INFORMATION ONLY

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Volume III

Source Term Estimates for DOE Spent Nuclear Fuels

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

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

[1]Fuel decay start date: 1970
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.4369E-12	3.59	7.19	0.00E+00	3.39E-11	6.78E-11
Am-241	1.1078E-01	3.59	7.19	1.50E-01	5.48E-01	9.47E-01
Am-242m	1.7940E-03	3.59	7.19	0.00E+00	6.45E-03	1.29E-02
Am-243	1.0724E-04	3.59	7.19	9.57E+00	9.57E+00	9.57E+00
C-14	2.5942E-05	3.59	7.19	0.00E+00	9.32E-05	1.86E-04
Cl-36	3.4243E-10	3.59	7.19	0.00E+00	1.23E-09	2.46E-09
Cm-243	2.8217E-04	3.59	7.19	0.00E+00	1.01E-03	2.03E-03
Cm-244	7.7027E-04	3.59	7.19	0.00E+00	2.77E-03	5.54E-03
Co-60	1.3011E-04	3.59	7.19	0.00E+00	4.68E-04	9.35E-04
Cs-134	1.2951E-07	3.59	7.19	0.00E+00	4.65E-07	9.31E-07
Cs-135	4.7693E-05	3.59	7.19	0.00E+00	1.71E-04	3.43E-04
Cs-137	9.3351E-01	3.59	7.19	0.00E+00	3.35E+00	6.71E+00
Eu-154	2.6341E-03	3.59	7.19	0.00E+00	9.47E-03	1.89E-02
Eu-155	4.0968E-04	3.59	7.19	0.00E+00	1.47E-03	2.94E-03
Fe-55	2.5543E-07	3.59	7.19	0.00E+00	9.18E-07	1.84E-06
H-3	1.2053E-03	3.59	7.19	0.00E+00	4.33E-03	8.66E-03
I-129	1.2891E-06	3.59	7.19	0.00E+00	4.63E-06	9.26E-06
Kr-85	7.0043E-03	3.59	7.19	0.00E+00	2.52E-02	5.03E-02
Np-237	4.3622E-06	3.59	7.19	0.00E+00	1.57E-05	3.13E-05
Pa-231	1.6733E-11	3.59	7.19	0.00E+00	6.01E-11	1.20E-10
Pb-210	6.0684E-12	3.59	7.19	0.00E+00	2.18E-11	4.36E-11
Pm-147	1.1315E-05	3.59	7.19	0.00E+00	4.07E-05	8.13E-05
Pu-238	6.1482E-03	3.59	7.19	0.00E+00	2.21E-02	4.42E-02
Pu-239	-3.5520E-02	3.59	0.00	1.23E+00	1.11E+00	1.23E+00
Pu-240	2.0590E-02	3.59	7.19	6.27E-01	7.01E-01	7.75E-01
Pu-241	-2.0307E+00	3.59	0.00	2.82E+01	2.09E+01	2.82E+01
Pu-242	1.1252E-05	3.59	7.19	1.67E-04	2.08E-04	2.48E-04
Ra-226	1.6601E-11	3.59	7.19	0.00E+00	5.97E-11	1.19E-10
Ra-228	3.7077E-16	3.59	7.19	0.00E+00	1.33E-15	2.66E-15
Ru-106	3.3126E-14	3.59	7.19	0.00E+00	1.19E-13	2.38E-13
Se-79	1.0117E-05	3.59	7.19	0.00E+00	3.64E-05	7.27E-05
Sn-126	4.3902E-05	3.59	7.19	0.00E+00	1.58E-04	3.16E-04
Sr-90	3.2926E-01	3.59	7.19	0.00E+00	1.18E+00	2.37E+00
Tc-99	3.9412E-04	3.59	7.19	0.00E+00	1.42E-03	2.83E-03
Th-229	3.6957E-12	3.59	7.19	0.00E+00	1.33E-11	2.66E-11
Th-230	1.6942E-09	3.59	7.19	0.00E+00	6.09E-09	1.22E-08
Th-232	4.6236E-16	3.59	7.19	0.00E+00	1.66E-15	3.32E-15
Tl-208	4.0390E-07	3.59	7.19	0.00E+00	1.45E-06	2.90E-06
U-232	1.0941E-06	3.59	7.19	0.00E+00	3.93E-06	7.86E-06
U-233	8.1218E-10	3.59	7.19	0.00E+00	2.92E-09	5.84E-09
U-234	5.3101E-06	3.59	7.19	0.00E+00	1.91E-05	3.82E-05
U-235	-6.7647E-09	3.59	0.00	2.53E-07	2.29E-07	2.53E-07
U-236	2.1272E-07	3.59	7.19	0.00E+00	7.64E-07	1.53E-06
U-238	-1.7914E-07	3.59	0.00	1.85E-05	1.78E-05	1.85E-05
Y-90	3.2926E-01	3.59	7.19	0.00E+00	1.18E+00	2.37E+00
Other Radionuclides					3.46E+00	6.91E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.441E+11
0.0250	3.065E+10
0.0375	5.783E+10
0.0575	4.042E+10
0.0850	2.228E+11
0.1250	1.312E+10
0.2250	1.359E+10
0.3750	5.783E+09
0.5750	2.449E+11
0.8500	1.280E+09
1.2500	7.576E+08
1.7500	3.488E+07
2.2500	4.208E+03
2.7500	1.026E+05
3.5000	6.082E+02
5.0000	2.503E+02
7.0000	2.760E+01
11.0000	3.093E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.08E-01	4.82E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	ALUM	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) and cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.59
Bounding:		7.19

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:	0.30	
Bounding:	0.61	

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: 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

[1]Fuel decay start date: 1980
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	91,386.55	182,773.11	0.00E+00	9.81E-05	1.96E-04
Am-241	1.4751E-01	91,386.55	182,773.11	0.00E+00	1.35E+04	2.70E+04
Am-242m	2.6809E-04	91,386.55	182,773.11	0.00E+00	2.45E+01	4.90E+01
Am-243	6.2484E-04	91,386.55	182,773.11	0.00E+00	5.71E+01	1.14E+02
C-14	4.7820E-05	91,386.55	182,773.11	0.00E+00	4.37E+00	8.74E+00
Cl-36	8.0297E-07	91,386.55	182,773.11	0.00E+00	7.34E-02	1.47E-01
Cm-243	1.7426E-04	91,386.55	182,773.11	0.00E+00	1.59E+01	3.18E+01
Cm-244	2.7616E-02	91,386.55	182,773.11	0.00E+00	2.52E+03	5.05E+03
Co-60	3.5610E-04	91,386.55	182,773.11	0.00E+00	3.25E+01	6.51E+01
Cs-134	2.6260E-07	91,386.55	182,773.11	0.00E+00	2.40E-02	4.80E-02
Cs-135	1.4433E-05	91,386.55	182,773.11	0.00E+00	1.32E+00	2.64E+00
Cs-137	9.8870E-01	91,386.55	182,773.11	0.00E+00	9.04E+04	1.81E+05
Eu-154	6.0320E-03	91,386.55	182,773.11	0.00E+00	5.51E+02	1.10E+03
Eu-155	2.1770E-04	91,386.55	182,773.11	0.00E+00	1.99E+01	3.98E+01
Fe-55	7.9296E-07	91,386.55	182,773.11	0.00E+00	7.25E-02	1.45E-01
H-3	8.9486E-03	91,386.55	182,773.11	0.00E+00	8.18E+02	1.64E+03
I-129	9.8288E-07	91,386.55	182,773.11	0.00E+00	8.98E-02	1.80E-01
Kr-85	1.0707E-02	91,386.55	182,773.11	0.00E+00	9.79E+02	1.96E+03
Np-237	1.1927E-05	91,386.55	182,773.11	0.00E+00	1.09E+00	2.18E+00
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
Tl-208	1.5136E-07	91,386.55	182,773.11	0.00E+00	1.38E-02	2.77E-02
U-232	4.1005E-07	91,386.55	182,773.11	0.00E+00	3.75E-02	7.49E-02
U-233	2.5856E-08	91,386.55	182,773.11	0.00E+00	2.36E-03	4.73E-03
U-234	5.2665E-05	91,386.55	182,773.11	0.00E+00	4.81E+00	9.63E+00
U-235	-1.4487E-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.955E+15
0.0250	1.394E+15
0.0375	1.313E+15
0.0575	1.643E+15
0.0850	7.679E+14
0.1250	5.109E+14
0.2250	6.556E+14
0.3750	2.831E+14
0.5750	6.667E+15
0.8500	6.510E+13
1.2500	4.143E+13
1.7500	1.821E+12
2.2500	2.993E+08
2.7500	1.055E+09
3.5000	7.527E+07
5.0000	3.217E+07
7.0000	3.706E+06
11.0000	4.255E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.65E+03	3.31E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	32,848.60	91,386.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	33,041.60	182,773.11	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.38	2.78
Bounding:	6.76	5.53

Estimated EOL HM/Given EOL HM: 1.06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	10,273.05	10,378.50	0.00E+00	9.02E-06	9.11E-06
Am-241	1.4352E-01	10,273.05	10,378.50	0.00E+00	1.47E+03	1.49E+03
Am-242m	2.8698E-04	10,273.05	10,378.50	0.00E+00	2.95E+00	2.98E+00
Am-243	6.2565E-04	10,273.05	10,378.50	0.00E+00	6.43E+00	6.49E+00
C-14	4.7901E-05	10,273.05	10,378.50	0.00E+00	4.92E-01	4.97E-01
Cl-36	8.0297E-07	10,273.05	10,378.50	0.00E+00	8.25E-03	8.33E-03
Cm-243	2.5081E-04	10,273.05	10,378.50	0.00E+00	2.58E+00	2.60E+00
Cm-244	4.9015E-02	10,273.05	10,378.50	0.00E+00	5.04E+02	5.09E+02
Co-60	2.5581E-03	10,273.05	10,378.50	0.00E+00	2.63E+01	2.65E+01
Cs-134	4.0536E-05	10,273.05	10,378.50	0.00E+00	4.16E-01	4.21E-01
Cs-135	1.4433E-05	10,273.05	10,378.50	0.00E+00	1.48E-01	1.50E-01
Cs-137	1.3979E+00	10,273.05	10,378.50	0.00E+00	1.44E+04	1.45E+04
Eu-154	2.0203E-02	10,273.05	10,378.50	0.00E+00	2.08E+02	2.10E+02
Eu-155	1.7684E-03	10,273.05	10,378.50	0.00E+00	1.82E+01	1.84E+01
Fe-55	4.3136E-05	10,273.05	10,378.50	0.00E+00	4.43E-01	4.48E-01
H-3	2.0769E-02	10,273.05	10,378.50	0.00E+00	2.13E+02	2.16E+02
I-129	9.8288E-07	10,273.05	10,378.50	0.00E+00	1.01E-02	1.02E-02
Kr-85	2.8214E-02	10,273.05	10,378.50	0.00E+00	2.90E+02	2.93E+02
Np-237	1.1218E-05	10,273.05	10,378.50	0.00E+00	1.15E-01	1.16E-01
Pa-231	1.3036E-09	10,273.05	10,378.50	0.00E+00	1.34E-05	1.35E-05
Pb-210	8.5078E-11	10,273.05	10,378.50	0.00E+00	8.74E-07	8.83E-07
Pm-147	3.6531E-04	10,273.05	10,378.50	0.00E+00	3.75E+00	3.79E+00
Pu-238	7.4564E-02	10,273.05	10,378.50	0.00E+00	7.66E+02	7.74E+02
Pu-239	1.1623E-02	10,273.05	10,378.50	0.00E+00	1.19E+02	1.21E+02
Pu-240	1.5132E-02	10,273.05	10,378.50	0.00E+00	1.55E+02	1.57E+02
Pu-241	9.0036E-01	10,273.05	10,378.50	0.00E+00	9.25E+03	9.34E+03
Pu-242	6.4260E-05	10,273.05	10,378.50	0.00E+00	6.60E-01	6.67E-01
Ra-226	2.2804E-10	10,273.05	10,378.50	0.00E+00	2.34E-06	2.37E-06
Ra-228	5.2713E-12	10,273.05	10,378.50	0.00E+00	5.42E-08	5.47E-08
Ru-106	6.1160E-10	10,273.05	10,378.50	0.00E+00	6.28E-06	6.35E-06
Se-79	1.2377E-05	10,273.05	10,378.50	0.00E+00	1.27E-01	1.28E-01
Sn-126	2.5210E-05	10,273.05	10,378.50	0.00E+00	2.59E-01	2.62E-01
Sr-90	9.1667E-01	10,273.05	10,378.50	0.00E+00	9.42E+03	9.51E+03
Tc-99	3.9357E-04	10,273.05	10,378.50	0.00E+00	4.04E+00	4.08E+00
Th-229	1.2057E-10	10,273.05	10,378.50	0.00E+00	1.24E-06	1.25E-06
Th-230	2.1043E-08	10,273.05	10,378.50	0.00E+00	2.16E-04	2.18E-04
Th-232	5.2972E-12	10,273.05	10,378.50	0.00E+00	5.44E-08	5.50E-08
Tl-208	1.7474E-07	10,273.05	10,378.50	0.00E+00	1.80E-03	1.81E-03
U-232	4.7368E-07	10,273.05	10,378.50	0.00E+00	4.87E-03	4.92E-03
U-233	2.5097E-08	10,273.05	10,378.50	0.00E+00	2.58E-04	2.60E-04
U-234	5.0000E-05	10,273.05	10,378.50	0.00E+00	5.14E-01	5.19E-01
U-235	-1.4489E-06	10,273.05	0.00	1.28E-02	0.00E+00	1.28E-02
U-236	7.5824E-06	10,273.05	10,378.50	0.00E+00	7.79E-02	7.87E-02
U-238	-2.6129E-07	10,273.05	0.00	1.22E-01	1.20E-01	1.22E-01
Y-90	9.1699E-01	10,273.05	10,378.50	0.00E+00	9.42E+03	9.52E+03
Other Radionuclides					1.38E+04	1.39E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.584E+14
0.0250	1.126E+14
0.0375	1.074E+14
0.0575	1.241E+14
0.0850	6.248E+13
0.1250	4.336E+13
0.2250	5.358E+13
0.3750	2.304E+13
0.5750	5.359E+14
0.8500	7.413E+12
1.2500	7.282E+12
1.7500	2.181E+11
2.2500	3.511E+07
2.7500	7.194E+07
3.5000	7.408E+06
5.0000	3.167E+06
7.0000	3.651E+05
11.0000	4.193E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.36E+02	2.39E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.8	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	10,273.05	1,711.71	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	10,378.50	3,423.43	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.79	0.17
Bounding:	0.80	0.33

Estimated EOL HM/Given EOL HM: 0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: 18"x15' 52.20

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	638,157.18	1,276,314.37	0.00E+00	3.95E-06	7.89E-06
Am-241	1.1066E-01	638,157.18	1,276,314.37	1.75E+04	8.81E+04	1.59E+05
Am-242m	1.9247E-03	638,157.18	1,276,314.37	0.00E+00	1.23E+03	2.46E+03
Am-243	1.0740E-04	638,157.18	1,276,314.37	0.00E+00	6.85E+01	1.37E+02
C-14	2.6042E-05	638,157.18	1,276,314.37	0.00E+00	1.66E+01	3.32E+01
Cl-36	3.4243E-10	638,157.18	1,276,314.37	0.00E+00	2.19E-04	4.37E-04
Cm-243	4.0629E-04	638,157.18	1,276,314.37	0.00E+00	2.59E+02	5.19E+02
Cm-244	1.6024E-03	638,157.18	1,276,314.37	0.00E+00	1.02E+03	2.05E+03
Co-60	3.4275E-03	638,157.18	1,276,314.37	0.00E+00	2.19E+03	4.37E+03
Cs-134	1.5566E-03	638,157.18	1,276,314.37	0.00E+00	9.93E+02	1.99E+03
Cs-135	4.7693E-05	638,157.18	1,276,314.37	0.00E+00	3.04E+01	6.09E+01
Cs-137	1.4007E+00	638,157.18	1,276,314.37	0.00E+00	8.94E+05	1.79E+06
Eu-154	1.6184E-02	638,157.18	1,276,314.37	0.00E+00	1.03E+04	2.07E+04
Eu-155	1.3774E-02	638,157.18	1,276,314.37	0.00E+00	8.79E+03	1.76E+04
Fe-55	3.8028E-04	638,157.18	1,276,314.37	0.00E+00	2.43E+02	4.85E+02
H-3	3.8454E-03	638,157.18	1,276,314.37	0.00E+00	2.45E+03	4.91E+03
I-129	1.2891E-06	638,157.18	1,276,314.37	0.00E+00	8.23E-01	1.65E+00
Kr-85	2.7848E-02	638,157.18	1,276,314.37	0.00E+00	1.78E+04	3.55E+04
Np-237	3.7516E-06	638,157.18	1,276,314.37	0.00E+00	2.39E+00	4.79E+00
Pa-231	1.2488E-11	638,157.18	1,276,314.37	0.00E+00	7.97E-06	1.59E-05
Pb-210	2.4206E-12	638,157.18	1,276,314.37	0.00E+00	1.54E-06	3.09E-06
Pm-147	1.5671E-02	638,157.18	1,276,314.37	0.00E+00	1.00E+04	2.00E+04
Pu-238	1.4877E-02	638,157.18	1,276,314.37	0.00E+00	9.49E+03	1.90E+04
Pu-239	-3.5520E-02	638,157.18	0.00	1.44E+05	1.21E+05	1.44E+05
Pu-240	2.0690E-02	638,157.18	1,276,314.37	7.31E+04	8.63E+04	9.95E+04
Pu-241	-1.4799E+00	638,157.18	0.00	3.28E+06	2.34E+06	3.28E+06
Pu-242	1.1252E-05	638,157.18	1,276,314.37	1.95E+01	2.67E+01	3.38E+01
Ra-226	7.8524E-12	638,157.18	1,276,314.37	0.00E+00	5.01E-06	1.00E-05
Ra-228	2.4086E-16	638,157.18	1,276,314.37	0.00E+00	1.54E-10	3.07E-10
Ru-106	1.5066E-05	638,157.18	1,276,314.37	0.00E+00	9.61E+00	1.92E+01
Se-79	1.0127E-05	638,157.18	1,276,314.37	0.00E+00	6.46E+00	1.29E+01
Sn-126	4.3902E-05	638,157.18	1,276,314.37	0.00E+00	2.80E+01	5.60E+01
Sr-90	5.0088E-01	638,157.18	1,276,314.37	0.00E+00	3.20E+05	6.39E+05
Tc-99	3.9412E-04	638,157.18	1,276,314.37	0.00E+00	2.52E+02	5.03E+02
Th-229	2.7219E-12	638,157.18	1,276,314.37	0.00E+00	1.74E-06	3.47E-06
Th-230	1.0441E-09	638,157.18	1,276,314.37	0.00E+00	6.66E-04	1.33E-03
Th-232	3.1689E-16	638,157.18	1,276,314.37	0.00E+00	2.02E-10	4.04E-10
Tl-208	4.6636E-07	638,157.18	1,276,314.37	0.00E+00	2.98E-01	5.95E-01
U-232	1.2638E-06	638,157.18	1,276,314.37	0.00E+00	8.06E-01	1.61E+00
U-233	5.7451E-10	638,157.18	1,276,314.37	0.00E+00	3.67E-04	7.33E-04
U-234	4.3044E-06	638,157.18	1,276,314.37	0.00E+00	2.75E+00	5.49E+00
U-235	-7.7765E-09	638,157.18	0.00	2.95E-02	2.46E-02	2.95E-02
U-236	1.8050E-07	638,157.18	1,276,314.37	0.00E+00	1.15E-01	2.30E-01
U-238	-1.7914E-07	638,157.18	0.00	2.15E+00	2.03E+00	2.15E+00
Y-90	5.0088E-01	638,157.18	1,276,314.37	0.00E+00	3.20E+05	6.39E+05
Other Radionuclides					9.04E+05	1.81E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.195E+16
0.0250	8.305E+15
0.0375	9.644E+15
0.0575	9.658E+15
0.0850	4.619E+15
0.1250	3.251E+15
0.2250	3.728E+15
0.3750	1.616E+15
0.5750	6.547E+16
0.8500	6.840E+14
1.2500	8.187E+14
1.7500	1.852E+13
2.2500	3.722E+09
2.7500	2.116E+10
3.5000	1.077E+08
5.0000	3.726E+07
7.0000	4.251E+06
11.0000	4.862E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.64E+04	2.69E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	Pu and U	Pu and U
BOL Enrichment %:	0.71	10 to 30

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	Basis for burnup used in estimate:
Nominal:	635,816.10	638,157.18	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1,362,463.07	1,276,314.37	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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: FFTF-DFA/TDFA PINS
SNF ID #: 323
Fuel Units & Descr: 2768 - ROD
Heavy Metal Mass: BOL= ; EOL=443.987kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	31,146.44	69,045.35	0.00E+00	1.93E-07	4.27E-07
Am-241	1.1066E-01	31,146.44	69,045.35	9.16E+02	4.36E+03	8.56E+03
Am-242m	1.9247E-03	31,146.44	69,045.35	0.00E+00	5.99E+01	1.33E+02
Am-243	1.0740E-04	31,146.44	69,045.35	0.00E+00	3.35E+00	7.42E+00
C-14	2.6042E-05	31,146.44	69,045.35	0.00E+00	8.11E-01	1.80E+00
Cl-36	3.4243E-10	31,146.44	69,045.35	0.00E+00	1.07E-05	2.36E-05
Cm-243	4.0629E-04	31,146.44	69,045.35	0.00E+00	1.27E+01	2.81E+01
Cm-244	1.6024E-03	31,146.44	69,045.35	0.00E+00	4.99E+01	1.11E+02
Co-60	3.4275E-03	31,146.44	69,045.35	0.00E+00	1.07E+02	2.37E+02
Cs-134	1.5566E-03	31,146.44	69,045.35	0.00E+00	4.85E+01	1.07E+02
Cs-135	4.7693E-05	31,146.44	69,045.35	0.00E+00	1.49E+00	3.29E+00
Cs-137	1.4007E+00	31,146.44	69,045.35	0.00E+00	4.36E+04	9.67E+04
Eu-154	1.6184E-02	31,146.44	69,045.35	0.00E+00	5.04E+02	1.12E+03
Eu-155	1.3774E-02	31,146.44	69,045.35	0.00E+00	4.29E+02	9.51E+02
Fe-55	3.8028E-04	31,146.44	69,045.35	0.00E+00	1.18E+01	2.63E+01
H-3	3.8454E-03	31,146.44	69,045.35	0.00E+00	1.20E+02	2.66E+02
I-129	1.2891E-06	31,146.44	69,045.35	0.00E+00	4.02E-02	8.90E-02
Kr-85	2.7848E-02	31,146.44	69,045.35	0.00E+00	8.67E+02	1.92E+03
Np-237	3.7516E-06	31,146.44	69,045.35	0.00E+00	1.17E-01	2.59E-01
Pa-231	1.2488E-11	31,146.44	69,045.35	0.00E+00	3.89E-07	8.62E-07
Pb-210	2.4206E-12	31,146.44	69,045.35	0.00E+00	7.54E-08	1.67E-07
Pm-147	1.5671E-02	31,146.44	69,045.35	0.00E+00	4.88E+02	1.08E+03
Pu-238	1.4877E-02	31,146.44	69,045.35	0.00E+00	4.63E+02	1.03E+03
Pu-239	-3.5520E-02	31,146.44	0.00	7.52E+03	6.41E+03	7.52E+03
Pu-240	2.0690E-02	31,146.44	69,045.35	3.82E+03	4.47E+03	5.25E+03
Pu-241	-1.4799E+00	31,146.44	0.00	1.72E+05	1.25E+05	1.72E+05
Pu-242	1.1252E-05	31,146.44	69,045.35	1.02E+00	1.37E+00	1.80E+00
Ra-226	7.8524E-12	31,146.44	69,045.35	0.00E+00	2.45E-07	5.42E-07
Ra-228	2.4086E-16	31,146.44	69,045.35	0.00E+00	7.50E-12	1.66E-11
Ru-106	1.5066E-05	31,146.44	69,045.35	0.00E+00	4.69E-01	1.04E+00
Se-79	1.0127E-05	31,146.44	69,045.35	0.00E+00	3.15E-01	6.99E-01
Sn-126	4.3902E-05	31,146.44	69,045.35	0.00E+00	1.37E+00	3.03E+00
Sr-90	5.0088E-01	31,146.44	69,045.35	0.00E+00	1.56E+04	3.46E+04
Tc-99	3.9412E-04	31,146.44	69,045.35	0.00E+00	1.23E+01	2.72E+01
Th-229	2.7219E-12	31,146.44	69,045.35	0.00E+00	8.48E-08	1.88E-07
Th-230	1.0441E-09	31,146.44	69,045.35	0.00E+00	3.25E-05	7.21E-05
Th-232	3.1689E-16	31,146.44	69,045.35	0.00E+00	9.87E-12	2.19E-11
Tl-208	4.6636E-07	31,146.44	69,045.35	0.00E+00	1.45E-02	3.22E-02
U-232	1.2638E-06	31,146.44	69,045.35	0.00E+00	3.94E-02	8.73E-02
U-233	5.7451E-10	31,146.44	69,045.35	0.00E+00	1.79E-05	3.97E-05
U-234	4.3044E-06	31,146.44	69,045.35	0.00E+00	1.34E-01	2.97E-01
U-235	-7.7765E-09	31,146.44	0.00	1.54E-03	1.30E-03	1.54E-03
U-236	1.8050E-07	31,146.44	69,045.35	0.00E+00	5.62E-03	1.25E-02
U-238	-1.7914E-07	31,146.44	0.00	1.12E-01	1.07E-01	1.12E-01
Y-90	5.0088E-01	31,146.44	69,045.35	0.00E+00	1.56E+04	3.46E+04
Other Radionuclides					4.41E+04	9.78E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.268E+15
0.0250	4.493E+14
0.0375	5.217E+14
0.0575	5.221E+14
0.0850	2.499E+14
0.1250	1.759E+14
0.2250	2.017E+14
0.3750	8.742E+13
0.5750	3.542E+15
0.8500	3.700E+13
1.2500	4.429E+13
1.7500	1.002E+12
2.2500	2.012E+08
2.7500	1.144E+09
3.5000	5.753E+06
5.0000	1.985E+06
7.0000	2.265E+05
11.0000	2.590E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.27E+02	1.44E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		31,146.44
Bounding:		69,045.35

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=475.192kg
Bounding burnup taken from SFD and converted to MWd using BOL=475.192kg

