0.00E+00	8.67E-01	1.73E+00	2.2500	1.376E+10
Fe-55	6.7429E-03	22.16	44.32	0.00E+00	1.49E-01	2.99E-01	2.7500	7.917E+07
H-3	1.0599E-02	22.16	44.32	0.00E+00	2.35E-01	4.70E-01	3.5000	8.781E+08
I-129	7.5300E-07	22.16	44.32	0.00E+00	1.67E-06	3.34E-06	5.0000	4.043E+01
Kr-85	2.8595E-01	22.16	44.32	0.00E+00	6.34E+00	1.27E+01	7.0000	4.559E+00
Np-237	9.5479E-06	22.16	44.32	0.00E+00	2.12E-04	4.23E-04	11.0000	5.175E-01
Pa-231	8.9297E-10	22.16	44.32	0.00E+00	1.98E-08	3.96E-08		
Pb-210	3.7609E-12	22.16	44.32	0.00E+00	8.33E-11	1.67E-10		
Pm-147	2.5452E+00	22.16	44.32	0.00E+00	5.64E+01	1.13E+02		
Pu-238	2.0550E-02	22.16	44.32	0.00E+00	4.55E-01	9.11E-01		
Pu-239	4.2838E-04	22.16	44.32	0.00E+00	9.49E-03	1.90E-02		
Pu-240	2.4401E-04	22.16	44.32	0.00E+00	5.41E-03	1.08E-02		
Pu-241	6.8764E-02	22.16	44.32	0.00E+00	1.52E+00	3.05E+00		
Pu-242	3.6329E-07	22.16	44.32	0.00E+00	8.05E-06	1.61E-05		
Ra-226	3.8045E-11	22.16	44.32	0.00E+00	8.43E-10	1.69E-09		
Ra-228	2.9902E-15	22.16	44.32	0.00E+00	6.63E-14	1.33E-13		
Ru-106	1.9055E-01	22.16	44.32	0.00E+00	4.22E+00	8.45E+00		
Se-79	1.2936E-05	22.16	44.32	0.00E+00	2.87E-04	5.73E-04		
Sn-126	1.1574E-05	22.16	44.32	0.00E+00	2.58E-04	5.13E-04		
Sr-90	2.7505E+00	22.16	44.32	0.00E+00	6.10E+01	1.22E+02		
Tc-99	4.2239E-04	22.16	44.32	0.00E+00	9.36E-03	1.87E-02		
Th-229	1.8848E-12	22.16	44.32	0.00E+00	4.18E-11	8.35E-11		
Th-230	1.7042E-08	22.16	44.32	0.00E+00	3.78E-07	7.55E-07		
Th-232	7.8132E-15	22.16	44.32	0.00E+00	1.73E-13	3.46E-13		
Ti-208	4.4063E-08	22.16	44.32	0.00E+00	9.76E-07	1.95E-06		
U-232	1.3151E-07	22.16	44.32	0.00E+00	2.91E-06	5.83E-06		
U-233	1.9544E-09	22.16	44.32	0.00E+00	4.34E-08	8.67E-08		
U-234	1.8371E-04	22.16	44.32	0.00E+00	4.07E-03	8.14E-03		
U-235	2.7235E-08	22.16	0.00	9.78E-03	9.72E-03	9.78E-03		
U-236	1.5493E-05	22.16	44.32	0.00E+00	3.43E-04	6.87E-04		
U-238	4.2851E-09	22.16	0.00	6.13E-03	6.13E-03	6.13E-03		
Y-90	2.7505E+00	22.16	44.32	0.00E+00	6.10E+01	1.22E+02		
Other Radionuclides					1.14E+02	2.28E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	19.8630137	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal:		22.16	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		44.32	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.00		1.00
Bounding:	0.01		

¹Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ZPRL (UALX-LEU) TAIWAN
SNF ID #: 554
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=23.748kg; EOL=23.348kg
ROD Storage Site: SRS

¹Fuel decay start date: 1997
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
0.97

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	1.1465E-09	377.86	755.72	0.00E+00	4.33E-07	8.66E-07	Avg. MeV	
Am-241	2.3056E-03	377.86	755.72	0.00E+00	8.71E-01	1.74E+00	0.0150	7.072E+13
Am-242m	4.1476E-07	377.86	755.72	0.00E+00	1.57E-04	3.13E-04	0.0250	1.469E+13
Am-243	1.4894E-06	377.86	755.72	0.00E+00	5.83E-04	1.13E-03	0.0375	1.279E+13
C-14	5.7108E-09	377.86	755.72	0.00E+00	2.16E-06	4.32E-06	0.0575	1.374E+13
Cl-36	1.3124E-32	377.86	755.72	0.00E+00	4.96E-30	9.92E-30	0.0850	8.290E+12
Cm-243	1.4562E-07	377.86	755.72	0.00E+00	5.50E-05	1.10E-04	0.1250	5.552E+12
Cm-244	2.4221E-05	377.86	755.72	0.00E+00	9.15E-03	1.83E-02	0.2250	7.157E+12
Co-60	2.7560E-06	377.86	755.72	0.00E+00	1.04E-03	2.08E-03	0.3750	3.111E+12
Cs-134	5.8851E-04	377.86	755.72	0.00E+00	2.22E-01	4.45E-01	0.5750	5.101E+13
Cs-135	3.4477E-06	377.86	755.72	0.00E+00	1.30E-03	2.61E-03	0.8500	7.350E+11
Cs-137	1.8099E+00	377.86	755.72	0.00E+00	6.84E+02	1.37E+03	1.2500	4.088E+11
Eu-154	1.6386E-02	377.86	755.72	0.00E+00	6.19E+00	1.24E+01	1.7500	2.019E+10
Eu-155	2.3957E-03	377.86	755.72	0.00E+00	9.05E-01	1.81E+00	2.2500	1.439E+06
Fe-55	3.2707E-06	377.86	755.72	0.00E+00	1.24E-02	2.47E-02	2.7500	1.179E+06
H-3	3.4504E-03	377.86	755.72	0.00E+00	1.30E+00	2.61E+00	3.5000	9.236E+02
I-129	7.5300E-07	377.86	755.72	0.00E+00	2.85E-04	5.69E-04	5.0000	3.138E+02
Kr-85	7.8540E-02	377.86	755.72	0.00E+00	2.97E+01	5.94E+01	7.0000	3.461E+01
Np-237	9.5615E-06	377.86	755.72	0.00E+00	3.61E-03	7.23E-03	11.0000	3.877E+00
Pa-231	2.7968E-09	377.86	755.72	0.00E+00	1.06E-06	2.11E-06		
Pb-210	1.2612E-10	377.86	755.72	0.00E+00	4.77E-08	9.53E-08		
Pm-147	1.2952E-02	377.86	755.72	0.00E+00	4.89E+00	9.79E+00		
Pu-238	1.7549E-02	377.86	755.72	0.00E+00	6.63E+00	1.33E+01		
Pu-239	4.2810E-04	377.86	755.72	0.00E+00	1.62E-01	3.24E-01		
Pu-240	2.4357E-04	377.86	755.72	0.00E+00	9.20E-02	1.84E-01		
Pu-241	2.6277E-02	377.86	755.72	0.00E+00	9.93E+00	1.99E+01		
Pu-242	3.6329E-07	377.86	755.72	0.00E+00	1.37E-04	2.75E-04		
Ra-226	4.4444E-10	377.86	755.72	0.00E+00	1.68E-07	3.36E-07		
Ra-228	1.9714E-14	377.86	755.72	0.00E+00	7.45E-12	1.49E-11		
Ru-106	2.0477E-07	377.86	755.72	0.00E+00	7.74E-05	1.55E-04		
Se-79	1.2933E-05	377.86	755.72	0.00E+00	4.89E-03	9.77E-03		
Sn-126	1.1574E-05	377.86	755.72	0.00E+00	4.37E-03	8.75E-03		
Sr-90	1.7092E+00	377.86	755.72	0.00E+00	6.46E+02	1.29E+03		
Tc-99	4.2239E-04	377.86	755.72	0.00E+00	1.60E-01	3.19E-01		
Th-229	7.7260E-12	377.86	755.72	0.00E+00	2.92E-09	5.84E-09		
Th-230	5.8497E-08	377.86	755.72	0.00E+00	2.21E-05	4.42E-05		
Th-232	2.6906E-14	377.86	755.72	0.00E+00	1.02E-11	2.03E-11		
Th-208	4.4336E-08	377.86	755.72	0.00E+00	1.68E-05	3.35E-05		
U-232	1.2037E-07	377.86	755.72	0.00E+00	4.55E-05	9.10E-05		
U-233	3.0011E-09	377.86	755.72	0.00E+00	1.13E-06	2.27E-06		
U-234	1.8497E-04	377.86	755.72	0.00E+00	6.99E-02	1.40E-01		
U-235	-2.7235E-06	377.86	0.00	1.01E-02	9.11E-03	1.01E-02		
U-236	1.5493E-05	377.86	755.72	0.00E+00	5.85E-03	1.17E-02		
U-238	-4.2851E-09	377.86	0.00	6.41E-03	6.40E-03	6.41E-03		
Y-90	1.7094E+00	377.86	755.72	0.00E+00	6.46E+02	1.29E+03		
Other Radionuclides					6.51E+02	1.30E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding:	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.74996117	80 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		377.86	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		755.72	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal:	0.05		1.00
Bounding:	0.10		