Checks

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

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: FFTF-TFA PINS
SNF ID #: 320
Fuel Units & Descr: 1645 - ROD
Heavy Metal Mass: BOL= ; EOL=389.701kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m: CI/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_a: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	27,338.13	60,603.11	0.00E+00	1.69E-07	3.75E-07
Am-241	1.1066E-01	27,338.13	60,603.11	8.04E+02	3.83E+03	7.51E+03
Am-242m	1.9247E-03	27,338.13	60,603.11	0.00E+00	5.26E+01	1.17E+02
Am-243	1.0740E-04	27,338.13	60,603.11	0.00E+00	2.94E+00	6.51E+00
C-14	2.6042E-05	27,338.13	60,603.11	0.00E+00	7.12E-01	1.58E+00
Cl-36	3.4243E-10	27,338.13	60,603.11	0.00E+00	9.36E-06	2.08E-05
Cm-243	4.0629E-04	27,338.13	60,603.11	0.00E+00	1.11E+01	2.46E+01
Cm-244	1.6024E-03	27,338.13	60,603.11	0.00E+00	4.38E+01	9.71E+01
Co-60	3.4275E-03	27,338.13	60,603.11	0.00E+00	9.37E+01	2.08E+02
Cs-134	1.5566E-03	27,338.13	60,603.11	0.00E+00	4.26E+01	9.43E+01
Cs-135	4.7693E-05	27,338.13	60,603.11	0.00E+00	1.30E+00	2.89E+00
Cs-137	1.4007E+00	27,338.13	60,603.11	0.00E+00	3.83E+04	8.49E+04
Eu-154	1.6184E-02	27,338.13	60,603.11	0.00E+00	4.42E+02	9.81E+02
Eu-155	1.3774E-02	27,338.13	60,603.11	0.00E+00	3.77E+02	8.35E+02
Fe-55	3.8028E-04	27,338.13	60,603.11	0.00E+00	1.04E+01	2.30E+01
H-3	3.8454E-03	27,338.13	60,603.11	0.00E+00	1.05E+02	2.33E+02
I-129	1.2891E-06	27,338.13	60,603.11	0.00E+00	3.52E-02	7.81E-02
Kr-85	2.7848E-02	27,338.13	60,603.11	0.00E+00	7.61E+02	1.69E+03
Np-237	3.7516E-06	27,338.13	60,603.11	0.00E+00	1.03E-01	2.27E-01
Pa-231	1.2488E-11	27,338.13	60,603.11	0.00E+00	3.41E-07	7.57E-07
Pb-210	2.4206E-12	27,338.13	60,603.11	0.00E+00	6.62E-08	1.47E-07
Pm-147	1.5671E-02	27,338.13	60,603.11	0.00E+00	4.28E+02	9.50E+02
Pu-238	1.4877E-02	27,338.13	60,603.11	0.00E+00	4.07E+02	9.02E+02
Pu-239	-3.5520E-02	27,338.13	0.00	6.60E+03	5.63E+03	6.60E+03
Pu-240	2.0690E-02	27,338.13	60,603.11	3.36E+03	3.92E+03	4.61E+03
Pu-241	-1.4799E+00	27,338.13	0.00	1.51E+05	1.10E+05	1.51E+05
Pu-242	1.1252E-05	27,338.13	60,603.11	8.95E-01	1.20E+00	1.58E+00
Ra-226	7.8524E-12	27,338.13	60,603.11	0.00E+00	2.15E-07	4.76E-07
Ra-228	2.4086E-16	27,338.13	60,603.11	0.00E+00	6.58E-12	1.46E-11
Ru-106	1.5066E-05	27,338.13	60,603.11	0.00E+00	4.12E-01	9.13E-01
Se-79	1.0127E-05	27,338.13	60,603.11	0.00E+00	2.77E-01	6.14E-01
Sn-126	4.3902E-05	27,338.13	60,603.11	0.00E+00	1.20E+00	2.66E+00
Sr-90	5.0088E-01	27,338.13	60,603.11	0.00E+00	1.37E+04	3.04E+04
Tc-99	3.9412E-04	27,338.13	60,603.11	0.00E+00	1.08E+01	2.39E+01
Th-229	2.7219E-12	27,338.13	60,603.11	0.00E+00	7.44E-08	1.65E-07
Th-230	1.0441E-09	27,338.13	60,603.11	0.00E+00	2.85E-05	6.33E-05
Th-232	3.1689E-16	27,338.13	60,603.11	0.00E+00	8.66E-12	1.92E-11
Tl-208	4.6636E-07	27,338.13	60,603.11	0.00E+00	1.27E-02	2.83E-02
U-232	1.2638E-06	27,338.13	60,603.11	0.00E+00	3.45E-02	7.66E-02
U-233	5.7451E-10	27,338.13	60,603.11	0.00E+00	1.57E-05	3.48E-05
U-234	4.3044E-06	27,338.13	60,603.11	0.00E+00	1.18E-01	2.61E-01
U-235	-7.7765E-09	27,338.13	0.00	1.36E-03	1.14E-03	1.36E-03
U-236	1.8050E-07	27,338.13	60,603.11	0.00E+00	4.93E-03	1.09E-02
U-238	-1.7914E-07	27,338.13	0.00	9.87E-02	9.38E-02	9.87E-02
Y-90	5.0088E-01	27,338.13	60,603.11	0.00E+00	1.37E+04	3.04E+04
Other Radionuclides					3.87E+04	8.59E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.990E+15
0.0250	3.943E+14
0.0375	4.579E+14
0.0575	4.582E+14
0.0850	2.193E+14
0.1250	1.543E+14
0.2250	1.770E+14
0.3750	7.673E+13
0.5750	3.109E+15
0.8500	3.248E+13
1.2500	3.887E+13
1.7500	8.794E+11
2.2500	1.766E+08
2.7500	1.005E+09
3.5000	5.050E+06
5.0000	1.742E+06
7.0000	1.988E+05
11.0000	2.273E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.26E+02	1.27E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA PINS (AC-3)
SNF ID #: 1046
Fuel Units & Descr: 72 - ROD
Heavy Metal Mass: BOL= ; EOL=8.878kg
ROD Storage Site: HANFORD

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

Estimated Canister usage: 16"x15'
1.09

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	634.54	787.70	0.00E+00	3.92E-09	4.87E-09
Am-241	1.1066E-01	634.54	787.70	1.83E+01	8.86E+01	1.06E+02
Am-242m	1.9247E-03	634.54	787.70	0.00E+00	1.22E+00	1.52E+00
Am-243	1.0740E-04	634.54	787.70	0.00E+00	6.81E-02	8.46E-02
C-14	2.6042E-05	634.54	787.70	0.00E+00	1.65E-02	2.05E-02
Cl-36	3.4243E-10	634.54	787.70	0.00E+00	2.17E-07	2.70E-07
Cm-243	4.0629E-04	634.54	787.70	0.00E+00	2.58E-01	3.20E-01
Cm-244	1.6024E-03	634.54	787.70	0.00E+00	1.02E+00	1.26E+00
Co-60	3.4275E-03	634.54	787.70	0.00E+00	2.17E+00	2.70E+00
Cs-134	1.5566E-03	634.54	787.70	0.00E+00	9.88E-01	1.23E+00
Cs-135	4.7693E-05	634.54	787.70	0.00E+00	3.03E-02	3.76E-02
Cs-137	1.4007E+00	634.54	787.70	0.00E+00	8.89E+02	1.10E+03
Eu-154	1.6184E-02	634.54	787.70	0.00E+00	1.03E+01	1.27E+01
Eu-155	1.3774E-02	634.54	787.70	0.00E+00	8.74E+00	1.09E+01
Fe-55	3.8028E-04	634.54	787.70	0.00E+00	2.41E-01	3.00E-01
H-3	3.8454E-03	634.54	787.70	0.00E+00	2.44E+00	3.03E+00
I-129	1.2891E-06	634.54	787.70	0.00E+00	8.18E-04	1.02E-03
Kr-85	2.7848E-02	634.54	787.70	0.00E+00	1.77E+01	2.19E+01
Np-237	3.7516E-06	634.54	787.70	0.00E+00	2.38E-03	2.96E-03
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	6.97E+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
Tl-208	4.6636E-07	634.54	787.70	0.00E+00	2.96E-04	3.67E-04
U-232	1.2638E-06	634.54	787.70	0.00E+00	8.02E-04	9.95E-04
U-233	5.7451E-10	634.54	787.70	0.00E+00	3.65E-07	4.53E-07
U-234	4.3044E-06	634.54	787.70	0.00E+00	2.73E-03	3.39E-03
U-235	-7.7765E-09	634.54	0.00	3.09E-05	2.60E-05	3.09E-05
U-236	1.8050E-07	634.54	787.70	0.00E+00	1.15E-04	1.42E-04
U-238	-1.7914E-07	634.54	0.00	2.25E-03	2.14E-03	2.25E-03
Y-90	5.0088E-01	634.54	787.70	0.00E+00	3.18E+02	3.95E+02
Other Radionuclides					8.99E+02	1.12E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.630E+13
0.0250	5.133E+12
0.0375	5.853E+12
0.0575	6.066E+12
0.0850	2.851E+12
0.1250	2.007E+12
0.2250	2.301E+12
0.3750	9.975E+11
0.5750	4.040E+13
0.8500	4.222E+11
1.2500	5.053E+11
1.7500	1.143E+10
2.2500	2.332E+06
2.7500	1.308E+07
3.5000	8.405E+04
5.0000	3.046E+04
7.0000	3.473E+03
11.0000	3.972E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	1.98E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		634.54
Bounding:		787.70

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=9.513kg
Bounding burnup taken from SFD and converted to MWd using BOL=9.513kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.44	
Bounding:	0.54	

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: FFTF-TFA-AB-1
SNF ID #: 317
Fuel Units & Descr: 1 - HEX ARRAY 217 ROD
Heavy Metal Mass: BOL= ; EOL=34.655kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	251.33	502.65	0.00E+00	1.55E-09	3.11E-09
Am-241	1.1066E-01	251.33	502.65	6.73E+01	9.51E+01	1.23E+02
Am-242m	1.9247E-03	251.33	502.65	0.00E+00	4.84E-01	9.67E-01
Am-243	1.0740E-04	251.33	502.65	0.00E+00	2.70E-02	5.40E-02
C-14	2.6042E-05	251.33	502.65	0.00E+00	6.54E-03	1.31E-02
Cl-36	3.4243E-10	251.33	502.65	0.00E+00	8.61E-08	1.72E-07
Cm-243	4.0629E-04	251.33	502.65	0.00E+00	1.02E-01	2.04E-01
Cm-244	1.6024E-03	251.33	502.65	0.00E+00	4.03E-01	8.05E-01
Co-60	3.4275E-03	251.33	502.65	0.00E+00	8.61E-01	1.72E+00
Cs-134	1.5566E-03	251.33	502.65	0.00E+00	3.91E-01	7.82E-01
Cs-135	4.7693E-05	251.33	502.65	0.00E+00	1.20E-02	2.40E-02
Cs-137	1.4007E+00	251.33	502.65	0.00E+00	3.52E+02	7.04E+02
Eu-154	1.6184E-02	251.33	502.65	0.00E+00	4.07E+00	8.13E+00
Eu-155	1.3774E-02	251.33	502.65	0.00E+00	3.46E+00	6.92E+00
Fe-55	3.8028E-04	251.33	502.65	0.00E+00	9.56E-02	1.91E-01
H-3	3.8454E-03	251.33	502.65	0.00E+00	9.66E-01	1.93E+00
I-129	1.2891E-06	251.33	502.65	0.00E+00	3.24E-04	6.48E-04
Kr-85	2.7848E-02	251.33	502.65	0.00E+00	7.00E+00	1.40E+01
Np-237	3.7516E-06	251.33	502.65	0.00E+00	9.43E-04	1.89E-03
Pa-231	1.2488E-11	251.33	502.65	0.00E+00	3.14E-09	6.28E-09
Pb-210	2.4206E-12	251.33	502.65	0.00E+00	6.08E-10	1.22E-09
Pm-147	1.5671E-02	251.33	502.65	0.00E+00	3.94E+00	7.88E+00
Pu-238	1.4877E-02	251.33	502.65	0.00E+00	3.74E+00	7.48E+00
Pu-239	-3.5520E-02	251.33	0.00	5.52E+02	5.44E+02	5.52E+02
Pu-240	2.0690E-02	251.33	502.65	2.81E+02	2.86E+02	2.91E+02
Pu-241	-1.4799E+00	251.33	0.00	1.26E+04	1.22E+04	1.26E+04
Pu-242	1.1252E-05	251.33	502.65	7.49E-02	7.77E-02	8.05E-02
Ra-226	7.8524E-12	251.33	502.65	0.00E+00	1.97E-09	3.95E-09
Ra-228	2.4086E-16	251.33	502.65	0.00E+00	6.05E-14	1.21E-13
Ru-106	1.5066E-05	251.33	502.65	0.00E+00	3.79E-03	7.57E-03
Se-79	1.0127E-05	251.33	502.65	0.00E+00	2.55E-03	5.09E-03
Sn-126	4.3902E-05	251.33	502.65	0.00E+00	1.10E-02	2.21E-02
Sr-90	5.0088E-01	251.33	502.65	0.00E+00	1.26E+02	2.52E+02
Tc-99	3.9412E-04	251.33	502.65	0.00E+00	9.91E-02	1.98E-01
Th-229	2.7219E-12	251.33	502.65	0.00E+00	6.84E-10	1.37E-09
Th-230	1.0441E-09	251.33	502.65	0.00E+00	2.62E-07	5.25E-07
Th-232	3.1689E-16	251.33	502.65	0.00E+00	7.96E-14	1.59E-13
Tl-208	4.6636E-07	251.33	502.65	0.00E+00	1.17E-04	2.34E-04
U-232	1.2638E-06	251.33	502.65	0.00E+00	3.18E-04	6.35E-04
U-233	5.7451E-10	251.33	502.65	0.00E+00	1.44E-07	2.89E-07
U-234	4.3044E-06	251.33	502.65	0.00E+00	1.08E-03	2.16E-03
U-235	-7.7765E-09	251.33	0.00	1.13E-04	1.11E-04	1.13E-04
U-236	1.8050E-07	251.33	502.65	0.00E+00	4.54E-05	9.07E-05
U-238	-1.7914E-07	251.33	0.00	8.26E-03	8.21E-03	8.26E-03
Y-90	5.0088E-01	251.33	502.65	0.00E+00	1.26E+02	2.52E+02
Other Radionuclides					3.56E+02	7.12E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.978E+13
0.0250	3.328E+12
0.0375	3.804E+12
0.0575	4.642E+12
0.0850	1.820E+12
0.1250	1.283E+12
0.2250	1.468E+12
0.3750	6.376E+11
0.5750	2.578E+13
0.8500	2.694E+11
1.2500	3.224E+11
1.7500	7.294E+09
2.2500	1.741E+06
2.7500	8.491E+06
3.5000	1.834E+05
5.0000	7.453E+04
7.0000	8.487E+03
11.0000	9.701E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.20E+01	3.61E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		251.33
Bounding:		502.65

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.09	

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: 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

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FERMI (Fast, Zirc, 10 to 40%, U)
[2]Template Burnup(MWd): 58.6725048
Template BOL Heavy Metal Mass (MT): 0.018774
Template Decay Time: 35 years

Estimated Canister usage: 16"x15' 1.20

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	9.6110E-08	5,934.58	8,479.48	0.00E+00	5.70E-04	8.15E-04
Am-241	6.5601E-07	5,934.58	8,479.48	0.00E+00	3.89E-03	5.56E-03
Am-242m	0.0000E+00	5,934.58	8,479.48	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	5,934.58	8,479.48	0.00E+00	4.97E-11	7.10E-11
C-14	2.1714E-05	5,934.58	8,479.48	0.00E+00	1.29E-01	1.84E-01
Cl-36	5.5188E-08	5,934.58	8,479.48	0.00E+00	3.28E-04	4.68E-04
Cm-243	1.5496E-14	5,934.58	8,479.48	0.00E+00	9.20E-11	1.31E-10
Cm-244	5.2375E-16	5,934.58	8,479.48	0.00E+00	3.11E-12	4.44E-12
Co-60	2.0947E-03	5,934.58	8,479.48	0.00E+00	1.24E+01	1.78E+01
Cs-134	6.2448E-07	5,934.58	8,479.48	0.00E+00	3.71E-03	5.30E-03
Cs-135	4.4996E-05	5,934.58	8,479.48	0.00E+00	2.67E-01	3.82E-01
Cs-137	1.3775E+00	5,934.58	8,479.48	0.00E+00	8.17E+03	1.17E+04
Eu-154	1.8510E-04	5,934.58	8,479.48	0.00E+00	1.10E+00	1.57E+00
Eu-155	1.4163E-03	5,934.58	8,479.48	0.00E+00	8.41E+00	1.20E+01
Fe-55	1.4179E-05	5,934.58	8,479.48	0.00E+00	8.41E-02	1.20E-01
H-3	3.5383E-03	5,934.58	8,479.48	0.00E+00	2.10E+01	3.00E+01
I-129	1.1426E-06	5,934.58	8,479.48	0.00E+00	6.78E-03	9.69E-03
Kr-85	3.8604E-02	5,934.58	8,479.48	0.00E+00	2.29E+02	3.27E+02
Np-237	3.3099E-06	5,934.58	8,479.48	0.00E+00	1.96E-02	2.81E-02
Pa-231	1.8953E-07	5,934.58	8,479.48	0.00E+00	1.12E-03	1.61E-03
Pb-210	8.9531E-12	5,934.58	8,479.48	0.00E+00	5.31E-08	7.59E-08
Pm-147	1.1588E-03	5,934.58	8,479.48	0.00E+00	6.88E+00	9.83E+00
Pu-238	1.7146E-04	5,934.58	8,479.48	0.00E+00	1.02E+00	1.45E+00
Pu-239	1.9464E-02	5,934.58	8,479.48	0.00E+00	1.16E+02	1.65E+02
Pu-240	6.7919E-05	5,934.58	8,479.48	0.00E+00	4.03E-01	5.76E-01
Pu-241	4.1774E-06	5,934.58	8,479.48	0.00E+00	2.48E-02	3.54E-02
Pu-242	4.3751E-13	5,934.58	8,479.48	0.00E+00	2.60E-09	3.71E-09
Ra-226	2.4219E-11	5,934.58	8,479.48	0.00E+00	1.44E-07	2.05E-07
Ra-228	2.3572E-11	5,934.58	8,479.48	0.00E+00	1.40E-07	2.00E-07
Ru-106	3.0951E-10	5,934.58	8,479.48	0.00E+00	1.84E-06	2.62E-06
Se-79	1.6488E-05	5,934.58	8,479.48	0.00E+00	9.79E-02	1.40E-01
Sn-126	3.7564E-05	5,934.58	8,479.48	0.00E+00	2.23E-01	3.19E-01
Sr-90	1.2052E+00	5,934.58	8,479.48	0.00E+00	7.15E+03	1.02E+04
Tc-99	4.4825E-04	5,934.58	8,479.48	0.00E+00	2.66E+00	3.80E+00
Th-229	4.6478E-11	5,934.58	8,479.48	0.00E+00	2.76E-07	3.94E-07
Th-230	2.2259E-09	5,934.58	8,479.48	0.00E+00	1.32E-05	1.89E-05
Th-232	2.3691E-11	5,934.58	8,479.48	0.00E+00	1.41E-07	2.01E-07
Tl-208	5.8256E-09	5,934.58	8,479.48	0.00E+00	3.46E-05	4.94E-05
U-232	1.5759E-08	5,934.58	8,479.48	0.00E+00	9.35E-05	1.34E-04
U-233	1.0110E-08	5,934.58	8,479.48	0.00E+00	6.00E-05	8.57E-05
U-234	4.9001E-06	5,934.58	8,479.48	0.00E+00	2.91E-02	4.16E-02
U-235	-2.3191E-06	5,934.58	0.00	1.46E-01	1.32E-01	1.46E-01
U-236	1.2633E-05	5,934.58	8,479.48	0.00E+00	7.50E-02	1.07E-01
U-238	-9.5407E-08	5,934.58	0.00	6.61E-02	6.55E-02	6.61E-02
Y-90	1.2053E+00	5,934.58	8,479.48	0.00E+00	7.15E+03	1.02E+04
Other Radionuclides					8.13E+03	1.16E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.611E+14
0.0250	1.166E+14
0.0375	1.025E+14
0.0575	1.086E+14
0.0850	6.569E+13
0.1250	4.255E+13
0.2250	5.638E+13
0.3750	2.457E+13
0.5750	4.340E+14
0.8500	4.008E+12
1.2500	2.659E+12
1.7500	1.034E+11
2.2500	1.824E+07
2.7500	1.758E+06
3.5000	1.785E+03
5.0000	6.231E+02
7.0000	5.538E+01
11.0000	5.281E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.16E+01	1.31E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:
This Template was used for the following reasons:
This template is a good approximation since it is a FAST, Uranium fuel

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,934.58
Bounding:		8,479.48

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=264.158kg
Bounding burnup taken from SFD and converted to MWd using BOL=264.158kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	7.19	
Bounding:	10.27	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-ACN-1 (MOX) PINS
SNF ID #: 321
Fuel Units & Descr: 90 - ROD
Heavy Metal Mass: BOL= ; EOL=14.346kg
ROD Storage Site: HANFORD

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

Estimated Canister usage: 18"x15'
0.02

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	1,038.59	2,077.18	0.00E+00	6.42E-09	1.28E-08
Am-241	1.1066E-01	1,038.59	2,077.18	2.97E+01	1.45E+02	2.60E+02
Am-242m	1.9247E-03	1,038.59	2,077.18	0.00E+00	2.00E+00	4.00E+00
Am-243	1.0740E-04	1,038.59	2,077.18	0.00E+00	1.12E-01	2.23E-01
C-14	2.6042E-05	1,038.59	2,077.18	0.00E+00	2.70E-02	5.41E-02
Cl-36	3.4243E-10	1,038.59	2,077.18	0.00E+00	3.56E-07	7.11E-07
Cm-243	4.0629E-04	1,038.59	2,077.18	0.00E+00	4.22E-01	8.44E-01
Cm-244	1.6024E-03	1,038.59	2,077.18	0.00E+00	1.66E+00	3.33E+00
Co-60	3.4275E-03	1,038.59	2,077.18	0.00E+00	3.56E+00	7.12E+00
Cs-134	1.5566E-03	1,038.59	2,077.18	0.00E+00	1.62E+00	3.23E+00
Cs-135	4.7693E-05	1,038.59	2,077.18	0.00E+00	4.95E-02	9.91E-02
Cs-137	1.4007E+00	1,038.59	2,077.18	0.00E+00	1.45E+03	2.91E+03
Eu-154	1.6184E-02	1,038.59	2,077.18	0.00E+00	1.68E+01	3.36E+01
Eu-155	1.3774E-02	1,038.59	2,077.18	0.00E+00	1.43E+01	2.86E+01
Fe-55	3.8028E-04	1,038.59	2,077.18	0.00E+00	3.95E-01	7.90E-01
H-3	3.8454E-03	1,038.59	2,077.18	0.00E+00	3.99E+00	7.99E+00
I-129	1.2891E-06	1,038.59	2,077.18	0.00E+00	1.34E-03	2.68E-03
Kr-85	2.7848E-02	1,038.59	2,077.18	0.00E+00	2.89E+01	5.78E+01
Np-237	3.7516E-06	1,038.59	2,077.18	0.00E+00	3.90E-03	7.79E-03
Pa-231	1.2488E-11	1,038.59	2,077.18	0.00E+00	1.30E-08	2.59E-08
Pb-210	2.4206E-12	1,038.59	2,077.18	0.00E+00	2.51E-09	5.03E-09
Pm-147	1.5671E-02	1,038.59	2,077.18	0.00E+00	1.63E+01	3.26E+01
Pu-238	1.4877E-02	1,038.59	2,077.18	0.00E+00	1.55E+01	3.09E+01
Pu-239	-3.5520E-02	1,038.59	0.00	2.44E+02	2.07E+02	2.44E+02
Pu-240	2.0690E-02	1,038.59	2,077.18	1.24E+02	1.45E+02	1.67E+02
Pu-241	-1.4799E+00	1,038.59	0.00	5.56E+03	4.02E+03	5.56E+03
Pu-242	1.1252E-05	1,038.59	2,077.18	3.30E-02	4.47E-02	5.64E-02
Ra-226	7.8524E-12	1,038.59	2,077.18	0.00E+00	8.16E-09	1.63E-08
Ra-228	2.4086E-16	1,038.59	2,077.18	0.00E+00	2.50E-13	5.00E-13
Ru-106	1.5066E-05	1,038.59	2,077.18	0.00E+00	1.56E-02	3.13E-02
Se-79	1.0127E-05	1,038.59	2,077.18	0.00E+00	1.05E-02	2.10E-02
Sn-126	4.3902E-05	1,038.59	2,077.18	0.00E+00	4.56E-02	9.12E-02
Sr-90	5.0088E-01	1,038.59	2,077.18	0.00E+00	5.20E+02	1.04E+03
Tc-99	3.9412E-04	1,038.59	2,077.18	0.00E+00	4.09E-01	8.19E-01
Th-229	2.7219E-12	1,038.59	2,077.18	0.00E+00	2.83E-09	5.65E-09
Th-230	1.0441E-09	1,038.59	2,077.18	0.00E+00	1.08E-06	2.17E-06
Th-232	3.1689E-16	1,038.59	2,077.18	0.00E+00	3.29E-13	6.58E-13
Tl-208	4.6636E-07	1,038.59	2,077.18	0.00E+00	4.84E-04	9.69E-04
U-232	1.2638E-06	1,038.59	2,077.18	0.00E+00	1.31E-03	2.63E-03
U-233	5.7451E-10	1,038.59	2,077.18	0.00E+00	5.97E-07	1.19E-06
U-234	4.3044E-06	1,038.59	2,077.18	0.00E+00	4.47E-03	8.94E-03
U-235	-7.7765E-09	1,038.59	0.00	5.00E-05	4.19E-05	5.00E-05
U-236	1.8050E-07	1,038.59	2,077.18	0.00E+00	1.87E-04	3.75E-04
U-238	-1.7914E-07	1,038.59	0.00	3.64E-03	3.45E-03	3.64E-03
Y-90	5.0088E-01	1,038.59	2,077.18	0.00E+00	5.20E+02	1.04E+03
Other Radionuclides					1.47E+03	2.94E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.834E+13
0.0250	1.352E+13
0.0375	1.570E+13
0.0575	1.574E+13
0.0850	7.518E+12
0.1250	5.290E+12
0.2250	6.067E+12
0.3750	2.630E+12
0.5750	1.065E+14
0.8500	1.113E+12
1.2500	1.332E+12
1.7500	3.014E+10
2.2500	6.063E+08
2.7500	3.443E+07
3.5000	1.780E+06
5.0000	6.179E+04
7.0000	7.050E+03
11.0000	8.063E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E+01	4.43E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,038.59
Bounding:		2,077.18

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=15.387kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.44	
Bounding:	0.89	

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

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	185.22	370.43	0.00E+00	1.15E-09	2.29E-09
Am-241	1.1066E-01	185.22	370.43	5.29E+00	2.58E+01	4.63E+01
Am-242m	1.9247E-03	185.22	370.43	0.00E+00	3.56E-01	7.13E-01
Am-243	1.0740E-04	185.22	370.43	0.00E+00	1.99E-02	3.98E-02
C-14	2.6042E-05	185.22	370.43	0.00E+00	4.82E-03	9.65E-03
Cl-36	3.4243E-10	185.22	370.43	0.00E+00	6.34E-08	1.27E-07
Cm-243	4.0629E-04	185.22	370.43	0.00E+00	7.53E-02	1.51E-01
Cm-244	1.6024E-03	185.22	370.43	0.00E+00	2.97E-01	5.94E-01
Co-60	3.4275E-03	185.22	370.43	0.00E+00	6.35E-01	1.27E+00
Cs-134	1.5566E-03	185.22	370.43	0.00E+00	2.88E-01	5.77E-01
Cs-135	4.7693E-05	185.22	370.43	0.00E+00	8.83E-03	1.77E-02
Cs-137	1.4007E+00	185.22	370.43	0.00E+00	2.59E+02	5.19E+02
Eu-154	1.6184E-02	185.22	370.43	0.00E+00	3.00E+00	6.00E+00
Eu-155	1.3774E-02	185.22	370.43	0.00E+00	2.55E+00	5.10E+00
Fe-55	3.8028E-04	185.22	370.43	0.00E+00	7.04E-02	1.41E-01
H-3	3.8454E-03	185.22	370.43	0.00E+00	7.12E-01	1.42E+00
I-129	1.2891E-06	185.22	370.43	0.00E+00	2.39E-04	4.78E-04
Kr-85	2.7848E-02	185.22	370.43	0.00E+00	5.16E+00	1.03E+01
Np-237	3.7516E-06	185.22	370.43	0.00E+00	6.95E-04	1.39E-03
Pa-231	1.2488E-11	185.22	370.43	0.00E+00	2.31E-09	4.63E-09
Pb-210	2.4206E-12	185.22	370.43	0.00E+00	4.48E-10	8.97E-10
Pm-147	1.5671E-02	185.22	370.43	0.00E+00	2.90E+00	5.80E+00
Pu-238	1.4877E-02	185.22	370.43	0.00E+00	2.76E+00	5.51E+00
Pu-239	-3.5520E-02	185.22	0.00	4.34E+01	3.68E+01	4.34E+01
Pu-240	2.0690E-02	185.22	370.43	2.21E+01	2.59E+01	2.97E+01
Pu-241	-1.4799E+00	185.22	0.00	9.91E+02	7.17E+02	9.91E+02
Pu-242	1.1252E-05	185.22	370.43	5.89E-03	7.97E-03	1.01E-02
Ra-226	7.8524E-12	185.22	370.43	0.00E+00	1.45E-09	2.91E-09
Ra-228	2.4086E-16	185.22	370.43	0.00E+00	4.46E-14	8.92E-14
Ru-106	1.5066E-05	185.22	370.43	0.00E+00	2.79E-03	5.58E-03
Se-79	1.0127E-05	185.22	370.43	0.00E+00	1.88E-03	3.75E-03
Sn-126	4.3902E-05	185.22	370.43	0.00E+00	8.13E-03	1.63E-02
Sr-90	5.0088E-01	185.22	370.43	0.00E+00	9.28E+01	1.86E+02
Tc-99	3.9412E-04	185.22	370.43	0.00E+00	7.30E-02	1.46E-01
Th-229	2.7219E-12	185.22	370.43	0.00E+00	5.04E-10	1.01E-09
Th-230	1.0441E-09	185.22	370.43	0.00E+00	1.93E-07	3.87E-07
Th-232	3.1689E-16	185.22	370.43	0.00E+00	5.87E-14	1.17E-13
Tl-208	4.6636E-07	185.22	370.43	0.00E+00	8.64E-05	1.73E-04
U-232	1.2638E-06	185.22	370.43	0.00E+00	2.34E-04	4.68E-04
U-233	5.7451E-10	185.22	370.43	0.00E+00	1.06E-07	2.13E-07
U-234	4.3044E-06	185.22	370.43	0.00E+00	7.97E-04	1.59E-03
U-235	-7.7765E-09	185.22	0.00	8.92E-06	7.48E-06	8.92E-06
U-236	1.8050E-07	185.22	370.43	0.00E+00	3.34E-05	6.69E-05
U-238	-1.7914E-07	185.22	0.00	6.49E-04	6.16E-04	6.49E-04
Y-90	5.0088E-01	185.22	370.43	0.00E+00	9.28E+01	1.86E+02
Other Radionuclides					2.62E+02	5.25E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.219E+13
0.0250	2.411E+12
0.0375	2.799E+12
0.0575	2.806E+12
0.0850	1.341E+12
0.1250	9.435E+11
0.2250	1.082E+12
0.3750	4.690E+11
0.5750	1.900E+13
0.8500	1.985E+11
1.2500	2.376E+11
1.7500	5.375E+09
2.2500	1.081E+06
2.7500	6.141E+06
3.5000	3.174E+04
5.0000	1.102E+04
7.0000	1.257E+03
11.0000	1.438E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.85E+00	7.90E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		185.22
Bounding:		370.43

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=2.744kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.44	
Bounding:	0.89	

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: 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

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

Estimated Canister usage:

18"x15"
2.80

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	96,319.97	140,074.70	0.00E+00	5.95E-07	8.66E-07
Am-241	1.1066E-01	96,319.97	140,074.70	1.35E+03	1.20E+04	1.69E+04
Am-242m	1.9247E-03	96,319.97	140,074.70	0.00E+00	1.85E+02	2.70E+02
Am-243	1.0740E-04	96,319.97	140,074.70	0.00E+00	1.03E+01	1.50E+01
C-14	2.6042E-05	96,319.97	140,074.70	0.00E+00	2.51E+00	3.65E+00
Cl-36	3.4243E-10	96,319.97	140,074.70	0.00E+00	3.30E-05	4.80E-05
Cm-243	4.0629E-04	96,319.97	140,074.70	0.00E+00	3.91E+01	5.69E+01
Cm-244	1.6024E-03	96,319.97	140,074.70	0.00E+00	1.54E+02	2.24E+02
Co-60	3.4275E-03	96,319.97	140,074.70	0.00E+00	3.30E+02	4.80E+02
Cs-134	1.5566E-03	96,319.97	140,074.70	0.00E+00	1.50E+02	2.18E+02
Cs-135	4.7693E-05	96,319.97	140,074.70	0.00E+00	4.59E+00	6.68E+00
Cs-137	1.4007E+00	96,319.97	140,074.70	0.00E+00	1.35E+05	1.96E+05
Eu-154	1.6184E-02	96,319.97	140,074.70	0.00E+00	1.56E+03	2.27E+03
Eu-155	1.3774E-02	96,319.97	140,074.70	0.00E+00	1.33E+03	1.93E+03
Fe-55	3.8028E-04	96,319.97	140,074.70	0.00E+00	3.66E+01	5.33E+01
H-3	3.8454E-03	96,319.97	140,074.70	0.00E+00	3.70E+02	5.39E+02
I-129	1.2891E-06	96,319.97	140,074.70	0.00E+00	1.24E-01	1.81E-01
Kr-85	2.7848E-02	96,319.97	140,074.70	0.00E+00	2.68E+03	3.90E+03
Np-237	3.7516E-06	96,319.97	140,074.70	0.00E+00	3.61E-01	5.26E-01
Pa-231	1.2488E-11	96,319.97	140,074.70	0.00E+00	1.20E-06	1.75E-06
Pb-210	2.4206E-12	96,319.97	140,074.70	0.00E+00	2.33E-07	3.39E-07
Pm-147	1.5671E-02	96,319.97	140,074.70	0.00E+00	1.51E+03	2.20E+03
Pu-238	1.4877E-02	96,319.97	140,074.70	0.00E+00	1.43E+03	2.08E+03
Pu-239	-3.5520E-02	96,319.97	0.00	1.11E+04	7.70E+03	1.11E+04
Pu-240	2.0690E-02	96,319.97	140,074.70	5.65E+03	7.64E+03	8.55E+03
Pu-241	-1.4799E+00	96,319.97	0.00	2.54E+05	1.11E+05	2.54E+05
Pu-242	1.1252E-05	96,319.97	140,074.70	1.51E+00	2.59E+00	3.08E+00
Ra-226	7.8524E-12	96,319.97	140,074.70	0.00E+00	7.56E-07	1.10E-06
Ra-228	2.4086E-16	96,319.97	140,074.70	0.00E+00	2.32E-11	3.37E-11
Ru-106	1.5066E-05	96,319.97	140,074.70	0.00E+00	1.45E+00	2.11E+00
Se-79	1.0127E-05	96,319.97	140,074.70	0.00E+00	9.75E-01	1.42E+00
Sn-126	4.3902E-05	96,319.97	140,074.70	0.00E+00	4.23E+00	6.15E+00
Sr-90	5.0088E-01	96,319.97	140,074.70	0.00E+00	4.82E+04	7.02E+04
Tc-99	3.9412E-04	96,319.97	140,074.70	0.00E+00	3.80E+01	5.52E+01
Th-229	2.7219E-12	96,319.97	140,074.70	0.00E+00	2.62E-07	3.81E-07
Th-230	1.0441E-09	96,319.97	140,074.70	0.00E+00	1.01E-04	1.46E-04
Th-232	3.1689E-16	96,319.97	140,074.70	0.00E+00	3.05E-11	4.44E-11
Tl-208	4.6636E-07	96,319.97	140,074.70	0.00E+00	4.49E-02	6.53E-02
U-232	1.2638E-06	96,319.97	140,074.70	0.00E+00	1.22E-01	1.77E-01
U-233	5.7451E-10	96,319.97	140,074.70	0.00E+00	5.53E-05	8.05E-05
U-234	4.3044E-06	96,319.97	140,074.70	0.00E+00	4.15E-01	6.03E-01
U-235	-7.7765E-09	96,319.97	0.00	2.28E-03	1.53E-03	2.28E-03
U-236	1.8050E-07	96,319.97	140,074.70	0.00E+00	1.74E-02	2.53E-02
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.573E+15
0.0250	9.110E+14
0.0375	1.058E+15
0.0575	1.052E+15
0.0850	5.070E+14
0.1250	3.567E+14
0.2250	4.091E+14
0.3750	1.773E+14
0.5750	7.185E+15
0.8500	7.507E+13
1.2500	8.985E+13
1.7500	2.033E+12
2.2500	4.059E+08
2.7500	2.320E+09
3.5000	1.050E+07
5.0000	3.527E+06
7.0000	4.026E+05
11.0000	4.604E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.93E+03	2.71E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		96,319.97
Bounding:		140,074.70

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.90	
Bounding:	1.31	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	5,116.34	5,738.65	0.00E+00	3.16E-08	3.55E-08
Am-241	1.1066E-01	5,116.34	5,738.65	1.44E+02	7.10E+02	7.79E+02
Am-242m	1.9247E-03	5,116.34	5,738.65	0.00E+00	9.85E+00	1.10E+01
Am-243	1.0740E-04	5,116.34	5,738.65	0.00E+00	5.49E-01	6.16E-01
C-14	2.6042E-05	5,116.34	5,738.65	0.00E+00	1.33E-01	1.49E-01
Cl-36	3.4243E-10	5,116.34	5,738.65	0.00E+00	1.75E-06	1.97E-06
Cm-243	4.0629E-04	5,116.34	5,738.65	0.00E+00	2.08E+00	2.33E+00
Cm-244	1.6024E-03	5,116.34	5,738.65	0.00E+00	8.20E+00	9.20E+00
Co-60	3.4275E-03	5,116.34	5,738.65	0.00E+00	1.75E+01	1.97E+01
Cs-134	1.5566E-03	5,116.34	5,738.65	0.00E+00	7.96E+00	8.93E+00
Cs-135	4.7693E-05	5,116.34	5,738.65	0.00E+00	2.44E-01	2.74E-01
Cs-137	1.4007E+00	5,116.34	5,738.65	0.00E+00	7.17E+03	8.04E+03
Eu-154	1.6184E-02	5,116.34	5,738.65	0.00E+00	8.28E+01	9.29E+01
Eu-155	1.3774E-02	5,116.34	5,738.65	0.00E+00	7.05E+01	7.90E+01
Fe-55	3.8028E-04	5,116.34	5,738.65	0.00E+00	1.95E+00	2.18E+00
H-3	3.8454E-03	5,116.34	5,738.65	0.00E+00	1.97E+01	2.21E+01
I-129	1.2891E-06	5,116.34	5,738.65	0.00E+00	6.60E-03	7.40E-03
Kr-85	2.7848E-02	5,116.34	5,738.65	0.00E+00	1.42E+02	1.60E+02
Np-237	3.7516E-06	5,116.34	5,738.65	0.00E+00	1.92E-02	2.15E-02
Pa-231	1.2488E-11	5,116.34	5,738.65	0.00E+00	6.39E-08	7.17E-08
Pb-210	2.4206E-12	5,116.34	5,738.65	0.00E+00	1.24E-08	1.39E-08
Pm-147	1.5671E-02	5,116.34	5,738.65	0.00E+00	8.02E+01	8.99E+01
Pu-238	1.4877E-02	5,116.34	5,738.65	0.00E+00	7.61E+01	8.54E+01
Pu-239	-3.5520E-02	5,116.34	0.00	1.18E+03	9.98E+02	1.18E+03
Pu-240	2.0690E-02	5,116.34	5,738.65	6.00E+02	7.05E+02	7.18E+02
Pu-241	-1.4799E+00	5,116.34	0.00	2.69E+04	1.93E+04	2.69E+04
Pu-242	1.1252E-05	5,116.34	5,738.65	1.60E-01	2.17E-01	2.24E-01
Ra-226	7.8524E-12	5,116.34	5,738.65	0.00E+00	4.02E-08	4.51E-08
Ra-228	2.4086E-16	5,116.34	5,738.65	0.00E+00	1.23E-12	1.38E-12
Ru-106	1.5066E-05	5,116.34	5,738.65	0.00E+00	7.71E-02	8.65E-02
Se-79	1.0127E-05	5,116.34	5,738.65	0.00E+00	5.18E-02	5.81E-02
Sn-126	4.3902E-05	5,116.34	5,738.65	0.00E+00	2.25E-01	2.52E-01
Sr-90	5.0088E-01	5,116.34	5,738.65	0.00E+00	2.56E+03	2.87E+03
Tc-99	3.9412E-04	5,116.34	5,738.65	0.00E+00	2.02E+00	2.26E+00
Th-229	2.7219E-12	5,116.34	5,738.65	0.00E+00	1.39E-08	1.56E-08
Th-230	1.0441E-09	5,116.34	5,738.65	0.00E+00	5.34E-06	5.99E-06
Th-232	3.1689E-16	5,116.34	5,738.65	0.00E+00	1.62E-12	1.82E-12
Tl-208	4.6636E-07	5,116.34	5,738.65	0.00E+00	2.39E-03	2.68E-03
U-232	1.2638E-06	5,116.34	5,738.65	0.00E+00	6.47E-03	7.25E-03
U-233	5.7451E-10	5,116.34	5,738.65	0.00E+00	2.94E-06	3.30E-06
U-234	4.3044E-06	5,116.34	5,738.65	0.00E+00	2.20E-02	2.47E-02
U-235	-7.7765E-09	5,116.34	0.00	2.42E-04	2.02E-04	2.42E-04
U-236	1.8050E-07	5,116.34	5,738.65	0.00E+00	9.23E-04	1.04E-03
U-238	-1.7914E-07	5,116.34	0.00	1.76E-02	1.67E-02	1.76E-02
Y-90	5.0088E-01	5,116.34	5,738.65	0.00E+00	2.56E+03	2.87E+03
Other Radionuclides					7.25E+03	8.13E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.921E+14
0.0250	3.740E+13
0.0375	4.337E+13
0.0575	4.433E+13
0.0850	2.077E+13
0.1250	1.462E+13
0.2250	1.676E+13
0.3750	7.267E+12
0.5750	2.944E+14
0.8500	3.076E+12
1.2500	3.681E+12
1.7500	8.327E+10
2.2500	1.703E+07
2.7500	9.530E+07
3.5000	6.358E+05
5.0000	2.319E+05
7.0000	2.644E+04
11.0000	3.023E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.33E+02	1.48E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,116.34
Bounding:		5,738.65

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.45	
Bounding:	0.51	

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: 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

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	3.46	6.92	0.00E+00	2.14E-11	4.28E-11
Am-241	1.1066E-01	3.46	6.92	6.67E+01	6.71E+01	6.75E+01
Am-242m	1.9247E-03	3.46	6.92	0.00E+00	6.66E-03	1.33E-02
Am-243	1.0740E-04	3.46	6.92	0.00E+00	3.72E-04	7.43E-04
C-14	2.6042E-05	3.46	6.92	0.00E+00	9.01E-05	1.80E-04
Cl-36	3.4243E-10	3.46	6.92	0.00E+00	1.19E-09	2.37E-09
Cm-243	4.0629E-04	3.46	6.92	0.00E+00	1.41E-03	2.81E-03
Cm-244	1.6024E-03	3.46	6.92	0.00E+00	5.55E-03	1.11E-02
Co-60	3.4275E-03	3.46	6.92	0.00E+00	1.19E-02	2.37E-02
Cs-134	1.5566E-03	3.46	6.92	0.00E+00	5.39E-03	1.08E-02
Cs-135	4.7693E-05	3.46	6.92	0.00E+00	1.65E-04	3.30E-04
Cs-137	1.4007E+00	3.46	6.92	0.00E+00	4.85E+00	9.70E+00
Eu-154	1.6184E-02	3.46	6.92	0.00E+00	5.60E-02	1.12E-01
Eu-155	1.3774E-02	3.46	6.92	0.00E+00	4.77E-02	9.53E-02
Fe-55	3.8028E-04	3.46	6.92	0.00E+00	1.32E-03	2.63E-03
H-3	3.8454E-03	3.46	6.92	0.00E+00	1.33E-02	2.66E-02
I-129	1.2891E-06	3.46	6.92	0.00E+00	4.46E-06	8.92E-06
Kr-85	2.7848E-02	3.46	6.92	0.00E+00	9.64E-02	1.93E-01
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	1.5066E-05	3.46	6.92	0.00E+00	5.21E-05	1.04E-04
Se-79	1.0127E-05	3.46	6.92	0.00E+00	3.51E-05	7.01E-05
Sn-126	4.3902E-05	3.46	6.92	0.00E+00	1.52E-04	3.04E-04
Sr-90	5.0088E-01	3.46	6.92	0.00E+00	1.73E+00	3.47E+00
Tc-99	3.9412E-04	3.46	6.92	0.00E+00	1.36E-03	2.73E-03
Th-229	2.7219E-12	3.46	6.92	0.00E+00	9.42E-12	1.88E-11
Th-230	1.0441E-09	3.46	6.92	0.00E+00	3.61E-09	7.23E-09
Th-232	3.1689E-16	3.46	6.92	0.00E+00	1.10E-15	2.19E-15
Tl-208	4.6636E-07	3.46	6.92	0.00E+00	1.61E-06	3.23E-06
U-232	1.2638E-06	3.46	6.92	0.00E+00	4.37E-06	8.75E-06
U-233	5.7451E-10	3.46	6.92	0.00E+00	1.99E-09	3.98E-09
U-234	4.3044E-06	3.46	6.92	0.00E+00	1.49E-05	2.98E-05
U-235	-7.7765E-09	3.46	0.00	1.12E-04	1.12E-04	1.12E-04
U-236	1.8050E-07	3.46	6.92	0.00E+00	6.25E-07	1.25E-06
U-238	-1.7914E-07	3.46	0.00	8.19E-03	8.19E-03	8.19E-03
Y-90	5.0088E-01	3.46	6.92	0.00E+00	1.73E+00	3.47E+00
Other Radionuclides					4.90E+00	9.81E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.822E+12
0.0250	1.074E+11
0.0375	5.867E+10
0.0575	9.775E+11
0.0850	2.608E+10
0.1250	2.051E+10
0.2250	2.053E+10
0.3750	1.009E+10
0.5750	3.551E+11
0.8500	3.721E+09
1.2500	4.441E+09
1.7500	1.010E+08
2.2500	3.234E+05
2.7500	2.897E+05
3.5000	1.561E+05
5.0000	6.623E+04
7.0000	7.538E+03
11.0000	8.815E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.82E+01	2.83E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.46
Bounding:		6.92

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=34.61kg
Bounding burnup assumed to be twice nominal burnup.

Checks

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

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

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329161
Template Decay Time: 35 years

Estimated Canister usage: 16"x15' 0.20

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	2,694.34	5,388.68	0.00E+00	1.67E-08	3.33E-08
Am-241	1.1066E-01	2,694.34	5,388.68	8.73E+01	3.85E+02	6.84E+02
Am-242m	1.9247E-03	2,694.34	5,388.68	0.00E+00	5.19E+00	1.04E+01
Am-243	1.0740E-04	2,694.34	5,388.68	0.00E+00	2.89E-01	5.79E-01
C-14	2.6042E-05	2,694.34	5,388.68	0.00E+00	7.02E-02	1.40E-01
Cl-36	3.4243E-10	2,694.34	5,388.68	0.00E+00	9.23E-07	1.85E-06
Cm-243	4.0629E-04	2,694.34	5,388.68	0.00E+00	1.09E+00	2.19E+00
Cm-244	1.6024E-03	2,694.34	5,388.68	0.00E+00	4.32E+00	8.63E+00
Co-60	3.4275E-03	2,694.34	5,388.68	0.00E+00	9.23E+00	1.85E+01
Cs-134	1.5566E-03	2,694.34	5,388.68	0.00E+00	4.19E+00	8.39E+00
Cs-135	4.7693E-05	2,694.34	5,388.68	0.00E+00	1.29E-01	2.57E-01
Cs-137	1.4007E+00	2,694.34	5,388.68	0.00E+00	3.77E+03	7.55E+03
Eu-154	1.6184E-02	2,694.34	5,388.68	0.00E+00	4.36E+01	8.72E+01
Eu-155	1.3774E-02	2,694.34	5,388.68	0.00E+00	3.71E+01	7.42E+01
Fe-55	3.8028E-04	2,694.34	5,388.68	0.00E+00	1.02E+00	2.05E+00
H-3	3.8454E-03	2,694.34	5,388.68	0.00E+00	1.04E+01	2.07E+01
I-129	1.2891E-06	2,694.34	5,388.68	0.00E+00	3.47E-03	6.95E-03
Kr-85	2.7848E-02	2,694.34	5,388.68	0.00E+00	7.50E+01	1.50E+02
Np-237	3.7516E-06	2,694.34	5,388.68	0.00E+00	1.01E-02	2.02E-02
Pa-231	1.2488E-11	2,694.34	5,388.68	0.00E+00	3.36E-08	6.73E-08
Pb-210	2.4206E-12	2,694.34	5,388.68	0.00E+00	6.52E-09	1.30E-08
Pm-147	1.5671E-02	2,694.34	5,388.68	0.00E+00	4.22E+01	8.44E+01
Pu-238	1.4877E-02	2,694.34	5,388.68	0.00E+00	4.01E+01	8.02E+01
Pu-239	-3.5520E-02	2,694.34	0.00	7.17E+02	6.21E+02	7.17E+02
Pu-240	2.0690E-02	2,694.34	5,388.68	3.64E+02	4.20E+02	4.76E+02
Pu-241	-1.4799E+00	2,694.34	0.00	1.64E+04	1.24E+04	1.64E+04
Pu-242	1.1252E-05	2,694.34	5,388.68	9.71E-02	1.27E-01	1.58E-01
Ra-226	7.8524E-12	2,694.34	5,388.68	0.00E+00	2.12E-08	4.23E-08
Ra-228	2.4086E-16	2,694.34	5,388.68	0.00E+00	6.49E-13	1.30E-12
Ru-106	1.5066E-05	2,694.34	5,388.68	0.00E+00	4.06E-02	8.12E-02
Se-79	1.0127E-05	2,694.34	5,388.68	0.00E+00	2.73E-02	5.46E-02
Sn-126	4.3902E-05	2,694.34	5,388.68	0.00E+00	1.18E-01	2.37E-01
Sr-90	5.0088E-01	2,694.34	5,388.68	0.00E+00	1.35E+03	2.70E+03
Tc-99	3.9412E-04	2,694.34	5,388.68	0.00E+00	1.06E+00	2.12E+00
Th-229	2.7219E-12	2,694.34	5,388.68	0.00E+00	7.33E-09	1.47E-08
Th-230	1.0441E-09	2,694.34	5,388.68	0.00E+00	2.81E-06	5.63E-06
Th-232	3.1689E-16	2,694.34	5,388.68	0.00E+00	8.54E-13	1.71E-12
Tl-208	4.6636E-07	2,694.34	5,388.68	0.00E+00	1.26E-03	2.51E-03
U-232	1.2638E-06	2,694.34	5,388.68	0.00E+00	3.41E-03	6.81E-03
U-233	5.7451E-10	2,694.34	5,388.68	0.00E+00	1.55E-06	3.10E-06
U-234	4.3044E-06	2,694.34	5,388.68	0.00E+00	1.16E-02	2.32E-02
U-235	-7.7765E-09	2,694.34	0.00	1.47E-04	1.26E-04	1.47E-04
U-236	1.8050E-07	2,694.34	5,388.68	0.00E+00	4.86E-04	9.73E-04
U-238	-1.7914E-07	2,694.34	0.00	1.07E-02	1.02E-02	1.07E-02
Y-90	5.0088E-01	2,694.34	5,388.68	0.00E+00	1.35E+03	2.70E+03
Other Radionuclides					3.82E+03	7.63E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.778E+14
0.0250	3.508E+13
0.0375	4.072E+13
0.0575	4.096E+13
0.0850	1.950E+13
0.1250	1.373E+13
0.2250	1.574E+13
0.3750	6.823E+12
0.5750	2.764E+14
0.8500	2.888E+12
1.2500	3.457E+12
1.7500	7.819E+10
2.2500	1.578E+07
2.7500	8.936E+07
3.5000	4.859E+05
5.0000	1.706E+05
7.0000	1.946E+04
11.0000	2.225E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.60E+01	1.19E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,694.34
Bounding:		5,388.68

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=45.283kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	
Bounding:	0.78	

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: 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

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	10,382.82	20,765.65	0.00E+00	6.42E-08	1.28E-07
Am-241	1.1066E-01	10,382.82	20,765.65	1.90E+02	1.34E+03	2.49E+03
Am-242m	1.9247E-03	10,382.82	20,765.65	0.00E+00	2.00E+01	4.00E+01
Am-243	1.0740E-04	10,382.82	20,765.65	0.00E+00	1.12E+00	2.23E+00
C-14	2.6042E-05	10,382.82	20,765.65	0.00E+00	2.70E-01	5.41E-01
Cl-36	3.4243E-10	10,382.82	20,765.65	0.00E+00	3.56E-06	7.11E-06
Cm-243	4.0629E-04	10,382.82	20,765.65	0.00E+00	4.22E+00	8.44E+00
Cm-244	1.6024E-03	10,382.82	20,765.65	0.00E+00	1.66E+01	3.33E+01
Co-60	3.4275E-03	10,382.82	20,765.65	0.00E+00	3.56E+01	7.12E+01
Cs-134	1.5566E-03	10,382.82	20,765.65	0.00E+00	1.62E+01	3.23E+01
Cs-135	4.7693E-05	10,382.82	20,765.65	0.00E+00	4.95E-01	9.90E-01
Cs-137	1.4007E+00	10,382.82	20,765.65	0.00E+00	1.45E+04	2.91E+04
Eu-154	1.6184E-02	10,382.82	20,765.65	0.00E+00	1.68E+02	3.36E+02
Eu-155	1.3774E-02	10,382.82	20,765.65	0.00E+00	1.43E+02	2.86E+02
Fe-55	3.8028E-04	10,382.82	20,765.65	0.00E+00	3.95E+00	7.90E+00
H-3	3.8454E-03	10,382.82	20,765.65	0.00E+00	3.99E+01	7.99E+01
I-129	1.2891E-06	10,382.82	20,765.65	0.00E+00	1.34E-02	2.68E-02
Kr-85	2.7848E-02	10,382.82	20,765.65	0.00E+00	2.89E+02	5.78E+02
Np-237	3.7516E-06	10,382.82	20,765.65	0.00E+00	3.90E-02	7.79E-02
Pa-231	1.2488E-11	10,382.82	20,765.65	0.00E+00	1.30E-07	2.59E-07
Pb-210	2.4206E-12	10,382.82	20,765.65	0.00E+00	2.51E-08	5.03E-08
Pm-147	1.5671E-02	10,382.82	20,765.65	0.00E+00	1.63E+02	3.25E+02
Pu-238	1.4877E-02	10,382.82	20,765.65	0.00E+00	1.54E+02	3.09E+02
Pu-239	-3.5520E-02	10,382.82	0.00	1.56E+03	1.19E+03	1.56E+03
Pu-240	2.0690E-02	10,382.82	20,765.65	7.92E+02	1.01E+03	1.22E+03
Pu-241	-1.4799E+00	10,382.82	0.00	3.56E+04	2.02E+04	3.56E+04
Pu-242	1.1252E-05	10,382.82	20,765.65	2.11E-01	3.28E-01	4.45E-01
Ra-226	7.8524E-12	10,382.82	20,765.65	0.00E+00	8.15E-08	1.63E-07
Ra-228	2.4086E-16	10,382.82	20,765.65	0.00E+00	2.50E-12	5.00E-12
Ru-106	1.5066E-05	10,382.82	20,765.65	0.00E+00	1.56E-01	3.13E-01
Se-79	1.0127E-05	10,382.82	20,765.65	0.00E+00	1.05E-01	2.10E-01
Sn-126	4.3902E-05	10,382.82	20,765.65	0.00E+00	4.56E-01	9.12E-01
Sr-90	5.0088E-01	10,382.82	20,765.65	0.00E+00	5.20E+03	1.04E+04
Tc-99	3.9412E-04	10,382.82	20,765.65	0.00E+00	4.09E+00	8.18E+00
Th-229	2.7219E-12	10,382.82	20,765.65	0.00E+00	2.83E-08	5.65E-08
Th-230	1.0441E-09	10,382.82	20,765.65	0.00E+00	1.08E-05	2.17E-05
Th-232	3.1689E-16	10,382.82	20,765.65	0.00E+00	3.29E-12	6.58E-12
Tl-208	4.6636E-07	10,382.82	20,765.65	0.00E+00	4.84E-03	9.68E-03
U-232	1.2638E-06	10,382.82	20,765.65	0.00E+00	1.31E-02	2.62E-02
U-233	5.7451E-10	10,382.82	20,765.65	0.00E+00	5.97E-06	1.19E-05
U-234	4.3044E-06	10,382.82	20,765.65	0.00E+00	4.47E-02	8.94E-02
U-235	-7.7765E-09	10,382.82	0.00	3.20E-04	2.39E-04	3.20E-04
U-236	1.8050E-07	10,382.82	20,765.65	0.00E+00	1.87E-03	3.75E-03
U-238	-1.7914E-07	10,382.82	0.00	2.33E-02	2.14E-02	2.33E-02
Y-90	5.0088E-01	10,382.82	20,765.65	0.00E+00	5.20E+03	1.04E+04
Other Radionuclides					1.47E+04	2.94E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.774E+14
0.0250	1.350E+14
0.0375	1.569E+14
0.0575	1.558E+14
0.0850	7.516E+13
0.1250	5.288E+13
0.2250	6.065E+13
0.3750	2.629E+13
0.5750	1.065E+15
0.8500	1.113E+13
1.2500	1.332E+13
1.7500	3.013E+11
2.2500	6.013E+07
2.7500	3.440E+06
3.5000	1.531E+06
5.0000	5.121E+05
7.0000	5.845E+04
11.0000	6.686E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.27E+02	3.98E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,382.82
Bounding:		20,765.65