¹Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

²Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

2030 Summary, Totals for all Spent Fuels

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.96E+02	3.52E+02	Avg. MeV	
Am-241	2.81E+06	4.01E+06	0.0150	2.404E+18
Am-242m	6.08E+03	9.59E+03	0.0250	4.961E+17
Am-243	5.44E+03	8.47E+03	0.0375	4.459E+17
C-14	2.92E+04	3.85E+04	0.0575	5.107E+17
Cl-36	5.09E+02	6.82E+02	0.0850	2.801E+17
Cm-243	1.19E+03	2.12E+03	0.1250	2.005E+17
Cm-244	1.44E+05	2.52E+05	0.2250	2.407E+17
Co-60	4.51E+06	8.25E+06	0.3750	1.062E+17
Cs-134	6.41E+05	1.28E+06	0.5750	1.847E+18
Cs-135	4.00E+02	5.77E+02	0.8500	7.223E+16
Cs-137	2.98E+07	4.77E+07	1.2500	6.333E+17
Eu-154	3.97E+05	6.96E+05	1.7500	1.149E+15
Eu-155	9.86E+04	1.88E+05	2.2500	7.981E+14
Fe-55	2.04E+06	4.07E+06	2.7500	1.512E+15
H-3	1.18E+05	1.97E+05	3.5000	5.204E+11
I-129	2.23E+01	3.28E+01	5.0000	1.695E+09
Kr-85	9.96E+05	1.77E+06	7.0000	1.947E+08
Np-237	2.08E+02	3.22E+02	11.0000	2.233E+07
Pa-231	3.41E+02	4.08E+02		
Pb-210	8.57E-02	9.90E-02		
Pm-147	3.41E+06	6.82E+06		
Pu-238	8.20E+05	1.37E+06		
Pu-239	4.80E+05	5.86E+05		
Pu-240	3.50E+05	4.54E+05		
Pu-241	1.08E+07	2.33E+07		
Pu-242	4.96E+02	7.26E+02		
Ra-226	1.54E-01	1.78E-01		
Ra-228	1.39E+01	1.68E+01		
Ru-106	2.48E+05	4.97E+05		
Se-79	3.68E+02	5.32E+02		
Sn-126	3.88E+02	6.00E+02		
Sr-90	2.52E+07	4.04E+07		
Tc-99	9.53E+03	1.44E+04		
Th-229	2.33E+02	2.74E+02		
Th-230	8.32E+00	9.90E+00		
Th-232	8.04E+00	8.40E+00		
Ti-208	3.51E+04	4.29E+04		
U-232	9.52E+04	1.16E+05		
U-233	1.74E+04	2.16E+04	Thermal Power	
U-234	1.01E+04	1.26E+04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	1.93E+02	2.66E+02		
U-236	2.83E+02	4.19E+02	5.92E+05	9.40E+05
U-238	7.89E+02	8.00E+02	Total	Total
Y-90	2.52E+07	4.04E+07		
Other Radionuclides	4.06E+07	6.38E+07		

Total Canister Usage Summary

	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC	MCO
Number of Canisters	1402.9	1448.1	165.3	27.0	162.4	403.0

Bare Fuel Transfers

166 Assemblies

2030 Summary, Totals for 18" x 10' Canister

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.31E+00	7.53E+00	Avg. MeV	
Am-241	1.40E+06	1.91E+06	0.0150	1.117E+18
Am-242m	2.51E+03	3.49E+03	0.0250	2.334E+17
Am-243	2.60E+03	3.61E+03	0.0375	2.087E+17
C-14	2.26E+04	2.91E+04	0.0575	2.396E+17
Cl-36	4.18E+02	5.42E+02	0.0850	1.321E+17
Cm-243	1.42E+02	2.21E+02	0.1250	1.017E+17
Cm-244	2.18E+04	3.29E+04	0.2250	1.131E+17
Co-60	9.36E+05	1.29E+06	0.3750	5.167E+16
Cs-134	6.16E+05	1.23E+06	0.5750	7.924E+17
Cs-135	9.74E+01	1.47E+02	0.8500	5.598E+16
Cs-137	1.07E+07	1.93E+07	1.2500	1.097E+17
Eu-154	2.29E+05	4.12E+05	1.7500	6.064E+14
Eu-155	6.25E+04	1.23E+05	2.2500	7.769E+14
Fe-55	4.73E+04	9.18E+04	2.7500	3.302E+13
H-3	4.30E+04	7.10E+04	3.5000	4.994E+11
I-129	5.20E+00	8.83E+00	5.0000	2.349E+08
Kr-85	5.60E+05	1.09E+06	7.0000	2.683E+07
Np-237	7.64E+01	1.29E+02	11.0000	3.066E+06
Pa-231	3.77E+00	8.57E+00		
Pb-210	1.85E-02	2.02E-02		
Pm-147	3.25E+06	6.50E+06		
Pu-238	2.57E+05	4.75E+05		
Pu-239	1.15E+05	1.31E+05		
Pu-240	6.08E+04	8.66E+04		
Pu-241	3.78E+06	1.04E+07		
Pu-242	1.51E+02	1.88E+02		
Ra-226	3.54E-02	4.36E-02		
Ra-228	2.19E-01	4.29E-01		
Ru-106	2.40E+05	4.80E+05		
Se-79	9.21E+01	1.54E+02		
Sr-126	8.62E+01	1.47E+02		
Sr-90	9.95E+06	1.80E+07		
Tc-99	2.98E+03	5.00E+03		
Th-229	2.60E+00	5.88E+00		
Th-230	2.32E+00	2.93E+00		
Th-232	5.98E-01	6.31E-01		
Ti-208	3.43E+02	6.12E+02		
U-232	9.30E+02	2.20E+03		
U-233	1.85E+03	1.96E+03	Thermal Power	
U-234	3.90E+03	5.19E+03	Nominal Heat	
U-235	1.09E+02	1.51E+02	Output (Watts)	Bounding Heat Output (Watts)
U-236	1.11E+02	1.82E+02	2.21E+05	3.73E+05
U-238	2.69E+01	3.34E+01	Total	Total
Y-90	9.96E+06	1.80E+07		
Other Radionuclides	1.99E+07	3.32E+07		

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	MIC	MCO
Number of Canisters	1402.9	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers

0 Assemblies

2030 Summary, Totals for 18" x 15' Canister

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon	Total
			Energy Group	Photons/sec (bounding)
Ac-227	2.64E+02	2.78E+02	Avg. MeV	
Am-241	5.08E+05	7.93E+05	0.0150	7.232E+17
Am-242m	2.30E+03	4.16E+03	0.0250	1.478E+17
Am-243	1.31E+03	2.20E+03	0.0375	1.333E+17
C-14	3.97E+03	4.44E+03	0.0575	1.472E+17
Cl-36	5.00E+01	5.77E+01	0.0850	8.369E+16
Cm-243	6.71E+02	1.24E+03	0.1250	5.640E+16
Cm-244	6.42E+04	1.13E+05	0.2250	7.211E+16
Co-60	3.50E+06	6.82E+06	0.3750	3.067E+16
Cs-134	2.48E+04	4.72E+04	0.5750	5.807E+17
Cs-135	1.96E+02	2.76E+02	0.8500	1.083E+16
Cs-137	1.06E+07	1.55E+07	1.2500	5.103E+17
Eu-154	1.23E+05	2.06E+05	1.7500	3.646E+14
Eu-155	3.22E+04	5.88E+04	2.2500	2.104E+13
Fe-55	1.99E+06	3.97E+06	2.7500	1.146E+15
H-3	4.52E+04	7.29E+04	3.5000	1.920E+10
I-129	9.51E+00	1.30E+01	5.0000	7.482E+08
Kr-85	2.89E+05	4.40E+05	7.0000	8.606E+07
Np-237	5.40E+01	8.29E+01	11.0000	9.874E+06
Pa-231	3.01E+02	3.18E+02		
Pb-210	6.33E-02	6.60E-02		
Pm-147	1.59E+05	3.09E+05		
Pu-238	3.19E+05	5.10E+05		
Pu-239	1.93E+05	2.44E+05		
Pu-240	1.42E+05	1.80E+05		
Pu-241	4.55E+06	7.41E+06		
Pu-242	1.38E+02	2.34E+02		
Ra-226	1.08E-01	1.12E-01		
Ra-228	1.23E+01	1.32E+01		
Ru-106	8.39E+03	1.68E+04		
Se-79	1.71E+02	2.20E+02		
Sn-126	2.25E+02	3.14E+02		
Sr-90	8.90E+06	1.25E+07		
Tc-99	3.34E+03	4.73E+03		
Th-229	2.11E+02	2.24E+02		
Th-230	5.28E+00	5.55E+00		
Th-232	3.48E+00	3.77E+00		
Ti-208	3.07E+04	3.26E+04		
U-232	8.31E+04	8.84E+04		
U-233	3.18E+03	6.22E+03	Thermal Power	
U-234	5.18E+03	5.52E+03	Nominal Heat	
U-235	2.20E+01	3.15E+01	Output (Watts)	Bounding Heat Output (Watts)
U-236	7.84E+01	1.06E+02	2.31E+05	3.56E+05
U-238	4.20E+01	4.30E+01	Total	Total
Y-90	8.90E+06	1.25E+07		
Other Radionuclides	1.18E+07	1.68E+07		