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.69	
Bounding:	1.38	

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: FFTF-TFA-P0-2,4 & 5
SNF ID #: 333
Fuel Units & Descr: 3 - HEX ARRAY 169 ROD
Heavy Metal Mass: BOL= ; EOL=131.25kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	10,725.31	11,359.60	0.00E+00	6.63E-08	7.02E-08
Am-241	1.1066E-01	10,725.31	11,359.60	2.74E+02	1.46E+03	1.53E+03
Am-242m	1.9247E-03	10,725.31	11,359.60	0.00E+00	2.06E+01	2.19E+01
Am-243	1.0740E-04	10,725.31	11,359.60	0.00E+00	1.15E+00	1.22E+00
C-14	2.6042E-05	10,725.31	11,359.60	0.00E+00	2.79E-01	2.96E-01
Cl-36	3.4243E-10	10,725.31	11,359.60	0.00E+00	3.67E-06	3.89E-06
Cm-243	4.0629E-04	10,725.31	11,359.60	0.00E+00	4.36E+00	4.62E+00
Cm-244	1.6024E-03	10,725.31	11,359.60	0.00E+00	1.72E+01	1.82E+01
Co-60	3.4275E-03	10,725.31	11,359.60	0.00E+00	3.68E+01	3.89E+01
Cs-134	1.5566E-03	10,725.31	11,359.60	0.00E+00	1.67E+01	1.77E+01
Cs-135	4.7693E-05	10,725.31	11,359.60	0.00E+00	5.12E-01	5.42E-01
Cs-137	1.4007E+00	10,725.31	11,359.60	0.00E+00	1.50E+04	1.59E+04
Eu-154	1.6184E-02	10,725.31	11,359.60	0.00E+00	1.74E+02	1.84E+02
Eu-155	1.3774E-02	10,725.31	11,359.60	0.00E+00	1.48E+02	1.56E+02
Fe-55	3.8028E-04	10,725.31	11,359.60	0.00E+00	4.08E+00	4.32E+00
H-3	3.8454E-03	10,725.31	11,359.60	0.00E+00	4.12E+01	4.37E+01
I-129	1.2891E-06	10,725.31	11,359.60	0.00E+00	1.38E-02	1.46E-02
Kr-85	2.7848E-02	10,725.31	11,359.60	0.00E+00	2.99E+02	3.16E+02
Np-237	3.7516E-06	10,725.31	11,359.60	0.00E+00	4.02E-02	4.26E-02
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	2.4066E-16	10,725.31	11,359.60	0.00E+00	2.58E-12	2.74E-12
Ru-106	1.5066E-05	10,725.31	11,359.60	0.00E+00	1.62E-01	1.71E-01
Se-79	1.0127E-05	10,725.31	11,359.60	0.00E+00	1.09E-01	1.15E-01
Sn-126	4.3902E-05	10,725.31	11,359.60	0.00E+00	4.71E-01	4.99E-01
Sr-90	5.0088E-01	10,725.31	11,359.60	0.00E+00	5.37E+03	5.69E+03
Tc-99	3.9412E-04	10,725.31	11,359.60	0.00E+00	4.23E+00	4.48E+00
Th-229	2.7219E-12	10,725.31	11,359.60	0.00E+00	2.92E-08	3.09E-08
Th-230	1.0441E-09	10,725.31	11,359.60	0.00E+00	1.12E-05	1.19E-05
Th-232	3.1689E-16	10,725.31	11,359.60	0.00E+00	3.40E-12	3.60E-12
Tl-208	4.6636E-07	10,725.31	11,359.60	0.00E+00	5.00E-03	5.30E-03
U-232	1.2638E-06	10,725.31	11,359.60	0.00E+00	1.36E-02	1.44E-02
U-233	5.7451E-10	10,725.31	11,359.60	0.00E+00	6.16E-06	6.53E-06
U-234	4.3044E-06	10,725.31	11,359.60	0.00E+00	4.62E-02	4.89E-02
U-235	-7.7765E-09	10,725.31	0.00	4.61E-04	3.78E-04	4.61E-04
U-236	1.8050E-07	10,725.31	11,359.60	0.00E+00	1.94E-03	2.05E-03
U-238	-1.7914E-07	10,725.31	0.00	3.36E-02	3.17E-02	3.36E-02
Y-90	5.0088E-01	10,725.31	11,359.60	0.00E+00	5.37E+03	5.69E+03
Other Radionuclides					1.52E+04	1.61E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.797E+14
0.0250	7.403E+13
0.0375	8.585E+13
0.0575	8.760E+13
0.0850	4.112E+13
0.1250	2.894E+13
0.2250	3.318E+13
0.3750	1.438E+13
0.5750	5.827E+14
0.8500	6.088E+12
1.2500	7.287E+12
1.7500	1.648E+11
2.2500	3.367E+07
2.7500	1.886E+06
3.5000	1.234E+06
5.0000	4.485E+05
7.0000	5.113E+04
11.0000	5.847E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.67E+02	2.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,725.31
Bounding:		11,359.60

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.50	
Bounding:	0.53	

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: FFTF-TFA-SRF-3&4
SNF ID #: 334
Fuel Units & Descr: 2 - HEX ARRAY 91 ROD
Heavy Metal Mass: BOL= ; EOL=85.81kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	3,631.59	3,953.60	0.00E+00	2.25E-08	2.44E-08
Am-241	1.1066E-01	3,631.59	3,953.60	1.72E+02	5.74E+02	6.10E+02
Am-242m	1.9247E-03	3,631.59	3,953.60	0.00E+00	6.99E+00	7.61E+00
Am-243	1.0740E-04	3,631.59	3,953.60	0.00E+00	3.90E-01	4.25E-01
C-14	2.6042E-05	3,631.59	3,953.60	0.00E+00	9.46E-02	1.03E-01
Cl-36	3.4243E-10	3,631.59	3,953.60	0.00E+00	1.24E-06	1.35E-06
Cm-243	4.0629E-04	3,631.59	3,953.60	0.00E+00	1.48E+00	1.61E+00
Cm-244	1.6024E-03	3,631.59	3,953.60	0.00E+00	5.82E+00	6.34E+00
Co-60	3.4275E-03	3,631.59	3,953.60	0.00E+00	1.24E+01	1.36E+01
Cs-134	1.5566E-03	3,631.59	3,953.60	0.00E+00	5.65E+00	6.15E+00
Cs-135	4.7693E-05	3,631.59	3,953.60	0.00E+00	1.73E-01	1.89E-01
Cs-137	1.4007E+00	3,631.59	3,953.60	0.00E+00	5.09E+03	5.54E+03
Eu-154	1.6184E-02	3,631.59	3,953.60	0.00E+00	5.88E+01	6.40E+01
Eu-155	1.3774E-02	3,631.59	3,953.60	0.00E+00	5.00E+01	5.45E+01
Fe-55	3.8028E-04	3,631.59	3,953.60	0.00E+00	1.38E+00	1.50E+00
H-3	3.8454E-03	3,631.59	3,953.60	0.00E+00	1.40E+01	1.52E+01
I-129	1.2891E-06	3,631.59	3,953.60	0.00E+00	4.68E-03	5.10E-03
Kr-85	2.7848E-02	3,631.59	3,953.60	0.00E+00	1.01E+02	1.10E+02
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-06	3,631.59	3,953.60	0.00E+00	3.68E-02	4.00E-02
Sn-126	4.3902E-05	3,631.59	3,953.60	0.00E+00	1.59E-01	1.74E-01
Sr-90	5.0088E-01	3,631.59	3,953.60	0.00E+00	1.82E+03	1.98E+03
Tc-99	3.9412E-04	3,631.59	3,953.60	0.00E+00	1.43E+00	1.56E+00
Th-229	2.7219E-12	3,631.59	3,953.60	0.00E+00	9.88E-09	1.08E-08
Th-230	1.0441E-09	3,631.59	3,953.60	0.00E+00	3.79E-06	4.13E-06
Th-232	3.1689E-16	3,631.59	3,953.60	0.00E+00	1.15E-12	1.25E-12
Tl-208	4.6636E-07	3,631.59	3,953.60	0.00E+00	1.69E-03	1.84E-03
U-232	1.2638E-06	3,631.59	3,953.60	0.00E+00	4.59E-03	5.00E-03
U-233	5.7451E-10	3,631.59	3,953.60	0.00E+00	2.09E-06	2.27E-06
U-234	4.3044E-06	3,631.59	3,953.60	0.00E+00	1.56E-02	1.70E-02
U-235	-7.7765E-09	3,631.59	0.00	2.91E-04	2.62E-04	2.91E-04
U-236	1.8050E-07	3,631.59	3,953.60	0.00E+00	6.55E-04	7.14E-04
U-238	-1.7914E-07	3,631.59	0.00	2.12E-02	2.05E-02	2.12E-02
Y-90	5.0088E-01	3,631.59	3,953.60	0.00E+00	1.82E+03	1.98E+03
Other Radionuclides					5.15E+03	5.60E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.363E+14
0.0250	2.584E+13
0.0375	2.989E+13
0.0575	3.156E+13
0.0850	1.431E+13
0.1250	1.007E+13
0.2250	1.155E+13
0.3750	5.008E+12
0.5750	2.028E+14
0.8500	2.119E+12
1.2500	2.536E+12
1.7500	5.737E+10
2.2500	1.207E+07
2.7500	6.585E+07
3.5000	6.094E+05
5.0000	2.326E+05
7.0000	2.650E+04
11.0000	3.030E+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 reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

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

Basis for burnup used in 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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-UO-1
SNF ID #: 335
Fuel Units & Descr: 1 - HEX ARRAY 217 ROD
Heavy Metal Mass: BOL= ; EOL=35.012kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.1822E-12	835.27	1,229.60	0.00E+00	5.16E-09	7.60E-09
Am-241	1.1066E-01	835.27	1,229.60	6.91E+01	1.62E+02	2.05E+02
Am-242m	1.9247E-03	835.27	1,229.60	0.00E+00	1.81E+00	2.37E+00
Am-243	1.0740E-04	835.27	1,229.60	0.00E+00	8.97E-02	1.32E-01
C-14	2.6042E-05	835.27	1,229.60	0.00E+00	2.18E-02	3.20E-02
Cl-36	3.4243E-10	835.27	1,229.60	0.00E+00	2.86E-07	4.21E-07
Cm-243	4.0629E-04	835.27	1,229.60	0.00E+00	3.39E-01	5.00E-01
Cm-244	1.6024E-03	835.27	1,229.60	0.00E+00	1.34E+00	1.97E+00
Co-60	3.4275E-03	835.27	1,229.60	0.00E+00	2.86E+00	4.21E+00
Cs-134	1.5566E-03	835.27	1,229.60	0.00E+00	1.30E+00	1.91E+00
Cs-135	4.7693E-05	835.27	1,229.60	0.00E+00	3.98E-02	5.86E-02
Cs-137	1.4007E+00	835.27	1,229.60	0.00E+00	1.17E+03	1.72E+03
Eu-154	1.6184E-02	835.27	1,229.60	0.00E+00	1.35E+01	1.99E+01
Eu-155	1.3774E-02	835.27	1,229.60	0.00E+00	1.15E+01	1.69E+01
Fe-55	3.8028E-04	835.27	1,229.60	0.00E+00	3.18E-01	4.68E-01
H-3	3.8454E-03	835.27	1,229.60	0.00E+00	3.21E+00	4.73E+00
I-129	1.2891E-06	835.27	1,229.60	0.00E+00	1.08E-03	1.59E-03
Kr-85	2.7848E-02	835.27	1,229.60	0.00E+00	2.33E+01	3.42E+01
Np-237	3.7516E-06	835.27	1,229.60	0.00E+00	3.13E-03	4.61E-03
Pa-231	1.2488E-11	835.27	1,229.60	0.00E+00	1.04E-08	1.54E-08
Pb-210	2.4206E-12	835.27	1,229.60	0.00E+00	2.02E-09	2.98E-09
Pm-147	1.5671E-02	835.27	1,229.60	0.00E+00	1.31E+01	1.93E+01
Pu-238	1.4877E-02	835.27	1,229.60	0.00E+00	1.24E+01	1.83E+01
Pu-239	-3.5520E-02	835.27	0.00	5.67E+02	5.38E+02	5.67E+02
Pu-240	2.0690E-02	835.27	1,229.60	2.88E+02	3.06E+02	3.14E+02
Pu-241	-1.4799E+00	835.27	0.00	1.29E+04	1.17E+04	1.29E+04
Pu-242	1.1252E-05	835.27	1,229.60	7.69E-02	8.63E-02	9.07E-02
Ra-226	7.8524E-12	835.27	1,229.60	0.00E+00	6.56E-09	9.66E-09
Ra-228	2.4086E-16	835.27	1,229.60	0.00E+00	2.01E-13	2.96E-13
Ru-106	1.5066E-05	835.27	1,229.60	0.00E+00	1.26E-02	1.85E-02
Se-79	1.0127E-05	835.27	1,229.60	0.00E+00	8.46E-03	1.25E-02
Sn-126	4.3902E-05	835.27	1,229.60	0.00E+00	3.67E-02	5.40E-02
Sr-90	5.0088E-01	835.27	1,229.60	0.00E+00	4.18E+02	6.16E+02
Tc-99	3.9412E-04	835.27	1,229.60	0.00E+00	3.29E-01	4.85E-01
Th-229	2.7219E-12	835.27	1,229.60	0.00E+00	2.27E-09	3.35E-09
Th-230	1.0441E-09	835.27	1,229.60	0.00E+00	8.72E-07	1.28E-06
Th-232	3.1689E-16	835.27	1,229.60	0.00E+00	2.65E-13	3.90E-13
Tl-208	4.6636E-07	835.27	1,229.60	0.00E+00	3.90E-04	5.73E-04
U-232	1.2638E-06	835.27	1,229.60	0.00E+00	1.06E-03	1.55E-03
U-233	5.7451E-10	835.27	1,229.60	0.00E+00	4.80E-07	7.06E-07
U-234	4.3044E-06	835.27	1,229.60	0.00E+00	3.60E-03	5.29E-03
U-235	-7.7765E-09	835.27	0.00	1.16E-04	1.10E-04	1.16E-04
U-236	1.8050E-07	835.27	1,229.60	0.00E+00	1.51E-04	2.22E-04
U-238	-1.7914E-07	835.27	0.00	8.48E-03	8.33E-03	8.48E-03
Y-90	5.0088E-01	835.27	1,229.60	0.00E+00	4.18E+02	6.16E+02
Other Radionuclides					1.18E+03	1.74E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.323E+13
0.0250	8.050E+12
0.0375	9.296E+12
0.0575	1.003E+13
0.0850	4.451E+12
0.1250	3.134E+12
0.2250	3.592E+12
0.3750	1.558E+12
0.5750	6.307E+13
0.8500	6.590E+11
1.2500	7.887E+11
1.7500	1.784E+10
2.2500	3.824E+06
2.7500	2.052E+07
3.5000	2.257E+05
5.0000	8.766E+04
7.0000	9.988E+03
11.0000	1.142E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.10E+01	4.80E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		835.27
Bounding:		1,229.60

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	0.23	

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: FFTF-TFA-WBO18 & WBO42
SNF ID #: 336
Fuel Units & Descr: 2 - HEX ARRAY 61 ROD
Heavy Metal Mass: BOL= ; EOL=94.984kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FERMI (Fast, Zirc. 10 to 40%, U)
[2]Template Burnup(MWd): 58.6725048
Template BOL Heavy Metal Mass (MT): 0.016774
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 0.40

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.6110E-08	1,204.37	1,348.90	0.00E+00	1.16E-04	1.30E-04
Am-241	6.5601E-07	1,204.37	1,348.90	0.00E+00	7.90E-04	8.85E-04
Am-242m	0.0000E+00	1,204.37	1,348.90	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	1,204.37	1,348.90	0.00E+00	1.01E-11	1.13E-11
C-14	2.1714E-05	1,204.37	1,348.90	0.00E+00	2.62E-02	2.93E-02
Cl-36	5.5188E-08	1,204.37	1,348.90	0.00E+00	6.65E-05	7.44E-05
Cm-243	1.5496E-14	1,204.37	1,348.90	0.00E+00	1.87E-11	2.09E-11
Cm-244	5.2375E-16	1,204.37	1,348.90	0.00E+00	6.31E-13	7.06E-13
Co-60	2.0947E-03	1,204.37	1,348.90	0.00E+00	2.52E+00	2.83E+00
Cs-134	6.2448E-07	1,204.37	1,348.90	0.00E+00	7.52E-04	8.42E-04
Cs-135	4.4996E-05	1,204.37	1,348.90	0.00E+00	5.42E-02	6.07E-02
Cs-137	1.3775E+00	1,204.37	1,348.90	0.00E+00	1.66E+03	1.86E+03
Eu-154	1.8510E-04	1,204.37	1,348.90	0.00E+00	2.23E-01	2.50E-01
Eu-155	1.4163E-03	1,204.37	1,348.90	0.00E+00	1.71E+00	1.91E+00
Fe-55	1.4179E-05	1,204.37	1,348.90	0.00E+00	1.71E-02	1.91E-02
H-3	3.5383E-03	1,204.37	1,348.90	0.00E+00	4.26E+00	4.77E+00
I-129	1.1426E-06	1,204.37	1,348.90	0.00E+00	1.38E-03	1.54E-03
Kr-85	3.8604E-02	1,204.37	1,348.90	0.00E+00	4.65E+01	5.21E+01
Np-237	3.3099E-06	1,204.37	1,348.90	0.00E+00	3.99E-03	4.46E-03
Pa-231	1.8953E-07	1,204.37	1,348.90	0.00E+00	2.28E-04	2.56E-04
Pb-210	8.9531E-12	1,204.37	1,348.90	0.00E+00	1.08E-08	1.21E-08
Pm-147	1.1588E-03	1,204.37	1,348.90	0.00E+00	1.40E+00	1.56E+00
Pu-238	1.7146E-04	1,204.37	1,348.90	0.00E+00	2.07E-01	2.31E-01
Pu-239	1.9464E-02	1,204.37	1,348.90	0.00E+00	2.34E+01	2.63E+01
Pu-240	6.7919E-05	1,204.37	1,348.90	0.00E+00	8.18E-02	9.16E-02
Pu-241	4.1774E-06	1,204.37	1,348.90	0.00E+00	5.03E-03	5.63E-03
Pu-242	4.3751E-13	1,204.37	1,348.90	0.00E+00	5.27E-10	5.90E-10
Ra-226	2.4219E-11	1,204.37	1,348.90	0.00E+00	2.92E-08	3.27E-08
Ra-228	2.3572E-11	1,204.37	1,348.90	0.00E+00	2.84E-08	3.18E-08
Ru-106	3.0951E-10	1,204.37	1,348.90	0.00E+00	3.73E-07	4.18E-07
Se-79	1.6488E-05	1,204.37	1,348.90	0.00E+00	1.99E-02	2.22E-02
Sn-126	3.7564E-05	1,204.37	1,348.90	0.00E+00	4.52E-02	5.07E-02
Sr-90	1.2052E+00	1,204.37	1,348.90	0.00E+00	1.45E+03	1.63E+03
Tc-99	4.4825E-04	1,204.37	1,348.90	0.00E+00	5.40E-01	6.05E-01
Th-229	4.6478E-11	1,204.37	1,348.90	0.00E+00	5.60E-08	6.27E-08
Th-230	2.2259E-09	1,204.37	1,348.90	0.00E+00	2.68E-06	3.00E-06
Th-232	2.3691E-11	1,204.37	1,348.90	0.00E+00	2.85E-08	3.20E-08
Tl-208	5.8256E-09	1,204.37	1,348.90	0.00E+00	7.02E-06	7.86E-06
U-232	1.5759E-08	1,204.37	1,348.90	0.00E+00	1.90E-05	2.13E-05
U-233	1.0110E-08	1,204.37	1,348.90	0.00E+00	1.22E-05	1.36E-05
U-234	4.9001E-06	1,204.37	1,348.90	0.00E+00	5.90E-03	6.61E-03
U-235	-2.3191E-06	1,204.37	0.00	5.33E-02	5.05E-02	5.33E-02
U-236	1.2633E-05	1,204.37	1,348.90	0.00E+00	1.52E-02	1.70E-02
U-238	-9.5407E-08	1,204.37	0.00	2.41E-02	2.40E-02	2.41E-02
Y-90	1.2053E+00	1,204.37	1,348.90	0.00E+00	1.45E+03	1.63E+03
Other Radionuclides					1.65E+03	1.85E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.926E+13
0.0250	1.854E+13
0.0375	1.631E+13
0.0575	1.728E+13
0.0850	1.045E+13
0.1250	6.768E+12
0.2250	8.970E+12
0.3750	3.908E+12
0.5750	6.904E+13
0.8500	6.376E+11
1.2500	4.229E+11
1.7500	1.645E+10
2.2500	2.902E+08
2.7500	2.798E+05
3.5000	3.574E+02
5.0000	1.306E+02
7.0000	1.244E+01
11.0000	1.257E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.86E+01	2.08E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:
This Template was used for the following reasons:
This template is a good approximation since it is a FAST, Uranium fuel

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,204.37
Bounding:		1,348.90

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=96.35kg
Bounding burnup taken from SFD and converted to MWd using BOL=96.35kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.00	
Bounding:	4.48	

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: GE TEST
SNF ID #: 96
Fuel Units & Descr: 22 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=45.203kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329181
Template Decay Time: 50 years

Estimated Canister usage:

HIC
2.00

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	9.4369E-12	45,119.38	45,119.38	0.00E+00	4.26E-07	4.26E-07
Am-241	1.1078E-01	45,119.38	45,119.38	1.74E+02	5.17E+03	5.17E+03
Am-242m	1.7940E-03	45,119.38	45,119.38	0.00E+00	8.09E+01	8.09E+01
Am-243	1.0724E-04	45,119.38	45,119.38	0.00E+00	4.84E+00	4.84E+00
C-14	2.5942E-05	45,119.38	45,119.38	0.00E+00	1.17E+00	1.17E+00
Cl-36	3.4243E-10	45,119.38	45,119.38	0.00E+00	1.55E-05	1.55E-05
Cm-243	2.8217E-04	45,119.38	45,119.38	0.00E+00	1.27E+01	1.27E+01
Cm-244	7.7027E-04	45,119.38	45,119.38	0.00E+00	3.48E+01	3.48E+01
Co-60	1.3011E-04	45,119.38	45,119.38	0.00E+00	5.87E+00	5.87E+00
Cs-134	1.2951E-07	45,119.38	45,119.38	0.00E+00	5.84E-03	5.84E-03
Cs-135	4.7693E-05	45,119.38	45,119.38	0.00E+00	2.15E+00	2.15E+00
Cs-137	9.3351E-01	45,119.38	45,119.38	0.00E+00	4.21E+04	4.21E+04
Eu-154	2.6341E-03	45,119.38	45,119.38	0.00E+00	1.19E+02	1.19E+02
Eu-155	4.0968E-04	45,119.38	45,119.38	0.00E+00	1.85E+01	1.85E+01
Fe-55	2.5543E-07	45,119.38	45,119.38	0.00E+00	1.15E-02	1.15E-02
H-3	1.2053E-03	45,119.38	45,119.38	0.00E+00	5.44E+01	5.44E+01
I-129	1.2891E-06	45,119.38	45,119.38	0.00E+00	5.82E-02	5.82E-02
Kr-85	7.0043E-03	45,119.38	45,119.38	0.00E+00	3.16E+02	3.16E+02
Np-237	4.3622E-06	45,119.38	45,119.38	0.00E+00	1.97E-01	1.97E-01
Pa-231	1.6733E-11	45,119.38	45,119.38	0.00E+00	7.55E-07	7.55E-07
Pb-210	6.0684E-12	45,119.38	45,119.38	0.00E+00	2.74E-07	2.74E-07
Pm-147	1.1315E-05	45,119.38	45,119.38	0.00E+00	5.11E-01	5.11E-01
Pu-238	6.1482E-03	45,119.38	45,119.38	0.00E+00	2.77E+02	2.77E+02
Pu-239	-3.5520E-02	45,119.38	0.00	1.43E+03	0.00E+00	1.43E+03
Pu-240	2.0590E-02	45,119.38	45,119.38	7.27E+02	1.66E+03	1.66E+03
Pu-241	-2.0307E+00	45,119.38	0.00	3.26E+04	0.00E+00	3.26E+04
Pu-242	1.1252E-05	45,119.38	45,119.38	1.94E-01	7.02E-01	7.02E-01
Ra-226	1.6601E-11	45,119.38	45,119.38	0.00E+00	7.49E-07	7.49E-07
Ra-228	3.7077E-16	45,119.38	45,119.38	0.00E+00	1.67E-11	1.67E-11
Ru-106	3.3126E-14	45,119.38	45,119.38	0.00E+00	1.49E-09	1.49E-09
Se-79	1.0117E-05	45,119.38	45,119.38	0.00E+00	4.56E-01	4.56E-01
Sn-126	4.3902E-05	45,119.38	45,119.38	0.00E+00	1.98E+00	1.98E+00
Sr-90	3.2926E-01	45,119.38	45,119.38	0.00E+00	1.49E+04	1.49E+04
Tc-99	3.9412E-04	45,119.38	45,119.38	0.00E+00	1.78E+01	1.78E+01
Th-229	3.6957E-12	45,119.38	45,119.38	0.00E+00	1.67E-07	1.67E-07
Th-230	1.6942E-09	45,119.38	45,119.38	0.00E+00	7.64E-05	7.64E-05
Th-232	4.6236E-16	45,119.38	45,119.38	0.00E+00	2.09E-11	2.09E-11
Tl-208	4.0390E-07	45,119.38	45,119.38	0.00E+00	1.82E-02	1.82E-02
U-232	1.0941E-06	45,119.38	45,119.38	0.00E+00	4.94E-02	4.94E-02
U-233	8.1218E-10	45,119.38	45,119.38	0.00E+00	3.66E-05	3.66E-05
U-234	5.3101E-06	45,119.38	45,119.38	0.00E+00	2.40E-01	2.40E-01
U-235	-6.7647E-09	45,119.38	0.00	2.94E-04	0.00E+00	2.94E-04
U-236	2.1272E-07	45,119.38	45,119.38	0.00E+00	9.60E-03	9.60E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.732E+14
0.0250	1.917E+14
0.0375	2.185E+14
0.0575	2.428E+14
0.0850	1.026E+14
0.1250	6.757E+13
0.2250	8.525E+13
0.3750	3.629E+13
0.5750	1.538E+15
0.8500	8.034E+12
1.2500	4.756E+12
1.7500	2.190E+11
2.2500	2.164E+07
2.7500	6.416E+08
3.5000	1.517E+06
5.0000	6.435E+05
7.0000	7.329E+04
11.0000	8.374E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.39E+02	8.85E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	ZIRC	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) and cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		45,119.38
Bounding:		45,119.38

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:	3.28	
Bounding:	3.28	

Estimated EOL HM/Given EOL HM: 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LWR COMMERCIAL FUEL
SNF ID #: 130
Fuel Units & Descr: 6 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=63.893kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	60,759.03	60,759.03	0.00E+00	5.33E-05	5.33E-05
Am-241	1.4352E-01	60,759.03	60,759.03	0.00E+00	8.72E+03	8.72E+03
Am-242m	2.8698E-04	60,759.03	60,759.03	0.00E+00	1.74E+01	1.74E+01
Am-243	6.2565E-04	60,759.03	60,759.03	0.00E+00	3.80E+01	3.80E+01
C-14	4.7901E-05	60,759.03	60,759.03	0.00E+00	2.91E+00	2.91E+00
Cl-36	8.0297E-07	60,759.03	60,759.03	0.00E+00	4.88E-02	4.88E-02
Cm-243	2.5081E-04	60,759.03	60,759.03	0.00E+00	1.52E+01	1.52E+01
Cm-244	4.9015E-02	60,759.03	60,759.03	0.00E+00	2.98E+03	2.98E+03
Co-60	2.5581E-03	60,759.03	60,759.03	0.00E+00	1.55E+02	1.55E+02
Cs-134	4.0536E-05	60,759.03	60,759.03	0.00E+00	2.46E+00	2.46E+00
Cs-135	1.4433E-05	60,759.03	60,759.03	0.00E+00	8.77E-01	8.77E-01
Cs-137	1.3979E+00	60,759.03	60,759.03	0.00E+00	8.49E+04	8.49E+04
Eu-154	2.0203E-02	60,759.03	60,759.03	0.00E+00	1.23E+03	1.23E+03
Eu-155	1.7684E-03	60,759.03	60,759.03	0.00E+00	1.07E+02	1.07E+02
Fe-55	4.3136E-05	60,759.03	60,759.03	0.00E+00	2.62E+00	2.62E+00
H-3	2.0769E-02	60,759.03	60,759.03	0.00E+00	1.26E+03	1.26E+03
I-129	9.8288E-07	60,759.03	60,759.03	0.00E+00	5.97E-02	5.97E-02
Kr-85	2.8214E-02	60,759.03	60,759.03	0.00E+00	1.71E+03	1.71E+03
Np-237	1.1218E-05	60,759.03	60,759.03	0.00E+00	6.82E-01	6.82E-01
Pa-231	1.3036E-09	60,759.03	60,759.03	0.00E+00	7.92E-05	7.92E-05
Pb-210	8.5078E-11	60,759.03	60,759.03	0.00E+00	5.17E-06	5.17E-06
Pm-147	3.6531E-04	60,759.03	60,759.03	0.00E+00	2.22E+01	2.22E+01
Pu-238	7.4564E-02	60,759.03	60,759.03	0.00E+00	4.53E+03	4.53E+03
Pu-239	1.1623E-02	60,759.03	60,759.03	0.00E+00	7.06E+02	7.06E+02
Pu-240	1.5132E-02	60,759.03	60,759.03	0.00E+00	9.19E+02	9.19E+02
Pu-241	9.0036E-01	60,759.03	60,759.03	0.00E+00	5.47E+04	5.47E+04
Pu-242	6.4260E-05	60,759.03	60,759.03	0.00E+00	3.90E+00	3.90E+00
Ra-226	2.2804E-10	60,759.03	60,759.03	0.00E+00	1.39E-05	1.39E-05
Ra-228	5.2713E-12	60,759.03	60,759.03	0.00E+00	3.20E-07	3.20E-07
Ru-106	6.1160E-10	60,759.03	60,759.03	0.00E+00	3.72E-05	3.72E-05
Se-79	1.2377E-05	60,759.03	60,759.03	0.00E+00	7.52E-01	7.52E-01
Sn-126	2.5210E-05	60,759.03	60,759.03	0.00E+00	1.53E+00	1.53E+00
Sr-90	9.1667E-01	60,759.03	60,759.03	0.00E+00	5.57E+04	5.57E+04
Tc-99	3.9357E-04	60,759.03	60,759.03	0.00E+00	2.39E+01	2.39E+01
Th-229	1.2057E-10	60,759.03	60,759.03	0.00E+00	7.33E-06	7.33E-06
Th-230	2.1043E-08	60,759.03	60,759.03	0.00E+00	1.28E-03	1.28E-03
Th-232	5.2972E-12	60,759.03	60,759.03	0.00E+00	3.22E-07	3.22E-07
Tl-208	1.7474E-07	60,759.03	60,759.03	0.00E+00	1.06E-02	1.06E-02
U-232	4.7368E-07	60,759.03	60,759.03	0.00E+00	2.88E-02	2.88E-02
U-233	2.5097E-08	60,759.03	60,759.03	0.00E+00	1.52E-03	1.52E-03
U-234	5.0000E-05	60,759.03	60,759.03	0.00E+00	3.04E+00	3.04E+00
U-235	-1.4489E-06	60,759.03	0.00	8.84E-03	0.00E+00	8.84E-03
U-236	7.5824E-06	60,759.03	60,759.03	0.00E+00	4.61E-01	4.61E-01
U-238	-2.6129E-07	60,759.03	0.00	4.16E-02	2.57E-02	4.16E-02
Y-90	9.1699E-01	60,759.03	60,759.03	0.00E+00	5.57E+04	5.57E+04
Other Radionuclides					8.16E+04	8.16E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.269E+15
0.0250	6.592E+14
0.0375	6.287E+14
0.0575	7.265E+14
0.0850	3.658E+14
0.1250	2.538E+14
0.2250	3.137E+14
0.3750	1.349E+14
0.5750	3.137E+15
0.8500	4.340E+13
1.2500	4.263E+13
1.7500	1.277E+12
2.2500	2.056E+08
2.7500	4.212E+08
3.5000	4.336E+07
5.0000	1.854E+07
7.0000	2.137E+06
11.0000	2.454E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.40E+03	1.40E+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 %:		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:		60,759.03
Bounding:		60,759.03

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.58

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1963
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.2581E-09	2,143.51	2,449.72	0.00E+00	2.70E-06	3.08E-06
Am-241	1.4761E-01	2,143.51	2,449.72	0.00E+00	3.16E+02	3.62E+02
Am-242m	2.5032E-04	2,143.51	2,449.72	0.00E+00	5.37E-01	6.13E-01
Am-243	6.2387E-04	2,143.51	2,449.72	0.00E+00	1.34E+00	1.53E+00
C-14	4.7739E-05	2,143.51	2,449.72	0.00E+00	1.02E-01	1.17E-01
Cl-36	8.0297E-07	2,143.51	2,449.72	0.00E+00	1.72E-03	1.97E-03
Cm-243	1.2099E-04	2,143.51	2,449.72	0.00E+00	2.59E-01	2.96E-01
Cm-244	1.5560E-02	2,143.51	2,449.72	0.00E+00	3.34E+01	3.81E+01
Co-60	4.9580E-05	2,143.51	2,449.72	0.00E+00	1.06E-01	1.21E-01
Cs-134	1.7022E-09	2,143.51	2,449.72	0.00E+00	3.65E-06	4.17E-06
Cs-135	1.4433E-05	2,143.51	2,449.72	0.00E+00	3.09E-02	3.54E-02
Cs-137	6.9929E-01	2,143.51	2,449.72	0.00E+00	1.50E+03	1.71E+03
Eu-154	1.8023E-03	2,143.51	2,449.72	0.00E+00	3.86E+00	4.42E+00
Eu-155	2.6793E-05	2,143.51	2,449.72	0.00E+00	5.74E-02	6.56E-02
Fe-55	1.4580E-08	2,143.51	2,449.72	0.00E+00	3.13E-05	3.57E-05
H-3	3.8566E-03	2,143.51	2,449.72	0.00E+00	8.27E+00	9.45E+00
I-129	9.8288E-07	2,143.51	2,449.72	0.00E+00	2.11E-03	2.41E-03
Kr-85	4.0617E-03	2,143.51	2,449.72	0.00E+00	8.71E+00	9.95E+00
Np-237	1.2645E-05	2,143.51	2,449.72	0.00E+00	2.71E-02	3.10E-02
Pa-231	1.6376E-09	2,143.51	2,449.72	0.00E+00	3.51E-06	4.01E-06
Pb-210	2.8795E-10	2,143.51	2,449.72	0.00E+00	6.17E-07	7.05E-07
Pm-147	1.3264E-07	2,143.51	2,449.72	0.00E+00	2.84E-04	3.25E-04
Pu-238	5.8882E-02	2,143.51	2,449.72	0.00E+00	1.26E+02	1.44E+02
Pu-239	1.1613E-02	2,143.51	2,449.72	0.00E+00	2.49E+01	2.84E+01
Pu-240	1.5142E-02	2,143.51	2,449.72	0.00E+00	3.25E+01	3.71E+01
Pu-241	2.1269E-01	2,143.51	2,449.72	0.00E+00	4.56E+02	5.21E+02
Pu-242	6.4260E-05	2,143.51	2,449.72	0.00E+00	1.38E-01	1.57E-01
Ra-226	5.8689E-10	2,143.51	2,449.72	0.00E+00	1.26E-06	1.44E-06
Ra-228	5.3036E-12	2,143.51	2,449.72	0.00E+00	1.14E-08	1.30E-08
Ru-106	6.8136E-19	2,143.51	2,449.72	0.00E+00	1.46E-15	1.67E-15
Se-79	1.2372E-05	2,143.51	2,449.72	0.00E+00	2.65E-02	3.03E-02
Sn-126	2.5194E-05	2,143.51	2,449.72	0.00E+00	5.40E-02	6.17E-02
Sr-90	4.4913E-01	2,143.51	2,449.72	0.00E+00	9.63E+02	1.10E+03
Tc-99	3.9357E-04	2,143.51	2,449.72	0.00E+00	8.44E-01	9.64E-01
Th-229	1.9331E-10	2,143.51	2,449.72	0.00E+00	4.14E-07	4.74E-07
Th-230	3.5223E-08	2,143.51	2,449.72	0.00E+00	7.55E-05	8.63E-05
Th-232	5.3085E-12	2,143.51	2,449.72	0.00E+00	1.14E-08	1.30E-08
Tl-208	1.3102E-07	2,143.51	2,449.72	0.00E+00	2.81E-04	3.21E-04
U-232	3.5497E-07	2,143.51	2,449.72	0.00E+00	7.61E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.632E+13
0.0250	1.317E+13
0.0375	1.231E+13
0.0575	1.690E+13
0.0850	7.209E+12
0.1250	4.702E+12
0.2250	6.130E+12
0.3750	2.653E+12
0.5750	6.316E+13
0.8500	5.063E+11
1.2500	2.367E+11
1.7500	1.362E+10
2.2500	2.399E+06
2.7500	1.193E+07
3.5000	5.921E+05
5.0000	2.529E+05
7.0000	2.911E+04
11.0000	3.341E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.15E+01	3.59E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	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	2,365.59

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: N REACTOR
SNF ID #: 991
Fuel Units & Descr: 103673 - 2 CONCENTRIC TUBES
Heavy Metal Mass: BOL=2102208.523kg; EOL=2099824.044kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1971
Estimates as of: 2030
Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.7399E-10	5,060,015.91	5,718,007.18	0.00E+00	4.42E-03	5.00E-03
Am-241	9.9095E-02	5,060,015.91	5,718,007.18	0.00E+00	5.01E+05	5.67E+05
Am-242m	5.4598E-05	5,060,015.91	5,718,007.18	0.00E+00	2.76E+02	3.12E+02
Am-243	4.6221E-05	5,060,015.91	5,718,007.18	0.00E+00	2.34E+02	2.64E+02
C-14	9.1853E-05	5,060,015.91	5,718,007.18	0.00E+00	4.65E+02	5.25E+02
Cl-36	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00
Cm-244	2.5589E-04	5,060,015.91	5,718,007.18	0.00E+00	1.29E+03	1.46E+03
Co-60	8.8563E-06	5,060,015.91	5,718,007.18	0.00E+00	4.48E+01	5.06E+01
Cs-134	9.0661E-08	5,060,015.91	5,718,007.18	0.00E+00	4.59E-01	5.18E-01
Cs-135	1.0066E-05	5,060,015.91	5,718,007.18	0.00E+00	5.09E+01	5.76E+01
Cs-137	8.4454E-01	5,060,015.91	5,718,007.18	0.00E+00	4.27E+06	4.83E+06
Eu-154	1.9842E-03	5,060,015.91	5,718,007.18	0.00E+00	1.00E+04	1.13E+04
Eu-155	3.5690E-05	5,060,015.91	5,718,007.18	0.00E+00	1.81E+02	2.04E+02
Fe-55	5.2802E-08	5,060,015.91	5,718,007.18	0.00E+00	2.67E-01	3.02E-01
H-3	9.0776E-04	5,060,015.91	5,718,007.18	0.00E+00	4.59E+03	5.19E+03
I-129	8.6006E-07	5,060,015.91	5,718,007.18	0.00E+00	4.35E+00	4.92E+00
Kr-85	1.0138E-02	5,060,015.91	5,718,007.18	0.00E+00	5.13E+04	5.80E+04
Np-237	9.0345E-06	5,060,015.91	5,718,007.18	0.00E+00	4.57E+01	5.17E+01
Pa-231	1.9210E-09	5,060,015.91	5,718,007.18	0.00E+00	9.72E-03	1.10E-02
Pb-210	7.5862E-11	5,060,015.91	5,718,007.18	0.00E+00	3.84E-04	4.34E-04
Pm-147	1.1372E-05	5,060,015.91	5,718,007.18	0.00E+00	5.75E+01	6.50E+01
Pu-238	1.7802E-02	5,060,015.91	5,718,007.18	0.00E+00	9.01E+04	1.02E+05
Pu-239	2.8822E-02	5,060,015.91	5,718,007.18	0.00E+00	1.46E+05	1.65E+05
Pu-240	2.2759E-02	5,060,015.91	5,718,007.18	0.00E+00	1.15E+05	1.30E+05
Pu-241	2.9641E-01	5,060,015.91	5,718,007.18	0.00E+00	1.50E+06	1.69E+06
Pu-242	1.4526E-05	5,060,015.91	5,718,007.18	0.00E+00	7.35E+01	8.31E+01
Ra-226	2.3132E-10	5,060,015.91	5,718,007.18	0.00E+00	1.17E-03	1.32E-03
Ra-228	1.9655E-14	5,060,015.91	5,718,007.18	0.00E+00	9.95E-08	1.12E-07
Ru-106	1.9612E-14	5,060,015.91	5,718,007.18	0.00E+00	9.92E-08	1.12E-07
Se-79	1.0897E-05	5,060,015.91	5,718,007.18	0.00E+00	5.51E+01	6.23E+01
Sn-126	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00
Sr-90	5.9411E-01	5,060,015.91	5,718,007.18	0.00E+00	3.01E+06	3.40E+06
Tc-99	3.6494E-04	5,060,015.91	5,718,007.18	0.00E+00	1.85E+03	2.09E+03
Th-229	3.1063E-12	5,060,015.91	5,718,007.18	0.00E+00	1.57E-05	1.78E-05
Th-230	2.5187E-08	5,060,015.91	5,718,007.18	0.00E+00	1.27E-01	1.44E-01
Th-232	2.5287E-14	5,060,015.91	5,718,007.18	0.00E+00	1.28E-07	1.45E-07
Tl-208	6.4885E-15	5,060,015.91	5,718,007.18	0.00E+00	3.28E-08	3.71E-08
U-232	0.0000E+00	5,060,015.91	5,718,007.18	0.00E+00	0.00E+00	0.00E+00
U-233	1.5704E-09	5,060,015.91	5,718,007.18	0.00E+00	7.95E-03	8.98E-03
U-234	6.6293E-05	5,060,015.91	5,718,007.18	0.00E+00	3.35E+02	3.79E+02
U-235	-1.2930E-06	5,060,015.91	0.00	5.22E+01	4.57E+01	5.22E+01
U-236	1.1961E-05	5,060,015.91	5,718,007.18	0.00E+00	6.05E+01	6.84E+01
U-238	-3.0619E-07	5,060,015.91	0.00	6.98E+02	6.97E+02	6.98E+02
Y-90	5.9425E-01	5,060,015.91	5,718,007.18	0.00E+00	3.01E+06	3.40E+06
Other Radionuclides					4.12E+06	4.65E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.961E+17
0.0250	3.987E+16
0.0375	3.672E+16
0.0575	4.438E+16
0.0850	2.204E+16
0.1250	1.441E+16
0.2250	1.887E+16
0.3750	8.181E+15
0.5750	1.784E+17
0.8500	1.524E+15
1.2500	6.649E+14
1.7500	4.073E+13
2.2500	3.974E+09
2.7500	1.194E+08
3.5000	1.056E+08
5.0000	4.451E+07
7.0000	5.033E+06
11.0000	5.726E+05

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

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.15	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	0.50
Bounding:	0.45	0.88

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: 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

[1]Fuel decay start date: 1981
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	38,160.90	38,160.90	0.00E+00	3.35E-05	3.35E-05
Am-241	1.4352E-01	38,160.90	38,160.90	0.00E+00	5.48E+03	5.48E+03
Am-242m	2.8698E-04	38,160.90	38,160.90	0.00E+00	1.10E+01	1.10E+01
Am-243	6.2565E-04	38,160.90	38,160.90	0.00E+00	2.39E+01	2.39E+01
C-14	4.7901E-05	38,160.90	38,160.90	0.00E+00	1.83E+00	1.83E+00
Cl-36	8.0297E-07	38,160.90	38,160.90	0.00E+00	3.06E-02	3.06E-02
Cm-243	2.5081E-04	38,160.90	38,160.90	0.00E+00	9.57E+00	9.57E+00
Cm-244	4.9015E-02	38,160.90	38,160.90	0.00E+00	1.87E+03	1.87E+03
Co-60	2.5581E-03	38,160.90	38,160.90	0.00E+00	9.76E+01	9.76E+01
Cs-134	4.0536E-05	38,160.90	38,160.90	0.00E+00	1.55E+00	1.55E+00
Cs-135	1.4433E-05	38,160.90	38,160.90	0.00E+00	5.51E-01	5.51E-01
Cs-137	1.3979E+00	38,160.90	38,160.90	0.00E+00	5.33E+04	5.33E+04
Eu-154	2.0203E-02	38,160.90	38,160.90	0.00E+00	7.71E+02	7.71E+02
Eu-155	1.7684E-03	38,160.90	38,160.90	0.00E+00	6.75E+01	6.75E+01
Fe-55	4.3136E-05	38,160.90	38,160.90	0.00E+00	1.65E+00	1.65E+00
H-3	2.0769E-02	38,160.90	38,160.90	0.00E+00	7.93E+02	7.93E+02
I-129	9.8288E-07	38,160.90	38,160.90	0.00E+00	3.75E-02	3.75E-02
Kr-85	2.8214E-02	38,160.90	38,160.90	0.00E+00	1.08E+03	1.08E+03
Np-237	1.1218E-05	38,160.90	38,160.90	0.00E+00	4.28E-01	4.28E-01
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
Tl-208	1.7474E-07	38,160.90	38,160.90	0.00E+00	6.67E-03	6.67E-03
U-232	4.7368E-07	38,160.90	38,160.90	0.00E+00	1.81E-02	1.81E-02
U-233	2.5097E-08	38,160.90	38,160.90	0.00E+00	9.58E-04	9.58E-04
U-234	5.0000E-05	38,160.90	38,160.90	0.00E+00	1.91E+00	1.91E+00
U-235	-1.4489E-06	38,160.90	0.00	6.30E-02	7.76E-03	6.30E-02
U-236	7.5824E-06	38,160.90	38,160.90	0.00E+00	2.89E-01	2.89E-01
U-238	-2.6129E-07	38,160.90	0.00	3.82E-01	3.72E-01	3.82E-01
Y-90	9.1699E-01	38,160.90	38,160.90	0.00E+00	3.50E+04	3.50E+04
Other Radionuclides					5.12E+04	5.12E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.053E+15
0.0250	4.140E+14
0.0375	3.949E+14
0.0575	4.563E+14
0.0850	2.297E+14
0.1250	1.594E+14
0.2250	1.970E+14
0.3750	8.472E+13
0.5750	1.970E+15
0.8500	2.726E+13
1.2500	2.678E+13
1.7500	8.018E+11
2.2500	1.291E+08
2.7500	2.645E+08
3.5000	2.724E+07
5.0000	1.165E+07
7.0000	1.342E+06
11.0000	1.542E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.78E+02	8.78E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	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	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	38,160.90	10,460.29	Bounding burnup taken directly from SFD (converted to MWd).

Basis for burnup used in estimate:

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR C2 BLKT
SNF ID #: 193
Fuel Units & Descr: 72 - 19 FLAT PLATES
Heavy Metal Mass: BOL=16236kg; EOL=15780.002kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1969
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	433,632.15	867,264.30	0.00E+00	4.65E-04	9.31E-04
Am-241	1.4751E-01	433,632.15	867,264.30	0.00E+00	6.40E+04	1.28E+05
Am-242m	2.6809E-04	433,632.15	867,264.30	0.00E+00	1.16E+02	2.33E+02
Am-243	6.2484E-04	433,632.15	867,264.30	0.00E+00	2.71E+02	5.42E+02
C-14	4.7820E-05	433,632.15	867,264.30	0.00E+00	2.07E+01	4.15E+01
Cl-36	8.0297E-07	433,632.15	867,264.30	0.00E+00	3.48E-01	6.96E-01
Cm-243	1.7426E-04	433,632.15	867,264.30	0.00E+00	7.56E+01	1.51E+02
Cm-244	2.7616E-02	433,632.15	867,264.30	0.00E+00	1.20E+04	2.40E+04
Co-60	3.5610E-04	433,632.15	867,264.30	0.00E+00	1.54E+02	3.09E+02
Cs-134	2.6260E-07	433,632.15	867,264.30	0.00E+00	1.14E-01	2.28E-01
Cs-135	1.4433E-05	433,632.15	867,264.30	0.00E+00	6.26E+00	1.25E+01
Cs-137	9.8870E-01	433,632.15	867,264.30	0.00E+00	4.29E+05	8.57E+05
Eu-154	6.0320E-03	433,632.15	867,264.30	0.00E+00	2.62E+03	5.23E+03
Eu-155	2.1770E-04	433,632.15	867,264.30	0.00E+00	9.44E+01	1.89E+02
Fe-55	7.9296E-07	433,632.15	867,264.30	0.00E+00	3.44E-01	6.88E-01
H-3	8.9486E-03	433,632.15	867,264.30	0.00E+00	3.88E+03	7.76E+03
I-129	9.8288E-07	433,632.15	867,264.30	0.00E+00	4.26E-01	8.52E-01
Kr-85	1.0707E-02	433,632.15	867,264.30	0.00E+00	4.64E+03	9.29E+03
Np-237	1.1927E-05	433,632.15	867,264.30	0.00E+00	5.17E+00	1.03E+01
Pa-231	1.4703E-09	433,632.15	867,264.30	0.00E+00	6.38E-04	1.28E-03
Pb-210	1.6828E-10	433,632.15	867,264.30	0.00E+00	7.30E-05	1.46E-04
Pm-147	6.9606E-06	433,632.15	867,264.30	0.00E+00	3.02E+00	6.04E+00
Pu-238	6.6263E-02	433,632.15	867,264.30	0.00E+00	2.87E+04	5.75E+04
Pu-239	1.1618E-02	433,632.15	867,264.30	0.00E+00	5.04E+03	1.01E+04
Pu-240	1.5142E-02	433,632.15	867,264.30	0.00E+00	6.57E+03	1.31E+04
Pu-241	4.3766E-01	433,632.15	867,264.30	0.00E+00	1.90E+05	3.80E+05
Pu-242	6.4260E-05	433,632.15	867,264.30	0.00E+00	2.79E+01	5.57E+01
Ra-226	3.8501E-10	433,632.15	867,264.30	0.00E+00	1.67E-04	3.34E-04
Ra-228	5.2955E-12	433,632.15	867,264.30	0.00E+00	2.30E-06	4.59E-06
Ru-106	2.0413E-14	433,632.15	867,264.30	0.00E+00	8.85E-09	1.77E-08
Se-79	1.2376E-05	433,632.15	867,264.30	0.00E+00	5.37E+00	1.07E+01
Sn-126	2.5210E-05	433,632.15	867,264.30	0.00E+00	1.09E+01	2.19E+01
Sr-90	6.4163E-01	433,632.15	867,264.30	0.00E+00	2.78E+05	5.56E+05
Tc-99	3.9357E-04	433,632.15	867,264.30	0.00E+00	1.71E+02	3.41E+02
Th-229	1.5644E-10	433,632.15	867,264.30	0.00E+00	6.78E-05	1.36E-04
Th-230	2.7972E-06	433,632.15	867,264.30	0.00E+00	1.21E-02	2.43E-02
Th-232	5.3036E-12	433,632.15	867,264.30	0.00E+00	2.30E-06	4.60E-06
Tl-208	1.5136E-07	433,632.15	867,264.30	0.00E+00	6.56E-02	1.31E-01
U-232	4.1005E-07	433,632.15	867,264.30	0.00E+00	1.78E-01	3.56E-01
U-233	2.5856E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.300E+16
0.0250	6.613E+15
0.0375	6.232E+15
0.0575	7.798E+15
0.0850	3.644E+15
0.1250	2.424E+15
0.2250	3.111E+15
0.3750	1.343E+15
0.5750	3.164E+16
0.8500	3.089E+14
1.2500	1.966E+14
1.7500	8.642E+12
2.2500	1.420E+09
2.7500	5.007E+09
3.5000	3.572E+08
5.0000	1.527E+08
7.0000	1.759E+07
11.0000	2.019E+08

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.84E+03	1.57E+04
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 %:	0.71	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.76	1.65
Bounding:	1.53	2.17