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	1446.1	0.0	0.0	0.0	0.0

Bare Fuel Transfers

0 Assemblies

2030 Summary, Totals for 24" x 10' Canister

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.95E-03	3.69E-03	Avg. MeV	
Am-241	2.45E+03	4.90E+03	0.0150	1.428E+17
Am-242m	3.84E-01	7.68E-01	0.0250	2.965E+16
Am-243	1.44E+00	2.88E+00	0.0375	2.577E+16
C-14	5.53E-03	1.11E-02	0.0675	2.774E+16
Cl-36	1.27E-26	2.54E-26	0.0850	1.671E+16
Cm-243	1.11E-01	2.21E-01	0.1250	1.104E+16
Cm-244	1.60E+01	3.20E+01	0.2250	1.443E+16
Co-60	7.18E-01	1.44E+00	0.3750	6.278E+15
Cs-134	1.98E+01	3.97E+01	0.5750	1.037E+17
Cs-135	3.34E+00	6.68E+00	0.8500	1.267E+15
Cs-137	1.39E+06	2.79E+06	1.2500	6.129E+14
Eu-154	7.10E+03	1.42E+04	1.7500	3.450E+13
Eu-155	5.74E+02	1.15E+03	2.2500	2.884E+09
Fe-55	2.21E+00	4.42E+00	2.7500	2.753E+09
H-3	1.91E+03	3.82E+03	3.5000	1.595E+06
I-129	7.30E-01	1.46E+00	6.0000	6.518E+05
Kr-85	3.99E+04	7.98E+04	7.0000	7.132E+04
Np-237	9.28E+00	1.86E+01	11.0000	7.952E+03
Pa-231	3.82E-03	7.63E-03		
Pb-210	3.21E-04	6.42E-04		
Pm-147	8.96E+02	1.79E+03		
Pu-238	1.57E+04	3.14E+04		
Pu-239	4.15E+02	8.30E+02		
Pu-240	2.36E+02	4.72E+02		
Pu-241	1.57E+04	3.15E+04		
Pu-242	3.52E-01	7.04E-01		
Ra-226	8.74E-04	1.75E-03		
Ra-228	3.01E-08	6.01E-08		
Ru-106	2.06E-04	4.12E-04		
Se-79	1.25E+01	2.51E+01		
Sn-126	1.12E+01	2.24E+01		
Sr-90	1.31E+06	2.61E+06		
Tc-99	4.09E+02	8.19E+02		
Th-229	1.20E-05	2.41E-05		
Th-230	8.09E-02	1.62E-01		
Th-232	3.72E-08	7.44E-08		
Tl-208	3.92E-02	7.84E-02		
U-232	1.06E-01	2.12E-01		
U-233	3.52E-03	7.03E-03	Thermal Power	
U-234	1.80E+02	3.60E+02	Nominal Heat	
U-235	4.84E+00	7.28E+00	Output (Watts)	Bounding Heat Output (Watts)
U-236	1.50E+01	3.00E+01	1.62E+04	3.24E+04
U-238	8.14E-02	8.55E-02	Total	Total
Y-90	1.31E+06	2.61E+06		
Other Radionuclides	1.33E+06	2.65E+06		

Total Canister Usage Summary						
	16" x 10"	16" x 15"	24" x 10"	24" x 15"	NIC	MCO
Number of Canisters	0.0	0.0	165.3	0.0	0.0	0.0

Bare Fuel Transfers
0 Assemblies

2030 Summary, Totals for 24" x 15' Canister

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	2.74E+01	4.84E+01		
Am-241	6.85E+01	1.21E+02	0.0150	4.104E+16
Am-242m	4.17E-01	7.37E-01	0.0250	8.451E+15
Am-243	8.77E-02	1.55E-01	0.0375	7.223E+15
C-14	2.60E+01	4.60E+01	0.0575	7.895E+15
Cl-36	5.10E-01	9.01E-01	0.0850	5.043E+15
Cm-243	8.61E-02	1.52E-01	0.1250	3.160E+15
Cm-244	3.98E+00	7.04E+00	0.2250	4.522E+15
Co-60	2.46E+02	4.35E+02	0.3750	1.816E+15
Cs-134	7.21E+00	1.27E+01	0.5750	2.773E+16
Cs-135	8.06E+00	1.42E+01	0.8500	4.955E+14
Cs-137	4.16E+05	7.35E+05	1.2500	2.189E+14
Eu-154	2.42E+03	4.28E+03	1.7500	3.413E+13
Eu-155	1.86E+02	3.29E+02	2.2500	9.919E+08
Fe-55	6.48E-01	1.14E+00	2.7500	2.439E+14
H-3	5.99E+02	1.06E+03	3.5000	9.483E+05
I-129	4.46E-01	7.89E-01	5.0000	2.968E+05
Kr-85	1.76E+04	3.12E+04	7.0000	2.163E+04
Np-237	3.55E-02	6.28E-02	11.0000	1.648E+03
Pa-231	3.38E+01	5.98E+01		
Pb-210	4.01E-03	7.09E-03		
Pm-147	7.38E+01	1.30E+02		
Pu-238	1.20E+02	2.11E+02		
Pu-239	7.75E+00	1.37E+01		
Pu-240	4.56E+00	8.05E+00		
Pu-241	4.14E+02	7.31E+02		
Pu-242	1.15E-02	2.03E-02		
Ra-226	6.03E-03	1.07E-02		
Ra-228	1.30E+00	2.30E+00		
Ru-106	1.13E-05	2.00E-05		
Se-79	9.97E+00	1.76E+01		
Sn-126	1.12E+01	1.98E+01		
Sr-90	4.20E+05	7.43E+05		
Tc-99	9.16E+01	1.62E+02		
Th-229	1.82E+01	3.21E+01		
Th-230	3.22E-01	5.69E-01		
Th-232	3.60E+00	3.62E+00		
Ti-208	3.93E+03	6.95E+03		
U-232	1.06E+04	1.88E+04		
U-233	1.12E+04	1.22E+04		
U-234	2.30E+02	4.07E+02		
U-235	1.88E-02	3.13E-02		
U-236	3.74E-02	6.60E-02		
U-238	1.51E-03	1.59E-03		
Y-90	4.20E+05	7.43E+05		
Other Radionuclides	4.70E+05	8.30E+05		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	27.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2030 Summary, Totals for High Integrity Canister (HIC)

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.18E+00	1.75E+01	Avg. MeV	
Am-241	3.26E+04	3.68E+04	0.0150	3.328E+16
Am-242m	3.15E+02	3.23E+02	0.0250	6.815E+15
Am-243	8.98E+01	1.08E+02	0.0375	6.252E+15
C-14	2.40E+01	4.10E+01	0.0575	6.814E+15
Cl-36	3.43E-01	6.73E-01	0.0650	3.919E+15
Cm-243	7.92E+01	8.55E+01	0.1250	2.554E+15
Cm-244	4.62E+03	5.76E+03	0.2250	3.410E+15
Co-60	2.09E+03	3.24E+03	0.3750	1.427E+15
Cs-134	2.36E+02	3.09E+02	0.5750	2.899E+16
Cs-135	1.42E+01	1.95E+01	0.8500	3.842E+14
Cs-137	4.93E+05	7.80E+05	1.2500	4.276E+14
Eu-154	3.89E+03	5.56E+03	1.7500	1.791E+13
Eu-155	1.79E+03	1.95E+03	2.2500	1.551E+11
Fe-55	6.21E+02	1.20E+03	2.7500	8.829E+13
H-3	2.85E+03	3.47E+03	3.5000	2.316E+08
I-129	4.44E-01	7.40E-01	5.0000	3.757E+07
Kr-85	1.05E+04	2.18E+04	7.0000	4.322E+06
Np-237	2.13E+00	2.52E+00	11.0000	4.959E+05
Pa-231	1.46E+00	2.17E+01		
Pb-210	1.86E-04	2.58E-03		
Pm-147	3.37E+03	4.98E+03		
Pu-238	9.29E+03	1.15E+04		
Pu-239	3.18E+03	8.30E+03		
Pu-240	7.15E+03	7.60E+03		
Pu-241	7.96E+04	2.10E+05		
Pu-242	8.83E+00	1.07E+01		
Ra-226	2.96E-04	3.91E-03		
Ra-228	5.55E-02	8.33E-01		
Ru-106	6.98E+01	1.38E+02		
Se-79	5.17E+00	1.15E+01		
Sn-126	1.36E+01	2.10E+01		
Sr-90	3.07E+05	5.84E+05		
Tc-99	1.59E+02	2.26E+02		
Th-229	7.74E-01	1.16E+01		
Th-230	1.70E-02	2.10E-01		
Th-232	3.55E-01	3.56E-01		
Ti-208	1.67E+02	2.51E+03		
U-232	4.53E+02	6.81E+03		
U-233	1.16E+03	1.20E+03	Thermal Power	
U-234	1.70E+01	1.56E+02	Nominal Heat	
U-235	1.77E-01	3.83E-01	Output (Watts)	Bounding Heat Output (Watts)
U-236	2.40E+00	2.67E+00	6.56E+03	1.19E+04
U-238	4.32E-01	4.95E-01	Total	Total
Y-90	3.07E+05	5.84E+05		
Other Radionuclides	4.96E+05	8.14E+05		

Total Canister Usage Summary					
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC
Number of Canisters	0.0	0.0	0.0	0.0	162.4
Bare Fuel Transfers					
	0	Assemblies			

2030 Summary, Totals for MCO

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.89E-03	5.94E-03	Avg. MeV	
Am-241	5.66E+05	6.96E+05	0.0150	2.296E+17
Am-242m	3.93E+02	5.45E+02	0.0250	4.657E+16
Am-243	5.05E+02	8.07E+02	0.0375	4.304E+16
C-14	4.86E+02	5.68E+02	0.0575	5.228E+16
Cl-36	3.48E-01	6.96E-01	0.0850	2.573E+16
Cm-243	7.56E+01	1.51E+02	0.1250	1.687E+16
Cm-244	1.33E+04	2.54E+04	0.2250	2.203E+16
Co-60	1.99E+02	3.60E+02	0.3750	9.543E+15
Cs-134	5.73E-01	7.47E-01	0.5750	2.105E+17
Cs-135	5.73E+01	7.02E+01	0.8500	1.836E+15
Cs-137	4.71E+06	5.70E+06	1.2500	8.630E+14
Eu-154	1.27E+04	1.66E+04	1.7500	4.947E+13
Eu-155	2.75E+02	3.93E+02	2.2500	5.404E+09
Fe-55	6.11E-01	9.90E-01	2.7500	5.126E+09
H-3	8.48E+03	1.30E+04	3.5000	4.631E+08
I-129	4.78E+00	5.78E+00	5.0000	1.973E+08
Kr-85	5.60E+04	6.74E+04	7.0000	2.263E+07
Np-237	5.09E+01	6.21E+01	11.0000	2.593E+06
Pa-231	1.04E-02	1.23E-02		
Pb-210	4.57E-04	5.81E-04		
Pm-147	6.06E+01	7.12E+01		
Pu-238	1.19E+05	1.59E+05		
Pu-239	1.51E+05	1.75E+05		
Pu-240	1.22E+05	1.44E+05		
Pu-241	1.69E+06	2.08E+06		
Pu-242	1.01E+02	1.39E+02		
Ra-226	1.34E-03	1.66E-03		
Ra-228	2.40E-06	4.71E-06		
Ru-106	1.08E-07	1.30E-07		
Se-79	6.06E+01	7.32E+01		
Sn-126	1.09E+01	2.19E+01		
Sr-90	3.29E+06	3.96E+06		
Tc-99	2.02E+03	2.43E+03		
Th-229	8.36E-05	1.53E-04		
Th-230	1.40E-01	1.69E-01		
Th-232	2.43E-06	4.74E-06		
Ti-208	6.56E-02	1.31E-01		
U-232	1.78E-01	3.56E-01		
U-233	1.92E-02	3.14E-02	Thermal Power	
U-234	3.59E+02	4.26E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	4.57E+01	5.25E+01		
U-238	6.39E+01	7.51E+01	7.57E+04	9.36E+04
U-238	7.03E+02	7.05E+02	Total	Total
Y-90	3.29E+06	3.96E+06		
Other Radionuclides	4.54E+06	5.49E+06		