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SINGLE PASS REACTOR FUEL
SNF ID #: 196
Fuel Units & Descr: 835 - TUBE
Heavy Metal Mass: BOL=2891.605kg; EOL=2885.844kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1971
Estimates as of: 2030
Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.7399E-10	6,078.13	12,156.27	0.00E+00	5.31E-06	1.06E-05
Am-241	9.9095E-02	6,078.13	12,156.27	0.00E+00	6.02E+02	1.20E+03
Am-242m	5.4598E-05	6,078.13	12,156.27	0.00E+00	3.32E-01	6.64E-01
Am-243	4.6221E-05	6,078.13	12,156.27	0.00E+00	2.81E-01	5.62E-01
C-14	9.1853E-05	6,078.13	12,156.27	0.00E+00	5.58E-01	1.12E+00
Cl-36	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00
Cm-244	2.5589E-04	6,078.13	12,156.27	0.00E+00	1.56E+00	3.11E+00
Co-60	8.8563E-06	6,078.13	12,156.27	0.00E+00	5.38E-02	1.08E-01
Cs-134	9.0661E-08	6,078.13	12,156.27	0.00E+00	5.51E-04	1.10E-03
Cs-135	1.0066E-05	6,078.13	12,156.27	0.00E+00	6.12E-02	1.22E-01
Cs-137	8.4454E-01	6,078.13	12,156.27	0.00E+00	5.13E+03	1.03E+04
Eu-154	1.9842E-03	6,078.13	12,156.27	0.00E+00	1.21E+01	2.41E+01
Eu-155	3.5690E-05	6,078.13	12,156.27	0.00E+00	2.17E-01	4.34E-01
Fe-55	5.2802E-08	6,078.13	12,156.27	0.00E+00	3.21E-04	6.42E-04
H-3	9.0776E-04	6,078.13	12,156.27	0.00E+00	5.52E+00	1.10E+01
I-129	8.6006E-07	6,078.13	12,156.27	0.00E+00	5.23E-03	1.05E-02
Kr-85	1.0138E-02	6,078.13	12,156.27	0.00E+00	6.16E+01	1.23E+02
Np-237	9.0345E-06	6,078.13	12,156.27	0.00E+00	5.49E-02	1.10E-01
Pa-231	1.9210E-09	6,078.13	12,156.27	0.00E+00	1.17E-05	2.34E-05
Pb-210	7.5862E-11	6,078.13	12,156.27	0.00E+00	4.61E-07	9.22E-07
Pm-147	1.1372E-05	6,078.13	12,156.27	0.00E+00	6.91E-02	1.38E-01
Pu-238	1.7802E-02	6,078.13	12,156.27	0.00E+00	1.08E+02	2.16E+02
Pu-239	2.8822E-02	6,078.13	12,156.27	0.00E+00	1.75E+02	3.50E+02
Pu-240	2.2759E-02	6,078.13	12,156.27	0.00E+00	1.38E+02	2.77E+02
Pu-241	2.9641E-01	6,078.13	12,156.27	0.00E+00	1.80E+03	3.60E+03
Pu-242	1.4526E-05	6,078.13	12,156.27	0.00E+00	8.83E-02	1.77E-01
Ra-226	2.3132E-10	6,078.13	12,156.27	0.00E+00	1.41E-06	2.81E-06
Ra-228	1.9655E-14	6,078.13	12,156.27	0.00E+00	1.19E-10	2.39E-10
Ru-106	1.9612E-14	6,078.13	12,156.27	0.00E+00	1.19E-10	2.38E-10
Se-79	1.0897E-05	6,078.13	12,156.27	0.00E+00	6.62E-02	1.32E-01
Sn-126	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00
Sr-90	5.9411E-01	6,078.13	12,156.27	0.00E+00	3.61E+03	7.22E+03
Tc-99	3.6494E-04	6,078.13	12,156.27	0.00E+00	2.22E+00	4.44E+00
Th-229	3.1063E-12	6,078.13	12,156.27	0.00E+00	1.89E-08	3.78E-08
Th-230	2.5187E-08	6,078.13	12,156.27	0.00E+00	1.53E-04	3.06E-04
Th-232	2.5287E-14	6,078.13	12,156.27	0.00E+00	1.54E-10	3.07E-10
Tl-208	6.4885E-15	6,078.13	12,156.27	0.00E+00	3.94E-11	7.89E-11
U-232	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00
U-233	1.5704E-09	6,078.13	12,156.27	0.00E+00	9.55E-06	1.91E-05
U-234	6.6293E-05	6,078.13	12,156.27	0.00E+00	4.03E-01	8.06E-01
U-235	-1.2930E-06	6,078.13	0.00	5.37E-03	0.00E+00	5.37E-03
U-236	1.1961E-05	6,078.13	12,156.27	0.00E+00	7.27E-02	1.45E-01
U-238	-3.0619E-07	6,078.13	0.00	9.71E-01	9.69E-01	9.71E-01
Y-90	5.9425E-01	6,078.13	12,156.27	0.00E+00	3.61E+03	7.22E+03
Other Radionuclides					4.94E+03	9.89E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.170E+14
0.0250	8.476E+13
0.0375	7.807E+13
0.0575	9.436E+13
0.0850	4.685E+13
0.1250	3.064E+13
0.2250	4.012E+13
0.3750	1.739E+13
0.5750	3.793E+14
0.8500	3.239E+12
1.2500	1.414E+12
1.7500	8.660E+10
2.2500	8.444E+06
2.7500	2.507E+05
3.5000	2.218E+05
5.0000	9.346E+04
7.0000	1.056E+04
11.0000	1.202E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.26E+01	1.65E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	ALUM	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.086	0 to 5

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except cladding.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	2,891.61	6,078.13
Bounding:		12,156.27

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	2.10
Bounding:	0.70	

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: 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

[1]Fuel decay start date: 1971
Estimates as of: 2030
Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7399E-10	454.58	909.16	0.00E+00	3.97E-07	7.95E-07
Am-241	9.9095E-02	454.58	909.16	0.00E+00	4.50E+01	9.01E+01
Am-242m	5.4598E-05	454.58	909.16	0.00E+00	2.48E-02	4.96E-02
Am-243	4.6221E-05	454.58	909.16	0.00E+00	2.10E-02	4.20E-02
C-14	9.1853E-05	454.58	909.16	0.00E+00	4.18E-02	8.35E-02
Cl-36	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00
Cm-244	2.5589E-04	454.58	909.16	0.00E+00	1.16E-01	2.33E-01
Co-60	8.8563E-08	454.58	909.16	0.00E+00	4.03E-03	8.05E-03
Cs-134	9.0661E-08	454.58	909.16	0.00E+00	4.12E-05	8.24E-05
Cs-135	1.0066E-05	454.58	909.16	0.00E+00	4.58E-03	9.15E-03
Cs-137	8.4454E-01	454.58	909.16	0.00E+00	3.84E+02	7.68E+02
Eu-154	1.9842E-03	454.58	909.16	0.00E+00	9.02E-01	1.80E+00
Eu-155	3.5690E-05	454.58	909.16	0.00E+00	1.62E-02	3.24E-02
Fe-55	5.2802E-08	454.58	909.16	0.00E+00	2.40E-05	4.80E-05
H-3	9.0776E-04	454.58	909.16	0.00E+00	4.13E-01	8.25E-01
I-129	8.6006E-07	454.58	909.16	0.00E+00	3.91E-04	7.82E-04
Kr-85	1.0138E-02	454.58	909.16	0.00E+00	4.61E+00	9.22E+00
Np-237	9.0345E-08	454.58	909.16	0.00E+00	4.11E-03	8.21E-03
Pa-231	1.9210E-09	454.58	909.16	0.00E+00	8.73E-07	1.75E-06
Pb-210	7.5862E-11	454.58	909.16	0.00E+00	3.45E-08	6.90E-08
Pm-147	1.1372E-05	454.58	909.16	0.00E+00	5.17E-03	1.03E-02
Pu-238	1.7802E-02	454.58	909.16	0.00E+00	8.09E+00	1.62E+01
Pu-239	2.8822E-02	454.58	909.16	0.00E+00	1.31E+01	2.62E+01
Pu-240	2.2759E-02	454.58	909.16	0.00E+00	1.03E+01	2.07E+01
Pu-241	2.9641E-01	454.58	909.16	0.00E+00	1.35E+02	2.69E+02
Pu-242	1.4526E-05	454.58	909.16	0.00E+00	6.60E-03	1.32E-02
Ra-226	2.3132E-10	454.58	909.16	0.00E+00	1.05E-07	2.10E-07
Ra-228	1.9655E-14	454.58	909.16	0.00E+00	8.93E-12	1.79E-11
Ru-106	1.9612E-14	454.58	909.16	0.00E+00	8.92E-12	1.78E-11
Se-79	1.0897E-05	454.58	909.16	0.00E+00	4.95E-03	9.91E-03
Sn-126	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00
Sr-90	5.9411E-01	454.58	909.16	0.00E+00	2.70E+02	5.40E+02
Tc-99	3.6494E-04	454.58	909.16	0.00E+00	1.66E-01	3.32E-01
Th-229	3.1063E-12	454.58	909.16	0.00E+00	1.41E-09	2.82E-09
Th-230	2.5187E-08	454.58	909.16	0.00E+00	1.14E-05	2.29E-05
Th-232	2.5287E-14	454.58	909.16	0.00E+00	1.15E-11	2.30E-11
Tl-208	6.4885E-15	454.58	909.16	0.00E+00	2.95E-12	5.90E-12
U-232	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00
U-233	1.5704E-09	454.58	909.16	0.00E+00	7.14E-07	1.43E-06
U-234	6.6293E-05	454.58	909.16	0.00E+00	3.01E-02	6.03E-02
U-235	-1.2930E-06	454.58	0.00	1.10E-02	1.04E-02	1.10E-02
U-236	1.1961E-05	454.58	909.16	0.00E+00	5.44E-03	1.09E-02
U-238	-3.0619E-07	454.58	0.00	1.35E-01	1.35E-01	1.35E-01
Y-90	5.9425E-01	454.58	909.16	0.00E+00	2.70E+02	5.40E+02
Other Radionuclides					3.70E+02	7.40E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.119E+13
0.0250	6.339E+12
0.0375	5.839E+12
0.0575	7.057E+12
0.0850	3.504E+12
0.1250	2.291E+12
0.2250	3.001E+12
0.3750	1.301E+12
0.5750	2.837E+13
0.8500	2.423E+11
1.2500	1.057E+11
1.7500	6.477E+09
2.2500	6.322E+05
2.7500	1.912E+04
3.5000	1.692E+04
5.0000	7.133E+03
7.0000	8.066E+02
11.0000	9.178E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.18E+00	1.24E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	ALUM	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.252	0 to 5

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except cladding.

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.19	1.12
Bounding:	0.37	

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: SP-100 FUEL
SNF ID #: 777
Fuel Units & Descr: 2 - SCRAP
Heavy Metal Mass: BOL=2.711kg; EOL=2.628kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: FERMI (Fast, Zirc, 10 to 40%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.6110E-08	73.37	146.73	0.00E+00	7.05E-06	1.41E-05
Am-241	6.5601E-07	73.37	146.73	0.00E+00	4.81E-05	9.63E-05
Am-242m	0.0000E+00	73.37	146.73	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	73.37	146.73	0.00E+00	6.15E-13	1.23E-12
C-14	2.1714E-05	73.37	146.73	0.00E+00	1.59E-03	3.19E-03
Cl-36	5.5188E-08	73.37	146.73	0.00E+00	4.05E-06	8.10E-06
Cm-243	1.5496E-14	73.37	146.73	0.00E+00	1.14E-12	2.27E-12
Cm-244	5.2375E-16	73.37	146.73	0.00E+00	3.84E-14	7.69E-14
Co-60	2.0947E-03	73.37	146.73	0.00E+00	1.54E-01	3.07E-01
Cs-134	6.2448E-07	73.37	146.73	0.00E+00	4.58E-05	9.16E-05
Cs-135	4.4996E-05	73.37	146.73	0.00E+00	3.30E-03	6.60E-03
Cs-137	1.3775E+00	73.37	146.73	0.00E+00	1.01E+02	2.02E+02
Eu-154	1.8510E-04	73.37	146.73	0.00E+00	1.36E-02	2.72E-02
Eu-155	1.4163E-03	73.37	146.73	0.00E+00	1.04E-01	2.08E-01
Fe-55	1.4179E-05	73.37	146.73	0.00E+00	1.04E-03	2.08E-03
H-3	3.5383E-03	73.37	146.73	0.00E+00	2.60E-01	5.19E-01
I-129	1.1426E-06	73.37	146.73	0.00E+00	8.38E-05	1.68E-04
Kr-85	3.8604E-02	73.37	146.73	0.00E+00	2.83E+00	5.66E+00
Np-237	3.3099E-06	73.37	146.73	0.00E+00	2.43E-04	4.86E-04
Pa-231	1.8953E-07	73.37	146.73	0.00E+00	1.39E-05	2.78E-05
Pb-210	8.9531E-12	73.37	146.73	0.00E+00	6.57E-10	1.31E-09
Pm-147	1.1588E-03	73.37	146.73	0.00E+00	8.50E-02	1.70E-01
Pu-238	1.7146E-04	73.37	146.73	0.00E+00	1.26E-02	2.52E-02
Pu-239	1.9464E-02	73.37	146.73	0.00E+00	1.43E+00	2.86E+00
Pu-240	6.7919E-05	73.37	146.73	0.00E+00	4.98E-03	9.97E-03
Pu-241	4.1774E-06	73.37	146.73	0.00E+00	3.06E-04	6.13E-04
Pu-242	4.3751E-13	73.37	146.73	0.00E+00	3.21E-11	6.42E-11
Ra-226	2.4219E-11	73.37	146.73	0.00E+00	1.78E-09	3.55E-09
Ra-228	2.3572E-11	73.37	146.73	0.00E+00	1.73E-09	3.46E-09
Ru-106	3.0951E-10	73.37	146.73	0.00E+00	2.27E-08	4.54E-08
Se-79	1.6488E-05	73.37	146.73	0.00E+00	1.21E-03	2.42E-03
Sn-126	3.7564E-05	73.37	146.73	0.00E+00	2.76E-03	5.51E-03
Sr-90	1.2052E+00	73.37	146.73	0.00E+00	8.84E+01	1.77E+02
Tc-99	4.4825E-04	73.37	146.73	0.00E+00	3.29E-02	6.58E-02
Th-229	4.6478E-11	73.37	146.73	0.00E+00	3.41E-09	6.82E-09
Th-230	2.2259E-09	73.37	146.73	0.00E+00	1.63E-07	3.27E-07
Th-232	2.3691E-11	73.37	146.73	0.00E+00	1.74E-09	3.48E-09
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.709E+12
0.0250	2.017E+12
0.0375	1.774E+12
0.0575	1.879E+12
0.0850	1.137E+12
0.1250	7.362E+11
0.2250	9.757E+11
0.3750	4.251E+11
0.5750	7.510E+12
0.8500	6.936E+10
1.2500	4.601E+10
1.7500	1.790E+09
2.2500	3.156E+05
2.7500	3.042E+04
3.5000	2.873E+01
6.0000	9.856E+00
7.0000	8.518E-01
11.0000	7.913E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.13E+00	2.26E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	UNKNOWN	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	18	10 to 40

Basis for Parameter Differences:

This Template was used for the following reasons:
This template is a good approximation since it is a FAST, Uranium fuel

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		73.37
Bounding:		146.73

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:	8.66	
Bounding:	17.32	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	3.74	7.48	0.00E+00	2.51E-08	5.02E-08
Am-241	3.9068E-03	3.74	7.48	0.00E+00	1.46E-02	2.92E-02
Am-242m	1.2325E-06	3.74	7.48	0.00E+00	4.61E-06	9.23E-06
Am-243	1.4732E-07	3.74	7.48	0.00E+00	5.51E-07	1.10E-06
C-14	1.2824E-04	3.74	7.48	0.00E+00	4.80E-04	9.60E-04
Cl-36	2.8120E-06	3.74	7.48	0.00E+00	1.05E-05	2.10E-05
Cm-243	8.6556E-08	3.74	7.48	0.00E+00	3.24E-07	6.48E-07
Cm-244	5.3835E-07	3.74	7.48	0.00E+00	2.01E-06	4.03E-06
Co-60	2.4887E-02	3.74	7.48	0.00E+00	9.31E-02	1.86E-01
Cs-134	3.8030E-06	3.74	7.48	0.00E+00	1.42E-05	2.85E-05
Cs-135	3.2195E-05	3.74	7.48	0.00E+00	1.20E-04	2.41E-04
Cs-137	1.3788E+00	3.74	7.48	0.00E+00	5.16E+00	1.03E+01
Eu-154	1.3711E-03	3.74	7.48	0.00E+00	5.13E-03	1.03E-02
Eu-155	4.4361E-04	3.74	7.48	0.00E+00	1.66E-03	3.32E-03
Fe-55	2.6075E-04	3.74	7.48	0.00E+00	9.76E-04	1.95E-03
H-3	2.0647E-03	3.74	7.48	0.00E+00	7.73E-03	1.55E-02
I-129	7.3684E-07	3.74	7.48	0.00E+00	2.76E-06	5.52E-06
Kr-85	3.6346E-02	3.74	7.48	0.00E+00	1.36E-01	2.72E-01
Np-237	1.2844E-06	3.74	7.48	0.00E+00	4.81E-06	9.61E-06
Pa-231	1.2352E-08	3.74	7.48	0.00E+00	4.62E-08	9.25E-08
Pb-210	3.5338E-13	3.74	7.48	0.00E+00	1.32E-12	2.65E-12
Pm-147	7.6346E-04	3.74	7.48	0.00E+00	2.86E-03	5.71E-03
Pu-238	8.1970E-04	3.74	7.48	0.00E+00	3.07E-03	6.14E-03
Pu-239	5.5248E-03	3.74	7.48	0.00E+00	2.07E-02	4.14E-02
Pu-240	2.1203E-03	3.74	7.48	0.00E+00	7.94E-03	1.59E-02
Pu-241	2.4075E-02	3.74	7.48	0.00E+00	9.01E-02	1.80E-01
Pu-242	2.3128E-07	3.74	7.48	0.00E+00	8.66E-07	1.73E-06
Ra-226	9.6481E-13	3.74	7.48	0.00E+00	3.61E-12	7.22E-12
Ra-228	2.5188E-10	3.74	7.48	0.00E+00	9.43E-10	1.89E-09
Ru-106	1.0214E-10	3.74	7.48	0.00E+00	3.82E-10	7.64E-10
Se-79	1.3014E-05	3.74	7.48	0.00E+00	4.87E-05	9.74E-05
Sn-126	1.2164E-05	3.74	7.48	0.00E+00	4.55E-05	9.10E-05
Sr-90	1.2762E+00	3.74	7.48	0.00E+00	4.78E+00	9.55E+00
Tc-99	4.4241E-04	3.74	7.48	0.00E+00	1.66E-03	3.31E-03
Th-229	5.9684E-10	3.74	7.48	0.00E+00	2.23E-09	4.47E-09
Th-230	9.3880E-11	3.74	7.48	0.00E+00	3.51E-10	7.03E-10
Th-232	2.5278E-10	3.74	7.48	0.00E+00	9.46E-10	1.89E-09
Tl-208	1.3723E-08	3.74	7.48	0.00E+00	5.14E-08	1.03E-07
U-232	3.6932E-08	3.74	7.48	0.00E+00	1.38E-07	2.76E-07
U-233	1.2224E-07	3.74	7.48	0.00E+00	4.57E-07	9.15E-07
U-234	2.5714E-07	3.74	7.48	0.00E+00	9.62E-07	1.92E-06
U-235	-2.6194E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.225E+11
0.0250	1.086E+11
0.0375	9.431E+10
0.0575	1.016E+11
0.0850	6.114E+10
0.1250	3.979E+10
0.2250	5.267E+10
0.3750	2.297E+10
0.5750	3.841E+11
0.8500	3.931E+09
1.2500	1.526E+10
1.7500	1.020E+08
2.2500	8.361E+04
2.7500	3.844E+03
3.5000	9.740E+00
5.0000	4.104E+00
7.0000	4.635E-01
11.0000	5.273E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.02E-02	1.20E-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 %:	19.792	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	0.31
Bounding:	0.57	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: 18"x10'
0.59

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	421.00	842.00	0.00E+00	2.59E-06	5.18E-06
Am-241	4.8165E-03	421.00	842.00	0.00E+00	2.03E+00	4.06E+00
Am-242m	1.7383E-06	421.00	842.00	0.00E+00	7.32E-04	1.46E-03
Am-243	2.3263E-07	421.00	842.00	0.00E+00	9.79E-05	1.96E-04
C-14	4.3158E-05	421.00	842.00	0.00E+00	1.82E-02	3.63E-02
Cl-36	4.3023E-08	421.00	842.00	0.00E+00	1.81E-05	3.62E-05
Cm-243	1.3229E-07	421.00	842.00	0.00E+00	5.57E-05	1.11E-04
Cm-244	1.0000E-06	421.00	842.00	0.00E+00	4.21E-04	8.42E-04
Co-60	6.0120E-04	421.00	842.00	0.00E+00	2.53E-01	5.06E-01
Cs-134	4.3534E-06	421.00	842.00	0.00E+00	1.83E-03	3.67E-03
Cs-135	3.1549E-05	421.00	842.00	0.00E+00	1.33E-02	2.66E-02
Cs-137	1.3788E+00	421.00	842.00	0.00E+00	5.80E+02	1.16E+03
Eu-154	1.2041E-01	421.00	842.00	0.00E+00	5.07E+01	1.01E+02
Eu-155	6.6451E-03	421.00	842.00	0.00E+00	2.80E+00	5.60E+00
Fe-55	2.9338E-06	421.00	842.00	0.00E+00	1.24E-03	2.47E-03
H-3	2.0075E-03	421.00	842.00	0.00E+00	8.45E-01	1.69E+00
I-129	7.3805E-07	421.00	842.00	0.00E+00	3.11E-04	6.21E-04
Kr-85	3.6301E-02	421.00	842.00	0.00E+00	1.53E+01	3.06E+01
Np-237	1.4977E-06	421.00	842.00	0.00E+00	6.31E-04	1.26E-03
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
Tl-208	1.5774E-08	421.00	842.00	0.00E+00	6.64E-06	1.33E-05
U-232	4.2511E-08	421.00	842.00	0.00E+00	1.79E-05	3.58E-05
U-233	1.3155E-07	421.00	842.00	0.00E+00	5.54E-05	1.11E-04
U-234	3.0030E-07	421.00	842.00	0.00E+00	1.26E-04	2.53E-04
U-235	-2.6144E-06	421.00	0.00	5.28E-03	4.18E-03	5.28E-03
U-236	1.2720E-05	421.00	842.00	0.00E+00	5.36E-03	1.07E-02
U-238	-3.8857E-08	421.00	0.00	3.33E-03	3.31E-03	3.33E-03
Y-90	1.2744E+00	421.00	842.00	0.00E+00	5.37E+02	1.07E+03
Other Radionuclides					6.41E+02	1.28E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.939E+13
0.0250	1.229E+13
0.0375	1.160E+13
0.0575	1.169E+13
0.0850	6.974E+12
0.1250	6.024E+12
0.2250	6.231E+12
0.3750	2.645E+12
0.5750	4.356E+13
0.8500	2.223E+12
1.2500	2.161E+12
1.7500	7.017E+10
2.2500	1.384E+06
2.7500	4.683E+05
3.5000	1.133E+03
5.0000	4.765E+02
7.0000	5.372E+01
11.0000	6.105E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.08E+00	1.42E+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 %:	19.786	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	421.00	132.30	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		842.00	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20
SNF ID #: 233
Fuel Units & Descr: 90 - ELEMENT
Heavy Metal Mass: BOL=17.55kg; EOL=17.19kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	343.66	687.32	0.00E+00	2.30E-06	4.61E-06
Am-241	3.9068E-03	343.66	687.32	0.00E+00	1.34E+00	2.69E+00
Am-242m	1.2325E-06	343.66	687.32	0.00E+00	4.24E-04	8.47E-04
Am-243	1.4732E-07	343.66	687.32	0.00E+00	5.06E-05	1.01E-04
C-14	1.2824E-04	343.66	687.32	0.00E+00	4.41E-02	8.81E-02
Cl-36	2.8120E-06	343.66	687.32	0.00E+00	9.66E-04	1.93E-03
Cm-243	8.6556E-08	343.66	687.32	0.00E+00	2.97E-05	5.95E-05
Cm-244	5.3835E-07	343.66	687.32	0.00E+00	1.85E-04	3.70E-04
Co-60	2.4887E-02	343.66	687.32	0.00E+00	8.55E+00	1.71E+01
Cs-134	3.8030E-06	343.66	687.32	0.00E+00	1.31E-03	2.61E-03
Cs-135	3.2195E-05	343.66	687.32	0.00E+00	1.11E-02	2.21E-02
Cs-137	1.3788E+00	343.66	687.32	0.00E+00	4.74E+02	9.48E+02
Eu-154	1.3711E-03	343.66	687.32	0.00E+00	4.71E-01	9.42E-01
Eu-155	4.4361E-04	343.66	687.32	0.00E+00	1.52E-01	3.05E-01
Fe-55	2.6075E-04	343.66	687.32	0.00E+00	8.96E-02	1.79E-01
H-3	2.0647E-03	343.66	687.32	0.00E+00	7.10E-01	1.42E+00
I-129	7.3684E-07	343.66	687.32	0.00E+00	2.53E-04	5.06E-04
Kr-85	3.6346E-02	343.66	687.32	0.00E+00	1.25E+01	2.50E+01
Np-237	1.2844E-06	343.66	687.32	0.00E+00	4.41E-04	8.83E-04
Pa-231	1.2352E-08	343.66	687.32	0.00E+00	4.24E-06	8.49E-06
Pb-210	3.5338E-13	343.66	687.32	0.00E+00	1.21E-10	2.43E-10
Pm-147	7.6346E-04	343.66	687.32	0.00E+00	2.62E-01	5.25E-01
Pu-238	8.1970E-04	343.66	687.32	0.00E+00	2.82E-01	5.63E-01
Pu-239	5.5248E-03	343.66	687.32	0.00E+00	1.90E+00	3.80E+00
Pu-240	2.1203E-03	343.66	687.32	0.00E+00	7.29E-01	1.46E+00
Pu-241	2.4075E-02	343.66	687.32	0.00E+00	8.27E+00	1.65E+01
Pu-242	2.3128E-07	343.66	687.32	0.00E+00	7.95E-05	1.59E-04
Ra-226	9.6481E-13	343.66	687.32	0.00E+00	3.32E-10	6.63E-10
Ra-228	2.5188E-10	343.66	687.32	0.00E+00	8.66E-08	1.73E-07
Ru-106	1.0214E-10	343.66	687.32	0.00E+00	3.51E-08	7.02E-08
Se-79	1.3014E-05	343.66	687.32	0.00E+00	4.47E-03	8.94E-03
Sn-126	1.2164E-05	343.66	687.32	0.00E+00	4.18E-03	8.36E-03
Sr-90	1.2762E+00	343.66	687.32	0.00E+00	4.39E+02	8.77E+02
Tc-99	4.4241E-04	343.66	687.32	0.00E+00	1.52E-01	3.04E-01
Th-229	5.9684E-10	343.66	687.32	0.00E+00	2.05E-07	4.10E-07
Th-230	9.3880E-11	343.66	687.32	0.00E+00	3.23E-08	6.45E-08
Th-232	2.5278E-10	343.66	687.32	0.00E+00	8.69E-08	1.74E-07
Tl-208	1.3723E-08	343.66	687.32	0.00E+00	4.72E-06	9.43E-06
U-232	3.6932E-08	343.66	687.32	0.00E+00	1.27E-05	2.54E-05
U-233	1.2224E-07	343.66	687.32	0.00E+00	4.20E-05	8.40E-05
U-234	2.5714E-07	343.66	687.32	0.00E+00	8.84E-05	1.77E-04
U-235	-2.6194E-06	343.66	0.00	7.59E-03	6.68E-03	7.59E-03
U-236	1.2695E-05	343.66	687.32	0.00E+00	4.36E-03	8.73E-03
U-238	-3.6331E-08	343.66	0.00	4.72E-03	4.71E-03	4.72E-03
Y-90	1.2765E+00	343.66	687.32	0.00E+00	4.39E+02	8.77E+02
Other Radionuclides					4.73E+02	9.45E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.798E+13
0.0250	9.969E+12
0.0375	8.660E+12
0.0575	9.331E+12
0.0850	5.615E+12
0.1250	3.654E+12
0.2250	4.836E+12
0.3750	2.109E+12
0.5750	3.528E+13
0.8500	3.610E+11
1.2500	1.401E+12
1.7500	9.369E+09
2.2500	7.678E+08
2.7500	3.529E+05
3.5000	8.686E+02
5.0000	3.658E+02
7.0000	4.129E+01
11.0000	4.695E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.53E+00	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	Basis for burnup used in estimate:
Nominal:	256.56	343.66	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		687.32	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.30

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	30.88	61.75	0.00E+00	2.07E-07	4.14E-07
Am-241	3.9068E-03	30.88	61.75	0.00E+00	1.21E-01	2.41E-01
Am-242m	1.2325E-06	30.88	61.75	0.00E+00	3.81E-05	7.61E-05
Am-243	1.4732E-07	30.88	61.75	0.00E+00	4.55E-06	9.10E-06
C-14	1.2824E-04	30.88	61.75	0.00E+00	3.96E-03	7.92E-03
Cl-36	2.8120E-06	30.88	61.75	0.00E+00	8.68E-05	1.74E-04
Cm-243	8.6556E-08	30.88	61.75	0.00E+00	2.67E-06	5.34E-06
Cm-244	5.3835E-07	30.88	61.75	0.00E+00	1.66E-05	3.32E-05
Co-60	2.4887E-02	30.88	61.75	0.00E+00	7.68E-01	1.54E+00
Cs-134	3.8030E-06	30.88	61.75	0.00E+00	1.17E-04	2.35E-04
Cs-135	3.2195E-05	30.88	61.75	0.00E+00	9.94E-04	1.99E-03
Cs-137	1.3788E+00	30.88	61.75	0.00E+00	4.26E+01	8.51E+01
Eu-154	1.3711E-03	30.88	61.75	0.00E+00	4.23E-02	8.47E-02
Eu-155	4.4361E-04	30.88	61.75	0.00E+00	1.37E-02	2.74E-02
Fe-55	2.6075E-04	30.88	61.75	0.00E+00	8.05E-03	1.61E-02
H-3	2.0647E-03	30.88	61.75	0.00E+00	6.37E-02	1.27E-01
I-129	7.3684E-07	30.88	61.75	0.00E+00	2.28E-05	4.55E-05
Kr-85	3.6346E-02	30.88	61.75	0.00E+00	1.12E+00	2.24E+00
Np-237	1.2844E-06	30.88	61.75	0.00E+00	3.97E-05	7.93E-05
Pa-231	1.2352E-08	30.88	61.75	0.00E+00	3.81E-07	7.63E-07
Pb-210	3.5338E-13	30.88	61.75	0.00E+00	1.09E-11	2.18E-11
Pm-147	7.6346E-04	30.88	61.75	0.00E+00	2.36E-02	4.71E-02
Pu-238	8.1970E-04	30.88	61.75	0.00E+00	2.53E-02	5.06E-02
Pu-239	5.5248E-03	30.88	61.75	0.00E+00	1.71E-01	3.41E-01
Pu-240	2.1203E-03	30.88	61.75	0.00E+00	6.55E-02	1.31E-01
Pu-241	2.4075E-02	30.88	61.75	0.00E+00	7.43E-01	1.49E+00
Pu-242	2.3128E-07	30.88	61.75	0.00E+00	7.14E-06	1.43E-05
Ra-226	9.6481E-13	30.88	61.75	0.00E+00	2.98E-11	5.96E-11
Ra-228	2.5188E-10	30.88	61.75	0.00E+00	7.78E-09	1.56E-08
Ru-106	1.0214E-10	30.88	61.75	0.00E+00	3.15E-09	6.31E-09
Se-79	1.3014E-05	30.88	61.75	0.00E+00	4.02E-04	8.04E-04
Sn-126	1.2164E-05	30.88	61.75	0.00E+00	3.76E-04	7.51E-04
Sr-90	1.2762E+00	30.88	61.75	0.00E+00	3.94E+01	7.88E+01
Tc-99	4.4241E-04	30.88	61.75	0.00E+00	1.37E-02	2.73E-02
Th-229	5.9684E-10	30.88	61.75	0.00E+00	1.84E-08	3.69E-08
Th-230	9.3880E-11	30.88	61.75	0.00E+00	2.90E-09	5.80E-09
Th-232	2.5278E-10	30.88	61.75	0.00E+00	7.80E-09	1.56E-08
Tl-208	1.3723E-08	30.88	61.75	0.00E+00	4.24E-07	8.47E-07
U-232	3.6932E-08	30.88	61.75	0.00E+00	1.14E-06	2.28E-06
U-233	1.2224E-07	30.88	61.75	0.00E+00	3.77E-06	7.55E-06
U-234	2.5714E-07	30.88	61.75	0.00E+00	7.94E-06	1.59E-05
U-235	-2.6194E-06	30.88	0.00	2.72E-03	2.64E-03	2.72E-03
U-236	1.2695E-05	30.88	61.75	0.00E+00	3.92E-04	7.84E-04
U-238	-3.6331E-08	30.88	0.00	1.71E-03	1.70E-03	1.71E-03
Y-90	1.2765E+00	30.88	61.75	0.00E+00	3.94E+01	7.88E+01
Other Radionuclides					4.25E+01	8.49E+01

Gamma Sources

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

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.97E-01	9.93E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	30.88	18.90	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		61.75	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.14	0.61
Bounding:	0.29	

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 2.26

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_o: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_o: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.9667E-09	2,282.86	4,565.72	0.00E+00	4.49E-06	8.98E-06
Am-241	4.9468E-05	2,282.86	4,565.72	0.00E+00	1.13E-01	2.26E-01
Am-242m	9.7537E-09	2,282.86	4,565.72	0.00E+00	2.23E-05	4.45E-05
Am-243	9.8802E-10	2,282.86	4,565.72	0.00E+00	2.26E-06	4.51E-06
C-14	2.3095E-04	2,282.86	4,565.72	0.00E+00	5.27E-01	1.05E+00
Cl-36	1.2261E-06	2,282.86	4,565.72	0.00E+00	2.80E-03	5.60E-03
Cm-243	5.1581E-10	2,282.86	4,565.72	0.00E+00	1.18E-06	2.36E-06
Cm-244	7.3012E-09	2,282.86	4,565.72	0.00E+00	1.67E-05	3.33E-05
Co-60	3.6556E+00	2,282.86	4,565.72	0.00E+00	8.35E+03	1.67E+04
Cs-134	7.2063E-02	2,282.86	4,565.72	0.00E+00	1.65E+02	3.29E+02
Cs-135	3.0316E-05	2,282.86	4,565.72	0.00E+00	6.92E-02	1.38E-01
Cs-137	2.9002E+00	2,282.86	4,565.72	0.00E+00	6.62E+03	1.32E+04
Eu-154	7.5025E-03	2,282.86	4,565.72	0.00E+00	1.71E+01	3.43E+01
Eu-155	4.6123E-02	2,282.86	4,565.72	0.00E+00	1.05E+02	2.11E+02
Fe-55	3.6439E+00	2,282.86	4,565.72	0.00E+00	8.32E+03	1.66E+04
H-3	1.3524E-02	2,282.86	4,565.72	0.00E+00	3.09E+01	6.17E+01
I-129	7.3195E-07	2,282.86	4,565.72	0.00E+00	1.67E-03	3.34E-03
Kr-85	2.8686E-01	2,282.86	4,565.72	0.00E+00	6.55E+02	1.31E+03
Np-237	1.1478E-06	2,282.86	4,565.72	0.00E+00	2.62E-03	5.24E-03
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
Tl-208	2.6722E-08	2,282.86	4,565.72	0.00E+00	6.10E-05	1.22E-04
U-232	7.7720E-08	2,282.86	4,565.72	0.00E+00	1.77E-04	3.55E-04
U-233	2.9834E-09	2,282.86	4,565.72	0.00E+00	6.81E-06	1.36E-05
U-234	3.5275E-07	2,282.86	4,565.72	0.00E+00	8.05E-04	1.61E-03
U-235	-2.7761E-06	2,282.86	0.00	5.51E-02	4.88E-02	5.51E-02
U-236	1.6190E-05	2,282.86	4,565.72	0.00E+00	3.70E-02	7.39E-02
U-238	-2.8547E-09	2,282.86	0.00	3.20E-02	3.20E-02	3.20E-02
Y-90	2.7870E+00	2,282.86	4,565.72	0.00E+00	6.36E+03	1.27E+04
Other Radionuclides					1.20E+04	2.40E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.978E+14
0.0250	1.915E+14
0.0375	1.709E+14
0.0575	1.718E+14
0.0850	1.089E+14
0.1250	8.686E+13
0.2250	9.015E+13
0.3750	4.376E+13
0.5750	5.305E+14
0.8500	2.569E+13
1.2500	1.240E+15
1.7500	4.378E+11
2.2500	1.253E+12
2.7500	7.109E+09
3.5000	7.847E+08
5.0000	1.891E+02
7.0000	2.123E+01
11.0000	2.406E+00

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1957
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	15.30	30.61	0.00E+00	7.03E-07	1.41E-06
Am-241	1.1471E-04	15.30	30.61	0.00E+00	1.76E-03	3.51E-03
Am-242m	7.4210E-09	15.30	30.61	0.00E+00	1.14E-07	2.27E-07
Am-243	9.8236E-10	15.30	30.61	0.00E+00	1.50E-08	3.01E-08
C-14	2.2928E-04	15.30	30.61	0.00E+00	3.51E-03	7.02E-03
Cl-36	1.2260E-06	15.30	30.61	0.00E+00	1.88E-05	3.75E-05
Cm-243	1.2000E-10	15.30	30.61	0.00E+00	1.84E-09	3.67E-09
Cm-244	7.3577E-10	15.30	30.61	0.00E+00	1.13E-08	2.25E-08
Co-60	1.3732E-03	15.30	30.61	0.00E+00	2.10E-02	4.20E-02
Cs-134	1.2709E-10	15.30	30.61	0.00E+00	1.94E-09	3.89E-09
Cs-135	3.0316E-05	15.30	30.61	0.00E+00	4.64E-04	9.28E-04
Cs-137	7.2579E-01	15.30	30.61	0.00E+00	1.11E+01	2.22E+01
Eu-154	5.9750E-05	15.30	30.61	0.00E+00	9.14E-04	1.83E-03
Eu-155	1.0577E-05	15.30	30.61	0.00E+00	1.62E-04	3.24E-04
Fe-55	4.1631E-07	15.30	30.61	0.00E+00	6.37E-06	1.27E-05
H-3	4.6722E-04	15.30	30.61	0.00E+00	7.15E-03	1.43E-02
I-129	7.3195E-07	15.30	30.61	0.00E+00	1.12E-05	2.24E-05
Kr-85	5.9418E-03	15.30	30.61	0.00E+00	9.09E-02	1.82E-01
Np-237	1.1499E-06	15.30	30.61	0.00E+00	1.76E-05	3.52E-05
Pa-231	7.0899E-08	15.30	30.61	0.00E+00	1.08E-06	2.17E-06
Pb-210	2.2363E-12	15.30	30.61	0.00E+00	3.42E-11	6.84E-11
Pm-147	4.2296E-07	15.30	30.61	0.00E+00	6.47E-06	1.29E-05
Pu-238	2.3295E-04	15.30	30.61	0.00E+00	3.56E-03	7.13E-03
Pu-239	6.6722E-04	15.30	30.61	0.00E+00	1.02E-02	2.04E-02
Pu-240	8.6556E-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
Tl-208	1.6228E-08	15.30	30.61	0.00E+00	2.48E-07	4.97E-07
U-232	4.3960E-08	15.30	30.61	0.00E+00	6.73E-07	1.35E-06
U-233	3.3344E-09	15.30	30.61	0.00E+00	5.10E-08	1.02E-07
U-234	4.0749E-07	15.30	30.61	0.00E+00	6.24E-06	1.25E-05
U-235	-2.7761E-06	15.30	0.00	2.25E-03	2.21E-03	2.25E-03
U-236	1.6190E-05	15.30	30.61	0.00E+00	2.48E-04	4.96E-04
U-238	-2.8547E-09	15.30	0.00	2.55E-05	2.55E-05	2.55E-05
Y-90	6.6889E-01	15.30	30.61	0.00E+00	1.02E+01	2.05E+01
Other Radionuclides					1.39E+01	2.78E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.117E+12
0.0250	2.321E+11
0.0375	2.017E+11
0.0575	2.164E+11
0.0850	1.307E+11
0.1250	8.478E+10
0.2250	1.127E+11
0.3750	4.915E+10
0.5750	8.267E+11
0.8500	8.029E+09
1.2500	5.811E+09
1.7500	2.065E+08
2.2500	3.906E+04
2.7500	1.749E+04
3.5000	1.968E+00
5.0000	8.142E-01
7.0000	9.017E-02
11.0000	1.014E-02

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	NICHROME	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.20218125	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		15.30
Bounding:		30.61

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:	0.29	
Bounding:	0.59	

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: 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

[1]Fuel decay start date: 1959
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 65 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	28.72	57.43	0.00E+00	1.32E-06	2.64E-06
Am-241	1.1471E-04	28.72	57.43	0.00E+00	3.29E-03	6.59E-03
Am-242m	7.4210E-09	28.72	57.43	0.00E+00	2.13E-07	4.26E-07
Am-243	9.8236E-10	28.72	57.43	0.00E+00	2.82E-08	5.64E-08
C-14	2.2928E-04	28.72	57.43	0.00E+00	6.58E-03	1.32E-02
Cl-36	1.2260E-06	28.72	57.43	0.00E+00	3.52E-05	7.04E-05
Cm-243	1.2000E-10	28.72	57.43	0.00E+00	3.45E-09	6.89E-09
Cm-244	7.3577E-10	28.72	57.43	0.00E+00	2.11E-08	4.23E-08
Co-60	1.3732E-03	28.72	57.43	0.00E+00	3.94E-02	7.89E-02
Cs-134	1.2709E-10	28.72	57.43	0.00E+00	3.65E-09	7.30E-09
Cs-135	3.0316E-05	28.72	57.43	0.00E+00	8.71E-04	1.74E-03
Cs-137	7.2579E-01	28.72	57.43	0.00E+00	2.08E+01	4.17E+01
Eu-154	5.9750E-05	28.72	57.43	0.00E+00	1.72E-03	3.43E-03
Eu-155	1.0577E-05	28.72	57.43	0.00E+00	3.04E-04	6.08E-04
Fe-55	4.1631E-07	28.72	57.43	0.00E+00	1.20E-05	2.39E-05
H-3	4.6722E-04	28.72	57.43	0.00E+00	1.34E-02	2.68E-02
I-129	7.3195E-07	28.72	57.43	0.00E+00	2.10E-05	4.20E-05
Kr-85	5.9418E-03	28.72	57.43	0.00E+00	1.71E-01	3.41E-01
Np-237	1.1499E-06	28.72	57.43	0.00E+00	3.30E-05	6.60E-05
Pa-231	7.0899E-08	28.72	57.43	0.00E+00	2.04E-06	4.07E-06
Pb-210	2.2363E-12	28.72	57.43	0.00E+00	6.42E-11	1.28E-10
Pm-147	4.2296E-07	28.72	57.43	0.00E+00	1.21E-05	2.43E-05
Pu-238	2.3295E-04	28.72	57.43	0.00E+00	6.69E-03	1.34E-02
Pu-239	6.6722E-04	28.72	57.43	0.00E+00	1.92E-02	3.83E-02
Pu-240	8.6556E-05	28.72	57.43	0.00E+00	2.49E-03	4.97E-03
Pu-241	1.6889E-04	28.72	57.43	0.00E+00	4.85E-03	9.70E-03
Pu-242	1.9717E-09	28.72	57.43	0.00E+00	5.66E-08	1.13E-07
Ra-226	4.5740E-12	28.72	57.43	0.00E+00	1.31E-10	2.63E-10
Ra-228	8.3511E-12	28.72	57.43	0.00E+00	2.40E-10	4.80E-10
Ru-106	2.0516E-19	28.72	57.43	0.00E+00	5.89E-18	1.18E-17
Se-79	1.3220E-05	28.72	57.43	0.00E+00	3.80E-04	7.59E-04
Sn-126	1.1489E-05	28.72	57.43	0.00E+00	3.30E-04	6.60E-04
Sr-90	6.6872E-01	28.72	57.43	0.00E+00	1.92E+01	3.84E+01
Tc-99	4.6639E-04	28.72	57.43	0.00E+00	1.34E-02	2.68E-02
Th-229	2.3727E-11	28.72	57.43	0.00E+00	6.81E-10	1.36E-09
Th-230	2.7354E-10	28.72	57.43	0.00E+00	7.86E-09	1.57E-08
Th-232	8.3594E-12	28.72	57.43	0.00E+00	2.40E-10	4.80E-10
Tl-208	1.6228E-08	28.72	57.43	0.00E+00	4.66E-07	9.32E-07
U-232	4.3960E-08	28.72	57.43	0.00E+00	1.26E-06	2.52E-06
U-233	3.3344E-09	28.72	57.43	0.00E+00	9.58E-08	1.92E-07
U-234	4.0749E-07	28.72	57.43	0.00E+00	1.17E-05	2.34E-05
U-235	-2.7761E-06	28.72	0.00	4.95E-04	4.15E-04	4.95E-04
U-236	1.6190E-05	28.72	57.43	0.00E+00	4.65E-04	9.30E-04
U-238	-2.8547E-09	28.72	0.00	5.81E-06	5.73E-06	5.81E-06
Y-90	6.6889E-01	28.72	57.43	0.00E+00	1.92E+01	3.84E+01
Other Radionuclides					2.61E+01	5.22E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.096E+12
0.0250	4.356E+11
0.0375	3.785E+11
0.0575	4.062E+11
0.0850	2.453E+11
0.1250	1.591E+11
0.2250	2.114E+11
0.3750	9.222E+10
0.5750	1.551E+12
0.8500	1.507E+10
1.2500	1.090E+10
1.7500	3.876E+08
2.2500	7.330E+04
2.7500	3.283E+04
3.5000	3.343E+00
5.0000	1.381E+00
7.0000	1.526E-01
11.0000	1.714E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.34E-01	4.68E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		28.72	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		57.43	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ARKANSAS
SNF ID #: 7
Fuel Units & Descr: 3 - SCRAP
Heavy Metal Mass: BOL=12.6kg; EOL=11.895kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1986
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	670.42	1,340.84	0.00E+00	5.88E-07	1.18E-06
Am-241	1.4352E-01	670.42	1,340.84	0.00E+00	9.62E+01	1.92E+02
Am-242m	2.8698E-04	670.42	1,340.84	0.00E+00	1.92E-01	3.85E-01
Am-243	6.2565E-04	670.42	1,340.84	0.00E+00	4.19E-01	8.39E-01
C-14	4.7901E-05	670.42	1,340.84	0.00E+00	3.21E-02	6.42E-02
Cl-36	8.0297E-07	670.42	1,340.84	0.00E+00	5.38E-04	1.08E-03
Cm-243	2.5081E-04	670.42	1,340.84	0.00E+00	1.68E-01	3.36E-01
Cm-244	4.9015E-02	670.42	1,340.84	0.00E+00	3.29E+01	6.57E+01
Co-60	2.5581E-03	670.42	1,340.84	0.00E+00	1.72E+00	3.43E+00
Cs-134	4.0536E-05	670.42	1,340.84	0.00E+00	2.72E-02	5.44E-02
Cs-135	1.4433E-05	670.42	1,340.84	0.00E+00	9.68E-03	1.94E-02
Cs-137	1.3979E+00	670.42	1,340.84	0.00E+00	9.37E+02	1.87E+03
Eu-154	2.0203E-02	670.42	1,340.84	0.00E+00	1.35E+01	2.71E+01
Eu-155	1.7684E-03	670.42	1,340.84	0.00E+00	1.19E+00	2.37E+00
Fe-55	4.3136E-05	670.42	1,340.84	0.00E+00	2.89E-02	5.78E-02
H-3	2.0769E-02	670.42	1,340.84	0.00E+00	1.39E+01	2.78E+01
I-129	9.8288E-07	670.42	1,340.84	0.00E+00	6.59E-04	1.32E-03
Kr-85	2.8214E-02	670.42	1,340.84	0.00E+00	1.89E+01	3.78E+01
Np-237	1.1218E-05	670.42	1,340.84	0.00E+00	7.52E-03	1.50E-02
Pa-231	1.3036E-09	670.42	1,340.84	0.00E+00	8.74E-07	1.75E-06
Pb-210	8.5078E-11	670.42	1,340.84	0.00E+00	5.70E-08	1.14E-07
Pm-147	3.6531E-04	670.42	1,340.84	0.00E+00	2.45E-01	4.90E-01
Pu-238	7.4564E-02	670.42	1,340.84	0.00E+00	5.00E+01	1.00E+02
Pu-239	1.1623E-02	670.42	1,340.84	0.00E+00	7.79E+00	1.56E+01
Pu-240	1.5132E-02	670.42	1,340.84	0.00E+00	1.01E+01	2.03E+01
Pu-241	9.0036E-01	670.42	1,340.84	0.00E+00	6.04E+02	1.21E+03
Pu-242	6.4260E-05	670.42	1,340.84	0.00E+00	4.31E-02	8.62E-02
Ra-226	2.2804E-10	670.42	1,340.84	0.00E+00	1.53E-07	3.06E-07
Ra-228	5.2713E-12	670.42	1,340.84	0.00E+00	3.53E-09	7.07E-09
Ru-106	6.1160E-10	670.42	1,340.84	0.00E+00	4.10E-07	8.20E-07
Se-79	1.2377E-05	670.42	1,340.84	0.00E+00	8.30E-03	1.66E-02
Sn-126	2.5210E-05	670.42	1,340.84	0.00E+00	1.69E-02	3.38E-02
Sr-90	9.1667E-01	670.42	1,340.84	0.00E+00	6.15E+02	1.23E+03
Tc-99	3.9357E-04	670.42	1,340.84	0.00E+00	2.64E-01	5.28E-01
Th-229	1.2057E-10	670.42	1,340.84	0.00E+00	8.08E-08	1.62E-07
Th-230	2.1043E-08	670.42	1,340.84	0.00E+00	1.41E-05	2.82E-05
Th-232	5.2972E-12	670.42	1,340.84	0.00E+00	3.55E-09	7.10E-09
Tl-208	1.7474E-07	670.42	1,340.84	0.00E+00	1.17E-04	2.34E-04
U-232	4.7368E-07	670.42	1,340.84	0.00E+00	3.18E-04	6.35E-04
U-233	2.5097E-08	670.42	1,340.84	0.00E+00	1.68E-05	3.37E-05
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.214E+13
0.0250	1.455E+13
0.0375	1.388E+13
0.0575	1.603E+13
0.0850	8.073E+12
0.1250	5.602E+12
0.2250	6.922E+12
0.3750	2.977E+12
0.5750	6.923E+13
0.8500	9.578E+11
1.2500	9.408E+11
1.7500	2.817E+10
2.2500	4.536E+06
2.7500	9.294E+06
3.5000	9.570E+05
5.0000	4.092E+05
7.0000	4.716E+04
11.0000	5.416E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E+01	3.68E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.9	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	592.20	670.42	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,340.84	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.52	1.13
Bounding:	3.04	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1987
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	0.02	0.05	0.00E+00	4.57E-11	9.14E-11
Am-241	2.5251E-03	0.02	0.05	0.00E+00	5.75E-05	1.15E-04
Am-242m	3.9624E-07	0.02	0.05	0.00E+00	9.02E-09	1.80E-08
Am-243	1.4880E-06	0.02	0.05	0.00E+00	3.39E-08	6.78E-08
C-14	5.7053E-09	0.02	0.05	0.00E+00	1.30E-10	2.60E-10
Cl-36	1.3124E-32	0.02	0.05	0.00E+00	2.99E-34	5.98E-34
Cm-243	1.1419E-07	0.02	0.05	0.00E+00	2.60E-09	5.20E-09
Cm-244	1.6522E-05	0.02	0.05	0.00E+00	3.76E-07	7.52E-07
Co-60	7.4047E-07	0.02	0.05	0.00E+00	1.69E-08	3.37E-08
Cs-134	2.0455E-05	0.02	0.05	0.00E+00	4.66E-07	9.32E-07
Cs-135	3.4477E-06	0.02	0.05	0.00E+00	7.85E-08	1.57E-07
Cs-137	1.4365E+00	0.02	0.05	0.00E+00	3.27E-02	6.54E-02
Eu-154	7.3230E-03	0.02	0.05	0.00E+00	1.67E-04	3.33E-04
Eu-155	5.9259E-04	0.02	0.05	0.00E+00	1.35E-05	2.70E-05
Fe-55	2.2791E-06	0.02	0.05	0.00E+00	5.19E-08	1.04E-07
H-3	1.9698E-03	0.02	0.05	0.00E+00	4.49E-05	8.97E-05
I-129	7.5300E-07	0.02	0.05	0.00E+00	1.71E-08	3.43E-08
Kr-85	4.1176E-02	0.02	0.05	0.00E+00	9.38E-04	1.88E-03
Np-237	9.5752E-06	0.02	0.05	0.00E+00	2.18E-07	4.36E-07
Pa-231	3.9379E-09	0.02	0.05	0.00E+00	8.97E-11	1.79E-10
Pb-210	3.3115E-10	0.02	0.05	0.00E+00	7.54E-12	1.51E-11
Pm-147	9.2402E-04	0.02	0.05	0.00E+00	2.10E-05	4.21E-05
Pu-238	1.6217E-02	0.02	0.05	0.00E+00	3.69E-04	7.39E-04
Pu-239	4.2810E-04	0.02	0.05	0.00E+00	9.75E-06	1.95E-05
Pu-240	2.4333E-04	0.02	0.05	0.00E+00	5.54E-06	1.11E-05
Pu-241	1.6242E-02	0.02	0.05	0.00E+00	3.70E-04	7.40E-04
Pu-242	3.6329E-07	0.02	0.05	0.00E+00	8.27E-09	1.65E-08
Ra-226	9.0114E-10	0.02	0.05	0.00E+00	2.05E-11	4.10E-11
Ra-228	3.1019E-14	0.02	0.05	0.00E+00	7.06E-16	1.41E-15
Ru-106	2.1225E-10	0.02	0.05	0.00E+00	4.83E-12	9.67E-12
Se-79	1.2930E-05	0.02	0.05	0.00E+00	2.94E-07	5.89E-07
Sn-126	1.1571E-05	0.02	0.05	0.00E+00	2.63E-07	5.27E-07
Sr-90	1.3472E+00	0.02	0.05	0.00E+00	3.07E-02	6.14E-02
Tc-99	4.2239E-04	0.02	0.05	0.00E+00	9.62E-06	1.92E-05
Th-229	1.2407E-11	0.02	0.05	0.00E+00	2.83E-13	5.65E-13
Th-230	8.3497E-08	0.02	0.05	0.00E+00	1.90E-09	3.80E-09
Th-232	3.8371E-14	0.02	0.05	0.00E+00	8.74E-16	1.75E-15
Tl-208	4.0414E-08	0.02	0.05	0.00E+00	9.20E-10	1.84E-09
U-232	1.0948E-07	0.02	0.05	0.00E+00	2.49E-09	4.99E-09
U-233	3.6275E-09	0.02	0.05	0.00E+00	8.26E-11	1.65E-10
U-234	1.8562E-04	0.02	0.05	0.00E+00	4.23E-06	8.45E-06
U-235	-2.7235E-06	0.02	0.00	3.93E-04	3.93E-04	3.93E-04
U-236	1.5493E-05	0.02	0.05	0.00E+00	3.53E-07	7.06E-07
U-238	-4.2851E-09	0.02	0.00	5.39E-06	5.39E-06	5.39E-06
Y-90	1.3475E+00	0.02	0.05	0.00E+00	3.07E-02	6.14E-02
Other Radionuclides					3.12E-02	6.23E-02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.363E+09
0.0250	6.965E+08
0.0375	6.054E+08
0.0575	6.516E+08
0.0850	3.937E+08
0.1250	2.616E+08
0.2250	3.469E+08
0.3750	1.475E+08
0.5750	2.437E+09
0.8500	2.977E+07
1.2500	1.440E+07
1.7500	8.103E+05
2.2500	6.783E+01
2.7500	6.471E+01
3.5000	7.945E-02
5.0000	3.301E-02
7.0000	3.675E-03
11.0000	4.142E-04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.91E-04	7.73E-04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: 18"x10' 2.33