Total Canister Usage Summary

	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	403.0

Bare Fuel Transfers

0 Assemblies

2030 Summary, Totals for Bare Fuel Transfers

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.49E-02	8.96E-02	Avg. MeV	
Am-241	3.00E+05	5.72E+05	0.0150	1.173E+17
Am-242m	5.58E+02	1.07E+03	0.0250	2.344E+16
Am-243	9.29E+02	1.74E+03	0.0375	2.162E+16
C-14	2.13E+03	4.26E+03	0.0575	2.920E+16
Cl-36	4.02E+01	8.03E+01	0.0850	1.287E+16
Cm-243	2.27E+02	4.21E+02	0.1250	8.849E+15
Cm-244	4.02E+04	7.53E+04	0.2250	1.104E+16
Co-60	6.88E+04	1.38E+05	0.3750	4.764E+15
Cs-134	1.91E+01	3.82E+01	0.5750	1.031E+17
Cs-135	2.29E+01	4.32E+01	0.8500	1.436E+15
Cs-137	1.49E+06	2.79E+06	1.2500	1.117E+16
Eu-154	1.93E+04	3.75E+04	1.7500	4.170E+13
Eu-155	1.10E+03	2.15E+03	2.2500	5.828E+10
Fe-55	1.14E+02	2.27E+02	2.7500	1.040E+11
H-3	1.66E+04	3.15E+04	3.5000	1.114E+09
I-129	1.21E+00	2.24E+00	5.0000	4.758E+08
Kr-85	2.34E+04	4.48E+04	7.0000	5.480E+07
Np-237	1.49E+01	2.75E+01	11.0000	6.291E+06
Pa-231	5.17E-02	1.03E-01		
Pb-210	9.51E-04	1.87E-03		
Pm-147	1.80E+02	3.59E+02		
Pu-238	9.96E+04	1.80E+05		
Pu-239	1.70E+04	2.77E+04		
Pu-240	1.78E+04	3.59E+04		
Pu-241	6.70E+05	3.15E+06		
Pu-242	9.65E+01	1.53E+02		
Ra-226	2.18E-03	4.29E-03		
Ra-228	1.04E-02	2.07E-02		
Ru-106	2.85E-04	5.71E-04		
Se-79	1.63E+01	3.03E+01		
Sn-126	2.92E+01	5.36E+01		
Sr-90	1.05E+06	1.97E+06		
Tc-99	5.31E+02	9.87E+02		
Th-229	3.91E-02	7.81E-02		
Th-230	1.57E-01	3.08E-01		
Th-232	1.04E-02	2.08E-02		
Tl-208	1.47E+00	2.92E+00		
U-232	3.99E+00	7.91E+00		
U-233	6.25E+00	1.25E+01	Thermal Power	
U-234	2.74E+02	5.38E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	1.17E+01	2.31E+01		
U-236	1.21E+01	2.28E+01	3.16E+04	5.95E+04
U-238	1.62E+01	1.85E+01	Total	Total
Y-90	1.05E+06	1.97E+06		
Other Radionuclides	2.07E+06	3.96E+06		

Total Canister Usage Summary						
	18" x 10"	18" x 15"	24" x 10"	24" x 15"	MIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	0.0
Bare Fuel Transfers						
	Assemblies		BWR	PWR		
	166		87	79		

2030 Summary, TSPA Category 2: Pu/U Alloy

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	1.81E-02	3.13E-02		
Am-241	1.73E+04	1.96E+04	0.0150	3.010E+16
Am-242m	5.98E+00	1.00E+01	0.0250	6.220E+15
Am-243	1.53E+01	1.98E+01	0.0375	5.474E+15
C-14	7.45E+02	7.80E+02	0.0575	6.050E+15
Cl-36	6.31E-01	1.26E+00	0.0850	3.490E+15
Cm-243	2.69E-01	3.84E-01	0.1250	2.267E+15
Cm-244	1.67E+01	3.14E+01	0.2250	3.003E+15
Co-60	9.63E+02	1.14E+03	0.3750	1.308E+15
Cs-134	5.65E-04	9.21E-04	0.5750	2.337E+16
Cs-135	9.06E+00	1.31E+01	0.8500	2.216E+14
Cs-137	5.41E+05	6.29E+05	1.2500	1.631E+14
Eu-154	4.18E+02	4.54E+02	1.7500	5.728E+12
Eu-155	2.14E+01	3.68E+01	2.2500	1.055E+09
Fe-55	6.22E-02	1.12E-01	2.7500	2.070E+09
H-3	2.94E+03	3.08E+03	3.5000	3.849E+06
I-129	5.77E-01	6.80E-01	5.0000	1.613E+06
Kr-85	4.78E+03	6.08E+03	7.0000	1.812E+05
Np-237	4.02E+00	4.36E+00	11.0000	2.054E+04
Pa-231	2.91E-02	5.13E-02		
Pb-210	9.33E-03	9.35E-03		
Pm-147	2.14E+00	4.06E+00		
Pu-238	3.86E+03	4.52E+03		
Pu-239	1.37E+04	1.55E+04		
Pu-240	5.35E+03	5.44E+03		
Pu-241	2.50E+04	2.81E+04		
Pu-242	1.96E+00	2.63E+00		
Ra-226	1.88E-02	1.88E-02		
Ra-228	9.21E-04	1.09E-03		
Ru-106	8.92E-10	1.78E-09		
Se-79	9.42E+00	1.09E+01		
Sr-126	1.09E+01	1.43E+01		
Sr-90	4.68E+05	5.44E+05		
Tc-99	3.20E+02	3.62E+02		
Th-229	5.14E-03	5.91E-03		
Th-230	1.08E+00	1.09E+00		
Th-232	2.34E-03	2.34E-03		
Ti-208	4.04E-02	5.88E-02		
U-232	1.09E-01	1.58E-01		
U-233	6.80E-01	7.79E-01		
U-234	1.49E+03	1.49E+03		
U-235	2.21E+00	2.72E+00		
U-236	1.80E+01	1.92E+01		
U-238	1.36E+00	1.49E+00		
Y-90	4.68E+05	5.45E+05		
Other Radionuclides	5.31E+05	6.29E+05		

Total Canister Usage Summary						
	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC	MCO
Number of Canisters	8.0	7.7	0.0	0.0	5.0	0.0

Bare Fuel Transfers	
0	Assemblies

Thermal Power	
Nominal Heat	
Output (Watts)	Bounding Heat Output (Watts)
7.11E+03	8.22E+03
Total	Total

2030 Summary, TSPA Category 3: U/Pu Carbide

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	1.99E-03	3.98E-03	0.0150	2.713E+16
Am-241	1.08E+04	2.13E+04	0.0250	5.306E+15
Am-242m	5.94E+01	1.17E+02	0.0375	4.631E+15
Am-243	3.81E+01	7.62E+01	0.0575	4.516E+15
C-14	2.76E+02	5.53E+02	0.0850	2.451E+15
Cl-36	5.20E+00	1.04E+01	0.1250	2.599E+15
Cm-243	7.36E+00	1.44E+01	0.2250	1.657E+15
Cm-244	1.22E+03	2.44E+03	0.3750	7.841E+14
Co-60	3.31E+06	6.62E+06	0.5750	1.035E+16
Cs-134	1.85E+04	3.71E+04	0.8500	2.584E+15
Cs-135	1.38E+00	2.73E+00	1.2500	4.911E+17
Cs-137	1.07E+05	2.13E+05	1.7500	4.464E+13
Eu-154	3.20E+04	6.40E+04	2.2500	2.094E+13
Eu-155	1.05E+04	2.10E+04	2.7500	1.747E+11
Fe-55	1.99E+06	3.97E+06	3.5000	1.744E+10
H-3	3.01E+03	6.02E+03	5.0000	1.582E+07
I-129	3.45E-02	6.79E-02	7.0000	1.820E+06
Kr-85	9.70E+03	1.94E+04	11.0000	2.089E+05
Np-237	3.86E-01	7.68E-01		
Pa-231	6.51E-03	1.30E-02		
Pb-210	7.41E-07	1.48E-06		
Pm-147	1.06E+05	2.12E+05		
Pu-238	8.71E+03	1.74E+04		
Pu-239	1.91E+03	3.14E+03		
Pu-240	1.47E+03	2.28E+03		
Pu-241	4.88E+05	9.68E+05		
Pu-242	5.85E+00	1.15E+01		
Ra-226	6.94E-06	1.39E-05		
Ra-228	1.01E-03	2.03E-03		
Ru-106	8.37E+03	1.67E+04		
Se-79	5.18E-01	1.03E+00		
Sn-126	7.32E-01	1.43E+00		
Sr-90	9.60E+04	1.92E+05		
Tc-99	1.86E+01	3.68E+01		
Th-229	9.55E-04	1.91E-03		
Th-230	2.89E-03	5.79E-03		
Th-232	1.37E-03	2.74E-03		
Ti-208	2.54E-01	5.08E-01		
U-232	7.31E-01	1.46E+00		
U-233	8.23E-01	1.65E+00	Thermal Power	
U-234	2.91E+01	5.83E+01	Nominal Heat	
U-235	1.55E+00	2.86E+00	Output (Watts)	Bounding Heat Output (Watts)
U-236	5.36E-01	1.07E+00	5.67E+04	1.13E+05
U-238	2.84E-01	5.49E-01	Total	Total
Y-90	9.61E+04	1.92E+05		
Other Radionuclides	2.99E+05	5.97E+05		

Total Canister Usage Summary						
	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC	MCO
Number of Canisters	1.2	6.2	0.0	0.0	0.0	0.0
Bare Fuel Transfers						
	0	Assemblies				

2030 Summary, TSPA Category 4: MOX

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.31E-01	4.03E-01	Avg. MeV	
Am-241	9.30E+05	1.61E+06	0.0150	2.002E+17
Am-242m	3.37E+03	5.96E+03	0.0250	3.932E+16
Am-243	1.61E+03	2.81E+03	0.0375	3.694E+16
C-14	1.12E+04	1.95E+04	0.0575	5.717E+16
Cl-36	2.12E+02	3.68E+02	0.0850	2.129E+16
Cm-243	4.55E+02	8.16E+02	0.1250	1.515E+16
Cm-244	1.12E+04	1.90E+04	0.2250	1.808E+16
Co-60	6.53E+05	9.29E+05	0.3750	7.811E+15
Cs-134	1.47E+03	2.70E+03	0.5750	1.825E+17
Cs-135	8.79E+01	1.55E+02	0.8500	3.112E+15
Cs-137	2.82E+06	4.94E+06	1.2500	7.112E+16
Eu-154	6.04E+04	9.89E+04	1.7500	8.998E+13
Eu-155	1.45E+04	2.60E+04	2.2500	3.701E+11
Fe-55	4.28E+03	5.03E+03	2.7500	4.641E+11
H-3	1.50E+04	2.52E+04	3.5000	4.173E+08
I-129	2.26E+00	4.00E+00	5.0000	1.652E+08
Kr-85	5.21E+04	8.96E+04	7.0000	1.883E+07
Np-237	1.88E+01	3.30E+01	11.0000	2.150E+06
Pa-231	2.66E-01	4.62E-01		
Pb-210	4.11E-03	7.33E-03		
Pm-147	1.50E+04	2.74E+04		
Pu-238	1.51E+05	2.51E+05		
Pu-239	1.73E+05	2.12E+05		
Pu-240	1.27E+05	1.65E+05		
Pu-241	4.56E+06	1.32E+07		
Pu-242	1.76E+02	1.96E+02		
Ra-226	9.46E-03	1.68E-02		
Ra-228	5.57E-02	9.68E-02		
Ru-106	1.42E+01	2.61E+01		
Se-79	2.78E+01	4.88E+01		
Sn-126	5.89E+01	1.05E+02		
Sr-90	1.84E+06	3.18E+06		
Tc-99	1.02E+03	1.79E+03		
Th-229	2.03E-01	3.57E-01		
Th-230	6.84E-01	1.20E+00		
Th-232	5.58E-02	9.69E-02		
Ti-208	7.62E+00	1.32E+01		
U-232	2.06E+01	3.56E+01		
U-233	3.35E+01	5.81E+01		
U-234	1.19E+03	2.07E+03		
U-235	5.40E+01	9.33E+01		
U-236	2.19E+01	3.81E+01		
U-238	1.34E+01	2.15E+01		
Y-90	1.84E+06	3.18E+06		
Other Radionuclides	6.26E+06	1.09E+07		

Thermal Power	
Nominal Heat	
Output (Watts)	Bounding Heat Output (Watts)
8.41E+04	1.38E+05
Total	Total

Total Canister Usage Summary					
	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC
Number of Canisters	13.3	127.5	0.0	0.0	4.0

Bare Fuel Transfers	
3	Assemblies

2030 Summary, TSPA Category 5: U/Th Carbide

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	3.56E+00	5.21E+00		
Am-241	2.83E+03	4.11E+03	0.0150	7.885E+16
Am-242m	2.10E+00	3.01E+00	0.0250	1.613E+16
Am-243	4.11E+01	5.96E+01	0.0375	1.404E+16
C-14	2.06E+01	2.99E+01	0.0575	1.513E+16
Cl-36	9.53E-01	1.38E+00	0.0850	9.130E+15
Cm-243	2.04E+01	2.84E+01	0.1250	6.105E+15
Cm-244	4.95E+03	6.73E+03	0.2250	7.915E+15
Co-60	2.91E+02	3.61E+02	0.3750	3.424E+15
Cs-134	2.32E+01	2.78E+01	0.5750	5.580E+16
Cs-135	2.21E+01	3.20E+01	0.8500	8.157E+14
Cs-137	1.07E+06	1.50E+06	1.2500	4.853E+14
Eu-154	1.09E+04	1.40E+04	1.7500	2.499E+13
Eu-155	6.68E+02	8.26E+02	2.2500	1.914E+09
Fe-55	2.74E-02	3.29E-02	2.7500	2.545E+13
H-3	2.85E+03	3.79E+03	3.5000	1.063E+08
I-129	9.01E-01	1.31E+00	5.0000	4.529E+07
Kr-85	2.83E+04	3.71E+04	7.0000	5.201E+06
Np-237	1.12E+01	1.62E+01	11.0000	5.962E+05
Pa-231	4.23E+00	6.13E+00		
Pb-210	1.49E-03	2.28E-03		
Pm-147	9.28E+01	1.11E+02		
Pu-238	1.40E+05	2.00E+05		
Pu-239	1.21E+02	1.76E+02		
Pu-240	2.44E+02	3.54E+02		
Pu-241	1.44E+04	1.94E+04		
Pu-242	3.47E+00	5.03E+00		
Ra-226	2.88E-03	4.38E-03		
Ra-228	8.20E-01	1.19E+00		
Ru-106	2.39E-05	3.06E-05		
Se-79	1.88E+01	2.73E+01		
Sn-126	1.98E+01	2.87E+01		
Sr-90	1.02E+06	1.42E+06		
Tc-99	2.98E+02	4.31E+02		
Th-229	1.03E+01	1.54E+01		
Th-230	1.80E-01	2.67E-01		
Th-232	2.64E+00	2.70E+00		
Ti-208	5.09E+02	7.25E+02		
U-232	1.38E+03	1.96E+03		
U-233	1.84E+03	2.67E+03		
U-234	2.60E+02	3.78E+02		
U-235	3.85E+00	5.40E+00		
U-236	7.71E+00	1.12E+01		
U-238	4.87E-02	5.37E-02		
Y-90	1.02E+06	1.42E+06		
Other Radionuclides	1.03E+06	1.44E+06		

Total Canister Usage Summary

	18" x 10"	18" x 15"	24" x 10"	24" x 15"	MIC	MCO
Number of Canisters	0.0	567.2	0.0	0.0	1.0	0.0

Bare Fuel Transfers

0 Assemblies

2030 Summary, TSPA Category 6: U/Th Oxide

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.92E+02	3.46E+02	Avg. MeV	
Am-241	2.66E+04	5.27E+04	0.0150	2.244E+17
Am-242m	5.57E+01	1.08E+02	0.0250	4.609E+16
Am-243	5.10E+01	1.01E+02	0.0375	3.941E+16
C-14	6.29E+02	1.05E+03	0.0575	4.371E+16
Cl-36	1.21E+01	2.01E+01	0.0850	2.763E+16
Cm-243	3.30E+00	6.12E+00	0.1250	1.718E+16
Cm-244	5.43E+02	1.07E+03	0.2250	2.486E+16
Co-60	8.69E+04	1.74E+05	0.3750	9.899E+15
Cs-134	1.29E+01	2.70E+01	0.5750	1.523E+17
Cs-135	8.14E+01	9.84E+01	0.8500	2.757E+15
Cs-137	3.18E+06	4.03E+06	1.2500	1.385E+16
Eu-154	1.37E+04	2.20E+04	1.7500	2.002E+14
Eu-155	6.99E+02	1.25E+03	2.2500	7.261E+10
Fe-55	9.01E+02	1.80E+03	2.7500	1.481E+15
H-3	3.85E+03	5.71E+03	3.5000	2.263E+07
I-129	4.46E+00	5.36E+00	5.0000	9.005E+08
Kr-85	8.57E+04	1.20E+05	7.0000	9.599E+06
Np-237	8.37E-01	1.39E+00	11.0000	1.051E+06
Pa-231	3.36E+02	4.01E+02		
Pb-210	4.97E-02	5.77E-02		
Pm-147	1.81E+02	3.66E+02		
Pu-238	1.02E+04	1.96E+04		
Pu-239	1.36E+03	2.65E+03		
Pu-240	9.44E+02	1.85E+03		
Pu-241	1.52E+05	3.02E+05		
Pu-242	7.66E+00	1.52E+01		
Ra-226	7.79E-02	9.01E-02		
Ra-228	1.30E+01	1.55E+01		
Ru-106	2.65E-03	5.29E-03		
Se-79	9.96E+01	1.19E+02		
Sn-126	1.12E+02	1.34E+02		
Sr-90	3.18E+06	4.04E+06		
Tc-99	9.30E+02	1.13E+03		
Th-229	2.22E+02	2.58E+02		
Th-230	3.47E+00	4.12E+00		
Th-232	5.34E+00	5.59E+00		
Ti-208	3.46E+04	4.22E+04		
U-232	9.38E+04	1.14E+05		
U-233	1.55E+04	1.88E+04	Thermal Power	
U-234	2.32E+03	2.81E+03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	1.94E+00	3.73E+00	8.32E+04	8.10E+04
U-236	1.09E+00	1.89E+00	Total	Total
U-238	3.58E-01	7.14E-01		
Y-90	3.18E+06	4.04E+06		
Other Radionuclides	3.61E+06	4.89E+06		

Total Canister Usage Summary						
	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC	MCO
Number of Canisters	11.8	17.0	0.0	27.0	8.0	0.0

Bare Fuel Transfers
0 Assemblies

2030 Summary, TSPA Category 7: U-Metal

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.77E-02	1.84E-02	Avg. MeV	
Am-241	5.41E+05	6.16E+05	0.0150	2.262E+17
Am-242m	3.03E+02	3.56E+02	0.0250	4.602E+16
Am-243	2.80E+02	3.49E+02	0.0375	4.221E+16
C-14	2.89E+03	2.96E+03	0.0575	5.074E+16
Cl-36	3.72E+01	3.73E+01	0.0850	2.547E+16
Cm-243	1.21E+01	2.29E+01	0.1250	1.865E+16
Cm-244	3.11E+03	4.98E+03	0.2250	2.182E+16
Co-60	1.02E+04	1.02E+04	0.3750	9.461E+15
Cs-134	6.25E-01	7.02E-01	0.5750	2.028E+17
Cs-135	6.05E+01	6.81E+01	0.8500	1.754E+15
Cs-137	4.86E+06	5.49E+06	1.2500	1.507E+15
Eu-154	1.08E+04	1.25E+04	1.7500	4.675E+13
Eu-155	3.43E+02	3.80E+02	2.2500	8.650E+09
Fe-55	9.32E+00	9.40E+00	2.7500	1.757E+08
H-3	8.12E+03	9.27E+03	3.5000	1.619E+08
I-129	4.94E+00	5.57E+00	5.0000	6.854E+07
Kr-85	5.92E+04	6.66E+04	7.0000	7.795E+06
Np-237	5.12E+01	5.80E+01	11.0000	8.894E+05
Pa-231	3.36E-02	3.50E-02		
Pb-210	7.68E-03	7.74E-03		
Pm-147	1.85E+02	1.93E+02		
Pu-238	9.92E+04	1.15E+05		
Pu-239	1.62E+05	1.82E+05		
Pu-240	1.22E+05	1.38E+05		
Pu-241	1.57E+06	1.80E+06		
Pu-242	8.01E+01	9.37E+01		
Ra-226	1.59E-02	1.61E-02		
Ra-228	5.20E-04	5.20E-04		
Ru-106	3.16E-05	3.16E-05		
Se-79	6.56E+01	7.36E+01		
Sn-126	1.20E+01	1.35E+01		
Sr-90	3.50E+06	3.93E+06		
Tc-99	2.15E+03	2.41E+03		
Th-229	3.18E-03	3.19E-03		
Th-230	9.76E-01	9.94E-01		
Th-232	5.20E-04	5.20E-04		
Tl-208	3.52E-02	4.45E-02		
U-232	9.48E-02	1.20E-01	Thermal Power	
U-233	4.29E-01	4.32E-01	Nominal Heat	
U-234	1.50E+03	1.55E+03	Output (Watts)	Bounding Heat Output (Watts)
U-235	4.59E+01	5.26E+01		
U-236	7.59E+01	8.43E+01	7.78E+04	8.79E+04
U-238	7.00E+02	7.02E+02	Total	Total
Y-90	3.50E+06	3.93E+06		
Other Radionuclides	5.20E+06	5.80E+06		

Total Canister Usage Summary

	18" x 10"	18" x 15"	24" x 10"	24" x 15"	HIC	MCO
Number of Canisters	11.7	1.4	0.0	0.0	4.0	385.0

Bare Fuel Transfers

0 Assemblies

2030 Summary, TSPA Category 8: U-Oxide

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.11E-02	4.32E-02	Avg. MeV	
Am-241	4.76E+05	8.53E+05	0.0150	3.360E+17
Am-242m	8.53E+02	1.56E+03	0.0250	6.806E+16
Am-243	1.92E+03	3.53E+03	0.0375	6.313E+16
C-14	2.74E+03	2.93E+03	0.0575	7.435E+16
Cl-36	3.92E+01	4.16E+01	0.0850	3.779E+16
Cm-243	6.30E+02	1.16E+03	0.1250	2.540E+16
Cm-244	1.11E+05	2.04E+05	0.2250	3.238E+16
Co-60	5.62E+04	7.59E+04	0.3750	1.401E+16
Cs-134	1.11E+03	2.21E+03	0.5750	3.034E+17
Cs-135	7.26E+01	1.19E+02	0.8500	3.533E+15
Cs-137	4.93E+06	8.20E+06	1.2500	7.691E+15
Eu-154	3.73E+04	6.75E+04	1.7500	9.811E+13
Eu-155	3.21E+03	5.65E+03	2.2500	1.534E+12
Fe-55	9.59E+03	1.87E+04	2.7500	5.222E+10
H-3	4.66E+04	8.21E+04	3.5000	4.846E+09
I-129	4.03E+00	6.78E+00	5.0000	1.287E+09
Kr-85	8.15E+04	1.33E+05	7.0000	1.483E+08
Np-237	4.12E+01	7.17E+01	11.0000	1.703E+07
Pa-231	5.30E-02	7.30E-02		
Pb-210	8.43E-03	8.80E-03		
Pm-147	9.75E+03	1.90E+04		
Pu-238	2.18E+05	3.98E+05		
Pu-239	5.05E+04	8.08E+04		
Pu-240	5.26E+04	9.17E+04		
Pu-241	1.97E+06	3.56E+06		
Pu-242	1.99E+02	3.65E+02		
Ra-226	1.71E-02	1.80E-02		
Ra-228	5.97E-04	6.14E-04		
Ru-106	8.83E+02	1.77E+03		
Se-79	5.68E+01	9.26E+01		
Sn-126	9.37E+01	1.62E+02		
Sr-90	3.57E+06	5.79E+06		
Tc-99	1.82E+03	2.97E+03		
Th-229	3.94E-03	4.32E-03		
Th-230	1.01E+00	1.08E+00		
Th-232	5.97E-04	6.15E-04		
Ti-208	5.34E-01	9.54E-01		
U-232	1.45E+00	2.58E+00		
U-233	5.44E-01	6.12E-01		
U-234	1.44E+03	1.57E+03		
U-235	1.01E+01	1.58E+01		
U-236	5.08E+01	7.51E+01		
U-238	5.79E+01	5.88E+01		
Y-90	3.57E+06	5.80E+06		
Other Radionuclides	5.43E+06	8.65E+06		

Thermal Power	
Nominal Heat	Bounding Heat
Output (Watts)	Output (Watts)
7.98E+04	1.35E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	250.5	481.2	0.0	0.0	132.8	18.0

Bare Fuel Transfers

163 Assemblies

2030 Summary, TSPA Category 9: AI-Based Fuel

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.27E-03	1.24E-02	Avg. MeV	
Am-241	3.22E+04	6.20E+04	0.0150	1.183E+18
Am-242m	9.41E+00	1.84E+01	0.0250	2.491E+17
Am-243	3.86E+01	6.81E+01	0.0375	2.230E+17
C-14	1.53E+00	3.03E+00	0.0575	2.307E+17
Cl-36	1.45E-03	2.89E-03	0.0850	1.421E+17
Cm-243	6.11E+00	1.08E+01	0.1250	1.073E+17
Cm-244	3.17E+03	5.23E+03	0.2250	1.217E+17
Co-60	2.29E+02	4.46E+02	0.3750	5.538E+16
Cs-134	6.09E+05	1.22E+06	0.5750	8.494E+17
Cs-135	2.17E+01	4.21E+01	0.8500	5.509E+16
Cs-137	1.08E+07	2.09E+07	1.2500	1.353E+16
Eu-154	1.88E+05	3.62E+05	1.7500	5.877E+14
Eu-155	6.38E+04	1.24E+05	2.2500	7.673E+14
Fe-55	9.98E+03	1.97E+04	2.7500	4.425E+12
H-3	2.62E+04	5.10E+04	3.5000	4.897E+11
I-129	4.08E+00	7.94E+00	5.0000	3.818E+07
Kr-85	6.41E+05	1.25E+06	7.0000	4.360E+06
Np-237	6.48E+01	1.21E+02	11.0000	4.982E+05
Pa-231	1.44E-02	2.83E-02		
Pb-210	8.10E-04	1.61E-03		
Pm-147	3.21E+06	6.42E+06		
Pu-238	1.86E+05	3.34E+05		
Pu-239	1.02E+04	2.01E+04		
Pu-240	5.40E+03	1.07E+04		
Pu-241	4.99E+05	9.64E+05		
Pu-242	6.09E+00	1.14E+01		
Ra-226	2.30E-03	4.56E-03		
Ra-228	7.75E-06	1.54E-05		
Ru-106	2.35E+05	4.71E+05		
Se-78	7.09E+01	1.38E+02		
Sr-126	6.30E+01	1.23E+02		
Sr-90	1.01E+07	1.97E+07		
Tc-99	2.32E+03	4.51E+03		
Th-229	5.21E-05	1.02E-04		
Th-230	2.43E-01	4.81E-01		
Th-232	8.17E-06	1.62E-05		
Ti-208	2.11E-01	4.06E-01		
U-232	5.87E-01	1.13E+00		
U-233	2.05E-02	3.97E-02		
U-234	7.82E+02	1.54E+03		
U-235	2.21E+01	3.71E+01		
U-236	8.48E+01	1.64E+02		
U-238	3.51E+00	3.55E+00		
Y-90	1.01E+07	1.97E+07		
Other Radionuclides	1.32E+07	2.59E+07		

Total Canister Usage Summary					
	18" x 10"	18" x 15"	24" x 10"	24" x 15"	MCO
Number of Canisters	1017.2	235.8	165.3	0.0	1.0

Bare Fuel Transfers	
0	Assemblies

2030 Summary, TSPA Category 10: Miscellaneous SNF

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon	Total
			Energy Group	Photons/sec (bounding)
Ac-227	2.23E-01	2.23E-01	Avg. MeV	
Am-241	7.75E+05	7.77E+05	0.0150	7.646E+16
Am-242m	1.42E+03	1.45E+03	0.0250	1.502E+16
Am-243	1.44E+03	1.45E+03	0.0375	1.276E+16
C-14	1.07E+04	1.07E+04	0.0575	2.400E+16
Cl-36	2.02E+02	2.02E+02	0.0850	8.043E+15
Cm-243	5.87E+01	6.56E+01	0.1250	5.891E+15
Cm-244	8.42E+03	8.45E+03	0.2250	6.955E+15
Co-60	3.46E+05	3.46E+05	0.3750	3.010E+15
Cs-134	2.10E+01	4.77E+01	0.5750	5.074E+16
Cs-135	3.96E+01	4.04E+01	0.8500	1.093E+15
Cs-137	1.34E+06	1.36E+06	1.2500	2.642E+16
Eu-154	3.33E+04	3.36E+04	1.7500	3.217E+13
Eu-155	9.35E+02	1.17E+03	2.2500	1.373E+11
Fe-55	4.81E+02	4.87E+02	2.7500	2.367E+11
H-3	9.32E+03	9.39E+03	3.5000	1.490E+08
I-129	9.57E-01	9.79E-01	5.0000	6.281E+07
Kr-85	2.05E+04	2.10E+04	7.0000	7.153E+08
Np-237	1.46E+01	1.46E+01	11.0000	6.161E+05
Pa-231	2.54E-01	2.54E-01		
Pb-210	4.19E-03	4.19E-03		
Pm-147	2.38E+02	5.07E+02		
Pu-238	1.99E+02	2.44E+04		
Pu-239	6.58E+04	6.91E+04		
Pu-240	3.39E+04	3.80E+04		
Pu-241	1.49E+06	2.46E+06		
Pu-242	1.51E+01	2.53E+01		
Ra-226	9.53E-03	9.53E-03		
Ra-228	5.33E-02	5.33E-02		
Ru-106	2.01E-01	4.60E-01		
Se-79	1.71E+01	1.73E+01		
Sn-126	1.53E+01	1.61E+01		
Sr-90	1.23E+06	1.24E+06		
Tc-99	6.04E+02	6.11E+02		
Th-229	2.00E-01	2.00E-01		
Th-230	6.72E-01	6.72E-01		
Th-232	3.40E-03	3.78E-03		
Tl-208	6.72E+00	6.72E+00		
U-232	1.82E+01	1.82E+01		
U-233	3.20E+01	3.20E+01		
U-234	1.13E+03	1.13E+03		
U-235	5.10E+01	5.10E+01		
U-238	2.08E+01	2.08E+01		
U-238	1.12E+01	1.13E+01		
Y-90	1.23E+06	1.24E+06		
Other Radionuclides	4.57E+06	4.59E+06		

Thermal Power	
Nominal Heat	
Output (Watts)	Bounding Heat Output (Watts)
5.11E+04	5.24E+04
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	2.6	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2030 Summary, TSPA Category 11: U-Zr-Hx

Radionuclide	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.49E-04	7.42E-04	Avg. MeV	
Am-241	7.30E+02	1.33E+03	0.0150	2.225E+16
Am-242m	8.92E-01	1.74E+00	0.0250	4.767E+15
Am-243	1.09E+00	2.16E+00	0.0375	4.305E+15
C-14	1.47E+01	2.57E+01	0.0575	4.341E+15
Cl-36	3.10E-01	5.39E-01	0.0850	2.686E+15
Cm-243	8.89E-01	1.76E+00	0.1250	2.145E+15
Cm-244	8.06E+01	1.60E+02	0.2250	2.292E+15
Co-60	4.67E+04	9.33E+04	0.3750	1.074E+15
Cs-134	1.10E+04	2.19E+04	0.5750	1.637E+16
Cs-135	3.49E+00	6.06E+00	0.8500	1.274E+15
Cs-137	2.12E+05	4.03E+05	1.2500	7.432E+15
Eu-154	1.06E+04	2.13E+04	1.7500	1.848E+13
Eu-155	3.92E+03	7.84E+03	2.2500	7.824E+12
Fe-55	2.60E+04	5.20E+04	2.7500	6.552E+10
H-3	6.00E+02	1.19E+03	3.5000	7.634E+09
I-129	8.93E-02	1.57E-01	5.0000	1.108E+06
Kr-85	1.32E+04	2.61E+04	7.0000	1.271E+05
Np-237	5.41E-01	1.04E+00	11.0000	1.457E+04
Pa-231	9.96E-04	1.46E-03		
Pb-210	1.94E-07	3.50E-07		
Pm-147	6.86E+04	1.37E+05		
Pu-238	1.71E+03	3.37E+03		
Pu-239	5.33E+02	9.08E+02		
Pu-240	2.27E+02	3.93E+02		
Pu-241	1.20E+04	2.38E+04		
Pu-242	1.95E-01	3.80E-01		
Ra-226	5.20E-07	9.60E-07		
Ra-228	2.09E-05	3.46E-05		
Ru-106	3.67E+03	7.34E+03		
Se-79	1.58E+00	2.79E+00		
Sn-126	1.49E+00	2.62E+00		
Sr-90	1.98E+05	3.77E+05		
Tc-99	5.27E+01	9.25E+01		
Th-229	5.30E-05	7.90E-05		
Th-230	5.46E-05	1.04E-04		
Th-232	2.27E-05	3.83E-05		
Ti-208	5.80E-03	1.12E-02		
U-232	1.62E-02	3.13E-02	Thermal Power	
U-233	1.32E-02	2.29E-02	Nominal Heat	
U-234	2.07E-01	4.00E-01	Output (Watts)	Bounding Heat Output (Watts)
U-235	8.49E-01	1.12E+00	3.62E+03	7.00E+03
U-236	1.58E+00	2.79E+00	Total	Total
U-238	5.20E-01	5.24E-01		
Y-90	1.98E+05	3.77E+05		
Other Radionuclides	2.46E+05	4.70E+05		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	NIC	MCO
Number of Canisters	86.8	0.0	0.0	0.0	6.7	0.0

Bare Fuel Transfers	
0	Assemblies

Appendix E

Uncertainty Estimates in the Template Source Terms

Appendix E

Uncertainty Estimates in the Template Source Terms

Spent nuclear fuel (SNF) source terms generated using the template methodology are estimates based on reasonable assumptions, conservative analyses, and available characterization data. Each assumption, analysis, and piece of data introduces some level of uncertainty into the final source estimate. However, to predict an absolute uncertainty associated with each SNF would require knowledge of the true source term. From the true source terms, comparisons could then be made relative to the template estimates, and from the comparisons, one could then theoretically predict an uncertainty for the template estimates.

Unfortunately, the true source terms are unknown and not available for such comparisons, and therefore, their accuracy cannot be ascertained. But if the true source terms were available, we could predict absolute uncertainties for the total activity of a specific fuel element, or for a specific radionuclide within a specific fuel element, or the total activity for elements from one reactor, or the total inventory of all U.S. Department of Energy (DOE) SNFs. Of course, if the true source terms were available, there would be no need for the template methodology and estimation of SNF source terms. It is for this reason that the template methodology takes the "bounding" approach.

The bounding approach assumes, in those circumstances where bounding or maximum values can be inserted into the analysis, that the source term will not exceed the estimated value. And although conservatism is used everywhere possible in the template methodology, there is no guarantee that the final template source term is indeed conservative. For example, the burnup used in all the templates is extracted from the National SNF Database, and even the available maximum burnups do not have an uncertainty associated with the given value. Therefore, one could argue that it is still possible that using even the maximum burnup would underpredict an element source term.

However, if one were to use the maximum burnup for an entire group of elements, a group with an associated range of burnups extending from a minimum value to a maximum value, the total source term estimated for the group would necessarily have to be bounding. The question still remains though as to uncertainty in the database burnup uncertainty. If the burnups in the database are taken as a given (the maximum value is ideally the true maximum), then arguments similar to the one here that lead to bounding source terms are valid. This is the approach taken in the template methodology.

Uncertainties in the template-generated source term estimates can, however, be identified, and a quantitative value can be assigned to the uncertainty. This should help the reader better understand the limitations and sources of uncertainties as applied to the template-generated source terms. The discussion below focuses on this line of reasoning in an attempt to establish the limits of precision in the source term estimates rather than in their accuracy.

The discussion is broken into two parts: (1) input data uncertainty estimation and (2) estimation of uncertainties arising from the template methodology. The input data uncertainties arise from data used primarily in the ORIGEN2 depletion calculation that is used to generate the radionuclide source term for each SNF. The uncertainties arising from the template methodology are based on validation studies that provide a confidence level on how well the calculations compare to measured assay data.

An additional complexity associated with the discussion here is because each SNF will necessarily have a unique set of uncertainties. This is based on the fact that each SNF fuel has a unique set of available characterization data. Some SNFs do not have a complete set of characterization data (for

example, a fuel may not have a known burnup). Uncertainties in the available database characterization data are not known. The quantitative values assigned in the following discussions are based on SNF experience and are themselves estimates.

INPUT DATA UNCERTAINTY

The SNF fuel input data parameters that have associated uncertainties include the following: (1) burnup (MWD, MWD/MT, fissions/cc, %FIMA, etc.), (2) beginning-of-life (BOL) heavy metal and structural mass loadings, and (3) neutron cross sections. The influence of these three parameters and their uncertainties varies depending on the particular radionuclides selected from the template source term.

Burnup

The source term can be understood to be the gamma energy emission emanating from, or the decay heat generated by a particular SNF, or the concentration or activity of a particular nuclide. The source term can be used for a variety of purposes. For example, it is used as input for both shielding and thermal analyses.

First consider the source term in terms of its gamma energy emission rates over the 5 to 100-year time span of interest. The gamma energy for the high burnup Advanced Test Reactor and Fort St. Vrain fuel elements are given in Tables 1 and 2, respectively.

Table 1. Gamma radiation energy emission by component for high burnup Advanced Test Reactor as a function of decay time.

Component	5-Year Decay	35-Year Decay	100-Year Decay
Activation products	0.02%	0.0002%	4E-6%
Actinides/daughters	0.002%	0.01%	0.04%
Fission products	99.98%	99.99%	99.96%

Table 2. Gamma radiation energy emission by component for high burnup FSV SNF as a function of decay time.

Component	5-Year Decay	35-Year Decay	100-Year Decay
Activation products	1.69%	0.124%	5.68E-3%
Actinides/daughters	0.1%	0.319%	0.82%
Fission products	98.21%	99.56%	99.17%

The table data show that the fission products dominate the gamma energy emission rate across the 5 to 100-year decay times for both reactor SNF elements. Because the fission products dominate, the fuel element burnup is the key factor in estimating a gamma-ray emission source term.

A similar analysis shows that the decay heat (beta-gamma emission energy) is also dominated by the fission products, particularly at early times (<50-year decay). Therefore, again the uncertainty in the burnup is the major contributor to the decay heat source term (see Tables 3 and 4).

Table 3. Advanced Test Reactor SNF decay heat partitions as a function of decay time.

Component	5-Year Decay	35-Year Decay	100-Year Decay
Activation products	0.027%	0.0005%	0.0012%
Actinides/daughters	1.44%	3.84%	11.11%
Fission products	98.53%	96.16%	88.89%

Table 4. Fort St. Vrain SNF decay heat partitions as a function of decay time.

Component	5-Year Decay	35-Year Decay	100-Year Decay
Activation Products	0.756%	0.0366%	0.0016%
Actinides/Daughters	15.77%	29.07%	52.99%
Fission Products	83.47%	70.89%	47.0%

The source term associated with the end-of-life (EOL) actinide concentrations is driven by both burnup and neutron cross sections. Uncertainties in both will impact the actinide concentrations.

Therefore, the uncertainty in the burnup is the major contributor to the input data uncertainty for gamma-ray emission, decay heat, and actinide/fission product/activation product concentration source terms. Burnups used in the source term estimates using the template methodology are typically taken directly from the National SNF Database. For the majority of the SNFs or approximately 88% by mass, a burnup is provided in the database. In addition to the nominal burnup, a maximum as well as a minimum burnup is also given. Unfortunately, there is no uncertainty associated with these burnups.

Probably most of the burnups provided in the SNF database are derived from calculations (or in a small number of cases derived from measurements). The calculations would most likely be based on actual reactor power histories and estimated fuel element burnups appropriately partitioned based on a total core power output over the known burnup period. The burnups are probably reasonable, but none (or very few) are validated. Often, a single burnup is assigned to a group of elements to save time, despite the fact that no two fuel elements would have identical burnups.

The difference between the database nominal and the maximum, and the difference between the nominal and the minimum, does provide a quasi-uncertainty band about the nominal. This would be the spread in burnup for the particular SNF. Use of the maximum burnup would necessarily imply a bounding source term. However, one might argue that an uncertainty would still exist based on the calculational determination using input data with associated uncertainties for the maximum value.

An estimate for the uncertainty associated with a calculated burnup value would be approximately $\pm 10\%$, and a ± 5 to 10% uncertainty assigned to a measured burnup value.

Beginning-of-life Mass Loadings

Another calculation input data field with an associated uncertainty is the BOL heavy metal mass loading. The BOL heavy metal mass loading of an element could potentially influence the neutron cross sections used in the depletion calculation. However, typically, the BOL heavy metal masses are quite well known with typical uncertainties in the range of \pm a few percent for the major heavy metal components (U-235, U-238, Pu-239). For the minor BOL actinides (U-234, U-236, etc.), the uncertainties may be in the range of 5 to 10% and are typically based on measured data.

In addition to the heavy metal mass loading, the fuel element structural material masses are also part of the source term as activation products. BOL concentration uncertainties in the structural materials are on the order of ± 2 to 10% for the major constituents. Structural materials also contain impurities that can contribute significantly to the source term. Impurities with concentrations in the 0–500 ppm range can have uncertainties in the range of 10–200%. In order to reduce these uncertainties, the BOL impurity concentration would have to actually be measured. In the template methodology, the major and impurity concentrations are provided and referenced. In the conservative approach of the template methodology, typically the upper limit ppm concentrations were taken for each impurity, and the impurity mass is assumed to be additional mass relative to the major structural material components. Also, the total mass of structural materials is slightly overestimated in order to be conservative, particularly for fuel elements with complex fabrication features (grooves, holes, slots, tapers, etc.).

Neutron Reaction Cross Sections

The neutron cross sections for primarily actinides change as a complex function of core burnup, mass loading, location in the core relative to targets, safety rods, etc., shim control rod/drum movement, and other neutron spatial and spectral effects. All the templates, which are based on a particular fuel and represent a particular fuel type, enrichment, moderator, and clad, have had specific cross sections developed specially for that fuel and the represented fuel group. Cross sections were specifically developed for 37 actinides and their (n, γ), (n,2n), (n,3n), and (n,f) nuclear reactions. The statistical uncertainty in these cross sections at BOL are less than 1% for the (n, γ) and (n,f) nuclear reactions, approximately 5 to 10% for the (n,2n), >10% for the (n,3n) reaction cross sections.

CALCULATIONAL METHODOLOGY UNCERTAINTY

There is an uncertainty associated with the calculational methodology used to generate the template source terms or radionuclide inventories. The greatest uncertainties typically are the uncertainties associated with the input data. The methods or computer codes used to estimate radionuclide depletion, buildup, and decay are, however, quite accurate if the input data are exact. The closest we can come to demonstrating the uncertainty in the calculational methodology is to perform validation studies. In validation studies, the calculation input is assumed to be exact, and the calculated source terms are then compared against measured data. Based on calculated and measured data comparisons, the uncertainty or level of confidence bands can be determined on a radionuclide-by-radionuclide basis. Integrated values, such as decay heats and gross gamma dose rates, are also compared in order to draw conclusions relative to total inventories.

Measured Versus Calculated

In order to understand the magnitude of expected uncertainty under the best input data conditions, a limited number of validation studies have been performed to support the template methodology. These studies compare measured radionuclide concentrations, isotopic ratios, decay heats, or gamma dose rates with calculated values. The input data for the calculation is based on measured values that would include burnup data, power or irradiation history information, BOL fuel element heavy metal loadings, and material constituent impurity concentrations.

Validation Studies

The following uncertainty estimates are based on generalized results from template validation studies and represent expected calculated uncertainties for various radionuclides for EOL conditions:

1. $\pm 1-5\%$ for U-235, U-238, Pu-239, Th-232 concentrations
2. $\pm 10-30\%$ for U-233, U-234, U-236, Np-237, Pu-240 concentrations
3. $\pm 30-50\%$ for other significant concentration higher-order actinides (Pu-238, Pu-241, Pu-242, etc.)
4. $\pm 50-400\%$ for other insignificant concentration higher order actinides and daughter decay products
5. $\pm 1-5\%$ for direct yield fission products
6. $\pm 5-50\%$ for indirect yield and transmutation fission products
7. $\pm 5-50\%$ for major constituent activation products
8. \pm factor of 2-3 for activation product impurities (Co-60, C-14, etc.)
9. $\pm 5-10\%$ for decay heat
10. \pm factor of 1.2-2.0 gross gamma dose rates.

It should also be remembered that the measurement data used in the comparisons also have associated measurement uncertainties.

Application of templates to a particular SNF:

1. Burnup uncertainty is the major factor for fission product, actinides, and activation products.
2. If burnup is exact, the only uncertainty in the fission products are the fission yields. The fission yields are based on best available measurements. Indirect-yield and transmutation fission products, although typically very low concentrations in SNFs, have a cross-section dependency and, therefore, a cross-sectional uncertainty from the calculation.
3. If the burnup is exact, the actinides' cross sections for a particular SNF may not coincide exactly with cross sections of the template. However, the template uses a moderator, clad, and enrichment similar to the SNF and, therefore, should be within a factor of 2. For high burnup fuels, the cross section can change significantly with burnup, and differences of factors of 2-3 might be possible.
4. If burnup is exact, activation products from particle threshold reactions (high energy neutrons) will be relatively independent of cross section and a very small cross-section uncertainty could be expected ($<20\%$). On the other hand, activation products produced from thermal reactions will be cross-section dependent and may vary by a factor of 2 or more from the template-generated cross sections.

CONCLUSIONS

Based on the above discussions, the following conclusions are drawn:

1. The uncertainty for the total DOE SNF inventory activity is estimated to be:
 - If, X is the total nominal burnup (MWD) of all DOE SNFs,
 - Then, the uncertainty band is given by $X \pm X/4$, where $\pm X/4$ is then uncertainty in the nominal burnup and also the total activity.
 - If, Y is the total maximum burnup (MWD) of all DOE SNFs,
 - Then, the uncertainty band is given by $Y \pm Y/10$, where $\pm Y/10$ is then uncertainty in the maximum burnup and also the total activity.
2. Uncertainties will vary, however, from radionuclide-to-radionuclide in each of the template-generated source terms, and between each template source term.
3. In addition to the burnup uncertainty, the template-generated values will also have the following cross-section uncertainty and are broken out as follows:
 - For actinides:
 - $\pm 5\%$ for U-235, U-238, Pu-239, Th-232
 - $\pm 50\%$ for U-233, U-234, U-236, Pu-240, Np-237
 - $\pm 100\%$ for other significant concentration higher order actinides (Pu-238, Pu-241, Pu-242, etc.)
 - $\pm 200\text{--}400\%$ for other insignificant concentration higher order actinides and daughter decay products
 - For fission products:
 - $\pm 1\%$ for all direct yield fission products
 - $\pm 5\text{--}50\%$ for all indirect/transmutation fission products
 - For activation products:
 - $\pm 5\%$ for high energy threshold particle reactions (n,p), (n, α)
 - $\pm 5\text{--}10\%$ for high energy threshold particle reactions (n,2n)
 - $\pm >10\%$ for high energy threshold particle reactions (n,3n)
 - $\pm 50\%$ for thermal activation products

4. In addition to the burnup and cross-section uncertainties, the template-generated values will also have uncertainties in the BOL mass loadings and are broken out as follows:

- For actinides:
 - $\pm < 2\%$ for U-233, U-235, U-238, Pu-239, Th-232
 - $\pm 10\%$ for U-234, U-236, Pu-240
- For activation products:
 - $\pm 2\text{--}10\%$ for major structural constituents
 - $\pm 10\text{--}200\%$ for impurity generated activation products.