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1.30	13.74	0.00E+00	2.61E-09	2.76E-08
Am-241	2.5251E-03	1.30	13.74	0.00E+00	3.28E-03	3.47E-02
Am-242m	3.9624E-07	1.30	13.74	0.00E+00	5.14E-07	5.44E-06
Am-243	1.4880E-06	1.30	13.74	0.00E+00	1.93E-06	2.04E-05
C-14	5.7053E-09	1.30	13.74	0.00E+00	7.41E-09	7.84E-08
Cl-36	1.3124E-32	1.30	13.74	0.00E+00	1.70E-32	1.80E-31
Cm-243	1.1419E-07	1.30	13.74	0.00E+00	1.48E-07	1.57E-06
Cm-244	1.6522E-05	1.30	13.74	0.00E+00	2.15E-05	2.27E-04
Co-60	7.4047E-07	1.30	13.74	0.00E+00	9.61E-07	1.02E-05
Cs-134	2.0455E-05	1.30	13.74	0.00E+00	2.66E-05	2.81E-04
Cs-135	3.4477E-06	1.30	13.74	0.00E+00	4.48E-06	4.74E-05
Cs-137	1.4365E+00	1.30	13.74	0.00E+00	1.87E+00	1.97E+01
Eu-154	7.3230E-03	1.30	13.74	0.00E+00	9.51E-03	1.01E-01
Eu-155	5.9259E-04	1.30	13.74	0.00E+00	7.69E-04	8.14E-03
Fe-55	2.2791E-06	1.30	13.74	0.00E+00	2.96E-06	3.13E-05
H-3	1.9698E-03	1.30	13.74	0.00E+00	2.56E-03	2.71E-02
I-129	7.5300E-07	1.30	13.74	0.00E+00	9.78E-07	1.03E-05
Kr-85	4.1176E-02	1.30	13.74	0.00E+00	5.35E-02	5.66E-01
Np-237	9.5752E-06	1.30	13.74	0.00E+00	1.24E-05	1.32E-04
Pa-231	3.9379E-09	1.30	13.74	0.00E+00	5.11E-09	5.41E-08
Pb-210	3.3115E-10	1.30	13.74	0.00E+00	4.30E-10	4.55E-09
Pm-147	9.2402E-04	1.30	13.74	0.00E+00	1.20E-03	1.27E-02
Pu-238	1.6217E-02	1.30	13.74	0.00E+00	2.11E-02	2.23E-01
Pu-239	4.2810E-04	1.30	13.74	0.00E+00	5.56E-04	5.88E-03
Pu-240	2.4333E-04	1.30	13.74	0.00E+00	3.16E-04	3.34E-03
Pu-241	1.6242E-02	1.30	13.74	0.00E+00	2.11E-02	2.23E-01
Pu-242	3.6329E-07	1.30	13.74	0.00E+00	4.72E-07	4.99E-06
Ra-226	9.0114E-10	1.30	13.74	0.00E+00	1.17E-09	1.24E-08
Ra-228	3.1019E-14	1.30	13.74	0.00E+00	4.03E-14	4.26E-13
Ru-106	2.1225E-10	1.30	13.74	0.00E+00	2.76E-10	2.92E-09
Se-79	1.2930E-05	1.30	13.74	0.00E+00	1.68E-05	1.78E-04
Sn-126	1.1571E-05	1.30	13.74	0.00E+00	1.50E-05	1.59E-04
Sr-90	1.3472E+00	1.30	13.74	0.00E+00	1.75E+00	1.85E+01
Tc-99	4.2239E-04	1.30	13.74	0.00E+00	5.48E-04	5.80E-03
Th-229	1.2407E-11	1.30	13.74	0.00E+00	1.61E-11	1.70E-10
Th-230	8.3497E-08	1.30	13.74	0.00E+00	1.08E-07	1.15E-06
Th-232	3.8371E-14	1.30	13.74	0.00E+00	4.98E-14	5.27E-13
Tl-208	4.0414E-08	1.30	13.74	0.00E+00	5.25E-08	5.55E-07
U-232	1.0948E-07	1.30	13.74	0.00E+00	1.42E-07	1.50E-06
U-233	3.6275E-09	1.30	13.74	0.00E+00	4.71E-09	4.98E-08
U-234	1.8562E-04	1.30	13.74	0.00E+00	2.41E-04	2.55E-03
U-235	-2.7235E-06	1.30	0.00	2.25E-02	2.25E-02	2.25E-02
U-236	1.5493E-05	1.30	13.74	0.00E+00	2.01E-05	2.13E-04
U-238	-4.2851E-09	1.30	0.00	2.92E-04	2.92E-04	2.92E-04
Y-90	1.3475E+00	1.30	13.74	0.00E+00	1.75E+00	1.85E+01
Other Radionuclides					1.78E+00	1.88E+01

Gamma Sources

Photon Energy Group (Avg. MeV)	Total Photons/sec (bounding)
0.0150	1.012E+12
0.0250	2.101E+11
0.0375	1.826E+11
0.0575	1.966E+11
0.0850	1.185E+11
0.1250	7.837E+10
0.2250	1.027E+11
0.3750	4.449E+10
0.5750	7.352E+11
0.8500	8.981E+09
1.2500	4.344E+09
1.7500	2.445E+08
2.2500	2.045E+04
2.7500	1.951E+04
3.5000	1.362E+01
5.0000	5.593E+00
7.0000	6.154E-01
11.0000	6.886E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.23E-02	2.31E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.29270621	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	1.30	
Bounding:	13.74	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ARMF/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

[1]Fuel decay start date: 1991
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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 Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	0.03	0.29	0.00E+00	5.45E-11	5.76E-10
Am-241	2.5251E-03	0.03	0.29	0.00E+00	6.85E-05	7.25E-04
Am-242m	3.9624E-07	0.03	0.29	0.00E+00	1.08E-08	1.14E-07
Am-243	1.4880E-06	0.03	0.29	0.00E+00	4.04E-08	4.27E-07
C-14	5.7053E-09	0.03	0.29	0.00E+00	1.55E-10	1.64E-09
Cl-36	1.3124E-32	0.03	0.29	0.00E+00	3.56E-34	3.77E-33
Cm-243	1.1419E-07	0.03	0.29	0.00E+00	3.10E-09	3.28E-08
Cm-244	1.6522E-05	0.03	0.29	0.00E+00	4.48E-07	4.75E-06
Co-60	7.4047E-07	0.03	0.29	0.00E+00	2.01E-08	2.13E-07
Cs-134	2.0455E-05	0.03	0.29	0.00E+00	5.55E-07	5.87E-06
Cs-135	3.4477E-06	0.03	0.29	0.00E+00	9.36E-08	9.90E-07
Cs-137	1.4365E+00	0.03	0.29	0.00E+00	3.90E-02	4.13E-01
Eu-154	7.3230E-03	0.03	0.29	0.00E+00	1.99E-04	2.10E-03
Eu-155	5.9259E-04	0.03	0.29	0.00E+00	1.61E-05	1.70E-04
Fe-55	2.2791E-06	0.03	0.29	0.00E+00	6.19E-08	6.55E-07
H-3	1.9698E-03	0.03	0.29	0.00E+00	5.35E-05	5.66E-04
I-129	7.5300E-07	0.03	0.29	0.00E+00	2.04E-08	2.16E-07
Kr-85	4.1176E-02	0.03	0.29	0.00E+00	1.12E-03	1.18E-02
Np-237	9.5752E-06	0.03	0.29	0.00E+00	2.60E-07	2.75E-06
Pa-231	3.9379E-09	0.03	0.29	0.00E+00	1.07E-10	1.13E-09
Pb-210	3.3115E-10	0.03	0.29	0.00E+00	8.99E-12	9.51E-11
Pm-147	9.2402E-04	0.03	0.29	0.00E+00	2.51E-05	2.65E-04
Pu-238	1.6217E-02	0.03	0.29	0.00E+00	4.40E-04	4.66E-03
Pu-239	4.2810E-04	0.03	0.29	0.00E+00	1.16E-05	1.23E-04
Pu-240	2.4333E-04	0.03	0.29	0.00E+00	6.60E-06	6.99E-05
Pu-241	1.6242E-02	0.03	0.29	0.00E+00	4.41E-04	4.66E-03
Pu-242	3.6329E-07	0.03	0.29	0.00E+00	9.86E-09	1.04E-07
Ra-226	9.0114E-10	0.03	0.29	0.00E+00	2.45E-11	2.59E-10
Ra-228	3.1019E-14	0.03	0.29	0.00E+00	8.42E-16	8.91E-15
Ru-106	2.1225E-10	0.03	0.29	0.00E+00	5.76E-12	6.10E-11
Se-79	1.2930E-05	0.03	0.29	0.00E+00	3.51E-07	3.71E-06
Sn-126	1.1571E-05	0.03	0.29	0.00E+00	3.14E-07	3.32E-06
Sr-90	1.3472E+00	0.03	0.29	0.00E+00	3.66E-02	3.87E-01
Tc-99	4.2239E-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
Tl-208	4.0414E-08	0.03	0.29	0.00E+00	1.10E-09	1.16E-08
U-232	1.0948E-07	0.03	0.29	0.00E+00	2.97E-09	3.14E-08
U-233	3.6275E-09	0.03	0.29	0.00E+00	9.84E-11	1.04E-09
U-234	1.8562E-04	0.03	0.29	0.00E+00	5.04E-06	5.33E-05
U-235	-2.7235E-06	0.03	0.00	4.75E-04	4.75E-04	4.75E-04
U-236	1.5493E-05	0.03	0.29	0.00E+00	4.20E-07	4.45E-06
U-238	-4.2851E-09	0.03	0.00	5.38E-06	5.38E-06	5.38E-06
Y-90	1.3475E+00	0.03	0.29	0.00E+00	3.66E-02	3.87E-01
Other Radionuclides					3.71E-02	3.93E-01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.116E+10
0.0250	4.393E+09
0.0375	3.818E+09
0.0575	4.110E+09
0.0850	2.478E+09
0.1250	1.638E+09
0.2250	2.147E+09
0.3750	9.300E+08
0.5750	1.537E+10
0.8500	1.877E+08
1.2500	9.080E+07
1.7500	5.111E+06
2.2500	4.274E+02
2.7500	4.079E+02
3.5000	2.809E-01
5.0000	1.153E-01
7.0000	1.268E-02
11.0000	1.418E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.67E-04	4.82E-03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.22	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.03	
Bounding:	0.29	

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:	0.00	0.00
Bounding:	0.00	0.00

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: 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

[1]Fuel decay start date: 1991
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	0.13	1.42	0.00E+00	2.69E-10	2.84E-09
Am-241	2.5251E-03	0.13	1.42	0.00E+00	3.38E-04	3.58E-03
Am-242m	3.9624E-07	0.13	1.42	0.00E+00	5.30E-08	5.61E-07
Am-243	1.4880E-06	0.13	1.42	0.00E+00	1.99E-07	2.11E-06
C-14	5.7053E-09	0.13	1.42	0.00E+00	7.64E-10	8.08E-09
Cl-36	1.3124E-32	0.13	1.42	0.00E+00	1.76E-33	1.86E-32
Cm-243	1.1419E-07	0.13	1.42	0.00E+00	1.53E-08	1.62E-07
Cm-244	1.6522E-05	0.13	1.42	0.00E+00	2.21E-06	2.34E-05
Co-60	7.4047E-07	0.13	1.42	0.00E+00	9.91E-08	1.05E-06
Cs-134	2.0455E-05	0.13	1.42	0.00E+00	2.74E-06	2.90E-05
Cs-135	3.4477E-06	0.13	1.42	0.00E+00	4.62E-07	4.88E-06
Cs-137	1.4365E+00	0.13	1.42	0.00E+00	1.92E-01	2.03E+00
Eu-154	7.3230E-03	0.13	1.42	0.00E+00	9.80E-04	1.04E-02
Eu-155	5.9259E-04	0.13	1.42	0.00E+00	7.93E-05	8.39E-04
Fe-55	2.2791E-06	0.13	1.42	0.00E+00	3.05E-07	3.23E-06
H-3	1.9698E-03	0.13	1.42	0.00E+00	2.64E-04	2.79E-03
I-129	7.5300E-07	0.13	1.42	0.00E+00	1.01E-07	1.07E-06
Kr-85	4.1176E-02	0.13	1.42	0.00E+00	5.51E-03	5.83E-02
Np-237	9.5752E-06	0.13	1.42	0.00E+00	1.28E-06	1.36E-05
Pa-231	3.9379E-09	0.13	1.42	0.00E+00	5.27E-10	5.58E-09
Pb-210	3.3115E-10	0.13	1.42	0.00E+00	4.43E-11	4.69E-10
Pm-147	9.2402E-04	0.13	1.42	0.00E+00	1.24E-04	1.31E-03
Pu-238	1.6217E-02	0.13	1.42	0.00E+00	2.17E-03	2.30E-02
Pu-239	4.2810E-04	0.13	1.42	0.00E+00	5.73E-05	6.06E-04
Pu-240	2.4333E-04	0.13	1.42	0.00E+00	3.26E-05	3.45E-04
Pu-241	1.6242E-02	0.13	1.42	0.00E+00	2.17E-03	2.30E-02
Pu-242	3.6329E-07	0.13	1.42	0.00E+00	4.86E-08	5.15E-07
Ra-226	9.0114E-10	0.13	1.42	0.00E+00	1.21E-10	1.28E-09
Ra-228	3.1019E-14	0.13	1.42	0.00E+00	4.15E-15	4.39E-14
Ru-106	2.1225E-10	0.13	1.42	0.00E+00	2.84E-11	3.01E-10
Se-79	1.2930E-05	0.13	1.42	0.00E+00	1.73E-06	1.83E-05
Sn-126	1.1571E-05	0.13	1.42	0.00E+00	1.55E-06	1.64E-05
Sr-90	1.3472E+00	0.13	1.42	0.00E+00	1.80E-01	1.91E+00
Tc-99	4.2239E-04	0.13	1.42	0.00E+00	5.65E-05	5.98E-04
Th-229	1.2407E-11	0.13	1.42	0.00E+00	1.66E-12	1.76E-11
Th-230	8.3497E-08	0.13	1.42	0.00E+00	1.12E-08	1.18E-07
Th-232	3.8371E-14	0.13	1.42	0.00E+00	5.14E-15	5.44E-14
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.044E+11
0.0250	2.166E+10
0.0375	1.883E+10
0.0575	2.027E+10
0.0850	1.222E+10
0.1250	8.080E+09
0.2250	1.059E+10
0.3750	4.587E+09
0.5750	7.581E+10
0.8500	9.260E+08
1.2500	4.479E+08
1.7500	2.521E+07
2.2500	2.108E+03
2.7500	2.012E+03
3.5000	1.387E+00
5.0000	5.895E-01
7.0000	6.262E-02
11.0000	7.004E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E-03	2.38E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1991
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	0.01	0.12	0.00E+00	2.22E-11	2.34E-10
Am-241	2.5251E-03	0.01	0.12	0.00E+00	2.79E-05	2.95E-04
Am-242m	3.9624E-07	0.01	0.12	0.00E+00	4.37E-09	4.63E-08
Am-243	1.4880E-06	0.01	0.12	0.00E+00	1.64E-08	1.74E-07
C-14	5.7053E-09	0.01	0.12	0.00E+00	6.30E-11	6.67E-10
Cl-36	1.3124E-32	0.01	0.12	0.00E+00	1.45E-34	1.53E-33
Cm-243	1.1419E-07	0.01	0.12	0.00E+00	1.26E-09	1.33E-08
Cm-244	1.6522E-05	0.01	0.12	0.00E+00	1.82E-07	1.93E-06
Co-60	7.4047E-07	0.01	0.12	0.00E+00	8.17E-09	8.65E-08
Cs-134	2.0455E-05	0.01	0.12	0.00E+00	2.26E-07	2.39E-06
Cs-135	3.4477E-06	0.01	0.12	0.00E+00	3.81E-08	4.03E-07
Cs-137	1.4365E+00	0.01	0.12	0.00E+00	1.59E-02	1.68E-01
Eu-154	7.3230E-03	0.01	0.12	0.00E+00	8.08E-05	8.56E-04
Eu-155	5.9259E-04	0.01	0.12	0.00E+00	6.54E-06	6.92E-05
Fe-55	2.2791E-06	0.01	0.12	0.00E+00	2.52E-08	2.66E-07
H-3	1.9698E-03	0.01	0.12	0.00E+00	2.17E-05	2.30E-04
I-129	7.5300E-07	0.01	0.12	0.00E+00	8.31E-09	8.80E-08
Kr-85	4.1176E-02	0.01	0.12	0.00E+00	4.55E-04	4.81E-03
Np-237	9.5752E-06	0.01	0.12	0.00E+00	1.06E-07	1.12E-06
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
Tl-208	4.0414E-08	0.01	0.12	0.00E+00	4.46E-10	4.72E-09
U-232	1.0948E-07	0.01	0.12	0.00E+00	1.21E-09	1.28E-08
U-233	3.6275E-09	0.01	0.12	0.00E+00	4.00E-11	4.24E-10
U-234	1.8562E-04	0.01	0.12	0.00E+00	2.05E-06	2.17E-05
U-235	-2.7235E-06	0.01	0.00	1.90E-04	1.90E-04	1.90E-04
U-236	1.5493E-05	0.01	0.12	0.00E+00	1.71E-07	1.81E-06
U-238	-4.2851E-09	0.01	0.00	2.69E-06	2.69E-06	2.69E-06
Y-90	1.3475E+00	0.01	0.12	0.00E+00	1.49E-02	1.57E-01
Other Radionuclides					1.51E-02	1.60E-01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.609E+09
0.0250	1.787E+09
0.0375	1.553E+09
0.0575	1.672E+09
0.0850	1.008E+09
0.1250	6.664E+08
0.2250	8.734E+08
0.3750	3.783E+08
0.5750	6.252E+09
0.8500	7.637E+07
1.2500	3.694E+07
1.7500	2.079E+06
2.2500	1.739E+02
2.7500	1.659E+02
3.5000	1.168E-01
5.0000	4.801E-02
7.0000	5.285E-03
11.0000	5.915E-04

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.66666667	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.01	
Bounding:	0.12	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATR
SNF ID #: 15
Fuel Units & Descr: 1576 - 19 CURVED PLATES
Heavy Metal Mass: BOL=1818.704kg; EOL=1313.754kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	480,779.86	961,559.72	0.00E+00	9.65E-04	1.93E-03
Am-241	2.5251E-03	480,779.86	961,559.72	0.00E+00	1.21E+03	2.43E+03
Am-242m	3.9624E-07	480,779.86	961,559.72	0.00E+00	1.91E-01	3.81E-01
Am-243	1.4880E-06	480,779.86	961,559.72	0.00E+00	7.15E-01	1.43E+00
C-14	5.7053E-09	480,779.86	961,559.72	0.00E+00	2.74E-03	5.49E-03
Cl-36	1.3124E-32	480,779.86	961,559.72	0.00E+00	6.31E-27	1.26E-26
Cm-243	1.1419E-07	480,779.86	961,559.72	0.00E+00	5.49E-02	1.10E-01
Cm-244	1.6522E-05	480,779.86	961,559.72	0.00E+00	7.94E+00	1.59E+01
Co-60	7.4047E-07	480,779.86	961,559.72	0.00E+00	3.56E-01	7.12E-01
Cs-134	2.0455E-05	480,779.86	961,559.72	0.00E+00	9.83E+00	1.97E+01
Cs-135	3.4477E-06	480,779.86	961,559.72	0.00E+00	1.66E+00	3.32E+00
Cs-137	1.4365E+00	480,779.86	961,559.72	0.00E+00	6.91E+05	1.38E+06
Eu-154	7.3230E-03	480,779.86	961,559.72	0.00E+00	3.52E+03	7.04E+03
Eu-155	5.9259E-04	480,779.86	961,559.72	0.00E+00	2.85E+02	5.70E+02
Fe-55	2.2791E-06	480,779.86	961,559.72	0.00E+00	1.10E+00	2.19E+00
H-3	1.9698E-03	480,779.86	961,559.72	0.00E+00	9.47E+02	1.89E+03
I-129	7.5300E-07	480,779.86	961,559.72	0.00E+00	3.62E-01	7.24E-01
Kr-85	4.1176E-02	480,779.86	961,559.72	0.00E+00	1.98E+04	3.96E+04
Np-237	9.5752E-06	480,779.86	961,559.72	0.00E+00	4.60E+00	9.21E+00
Pa-231	3.9379E-09	480,779.86	961,559.72	0.00E+00	1.89E-03	3.79E-03
Pb-210	3.3115E-10	480,779.86	961,559.72	0.00E+00	1.59E-04	3.18E-04
Pm-147	9.2402E-04	480,779.86	961,559.72	0.00E+00	4.44E+02	8.89E+02
Pu-238	1.6217E-02	480,779.86	961,559.72	0.00E+00	7.80E+03	1.56E+04
Pu-239	4.2810E-04	480,779.86	961,559.72	0.00E+00	2.06E+02	4.12E+02
Pu-240	2.4333E-04	480,779.86	961,559.72	0.00E+00	1.17E+02	2.34E+02
Pu-241	1.6242E-02	480,779.86	961,559.72	0.00E+00	7.81E+03	1.56E+04
Pu-242	3.6329E-07	480,779.86	961,559.72	0.00E+00	1.75E-01	3.49E-01
Ra-226	9.0114E-10	480,779.86	961,559.72	0.00E+00	4.33E-04	8.67E-04
Ra-228	3.1019E-14	480,779.86	961,559.72	0.00E+00	1.49E-08	2.98E-08
Ru-106	2.1225E-10	480,779.86	961,559.72	0.00E+00	1.02E-04	2.04E-04
Se-79	1.2930E-05	480,779.86	961,559.72	0.00E+00	6.22E+00	1.24E+01
Sn-126	1.1571E-05	480,779.86	961,559.72	0.00E+00	5.56E+00	1.11E+01
Sr-90	1.3472E+00	480,779.86	961,559.72	0.00E+00	6.48E+05	1.30E+06
Tc-99	4.2239E-04	480,779.86	961,559.72	0.00E+00	2.03E+02	4.06E+02
Th-229	1.2407E-11	480,779.86	961,559.72	0.00E+00	5.97E-06	1.19E-05
Th-230	8.3497E-08	480,779.86	961,559.72	0.00E+00	4.01E-02	8.03E-02
Th-232	3.8371E-14	480,779.86	961,559.72	0.00E+00	1.84E-08	3.69E-08
Tl-208	4.0414E-08	480,779.86	961,559.72	0.00E+00	1.94E-02	3.89E-02
U-232	1.0948E-07	480,779.86	961,559.72	0.00E+00	5.26E-02	1.05E-01
U-233	3.6275E-09	480,779.86	961,559.72	0.00E+00	1.74E-03	3.49E-03
U-234	1.8562E-04	480,779.86	961,559.72	0.00E+00	8.92E+01	1.78E+02
U-235	-2.7235E-06	480,779.86	0.00	3.66E+00	2.35E+00	3.66E+00
U-236	1.5493E-05	480,779.86	961,559.72	0.00E+00	7.45E+00	1.49E+01
U-238	-4.2851E-09	480,779.86	0.00	4.18E-02	3.98E-02	4.18E-02
Y-90	1.3475E+00	480,779.86	961,559.72	0.00E+00	6.48E+05	1.30E+06
Other Radionuclides					6.58E+05	1.32E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.082E+16
0.0250	1.471E+16
0.0375	1.278E+16
0.0575	1.376E+16
0.0850	8.290E+15
0.1250	5.476E+15
0.2250	7.157E+15
0.3750	3.114E+15
0.5750	5.146E+16
0.8500	6.285E+14
1.2500	3.040E+14
1.7500	1.711E+13
2.2500	1.431E+09
2.7500	1.365E+09
3.5000	7.911E+05
5.0000	3.233E+05
7.0000	3.537E+04
11.0000	3.944E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.85E+03	1.61E+04
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 %:	93.154	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	480,779.86	478,197.82	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		961,559.72	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.99
Bounding:	1.68	

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATR
SNF ID #: 16
Fuel Units & Descr: 4132 - 19 CURVED PLATES
Heavy Metal Mass: BOL=4768.328kg; EOL=3705.991kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	1,017,446.76	2,034,893.51	0.00E+00	1.48E-04	2.96E-04
Am-241	1.1190E-03	1,017,446.76	2,034,893.51	0.00E+00	1.14E+03	2.28E+03
Am-242m	4.5425E-07	1,017,446.76	2,034,893.51	0.00E+00	4.62E-01	9.24E-01
Am-243	1.4921E-06	1,017,446.76	2,034,893.51	0.00E+00	1.52E+00	3.04E+00
C-14	5.7244E-09	1,017,446.76	2,034,893.51	0.00E+00	5.82E-03	1.16E-02
Cl-36	1.3124E-32	1,017,446.76	2,034,893.51	0.00E+00	1.34E-26	2.67E-26
Cm-243	2.3676E-07	1,017,446.76	2,034,893.51	0.00E+00	2.41E-01	4.82E-01
Cm-244	5.2042E-05	1,017,446.76	2,034,893.51	0.00E+00	5.30E+01	1.06E+02
Co-60	3.8208E-05	1,017,446.76	2,034,893.51	0.00E+00	3.89E+01	7.77E+01
Cs-134	4.8693E-01	1,017,446.76	2,034,893.51	0.00E+00	4.95E+05	9.91E+05
Cs-135	3.4477E-06	1,017,446.76	2,034,893.51	0.00E+00	3.51E+00	7.02E+00
Cs-137	2.8731E+00	1,017,446.76	2,034,893.51	0.00E+00	2.92E+06	5.85E+06
Eu-154	8.2053E-02	1,017,446.76	2,034,893.51	0.00E+00	8.35E+04	1.67E+05
Eu-155	3.9134E-02	1,017,446.76	2,034,893.51	0.00E+00	3.98E+04	7.96E+04
Fe-55	6.7429E-03	1,017,446.76	2,034,893.51	0.00E+00	6.86E+03	1.37E+04
H-3	1.0599E-02	1,017,446.76	2,034,893.51	0.00E+00	1.08E+04	2.16E+04
I-129	7.5300E-07	1,017,446.76	2,034,893.51	0.00E+00	7.66E-01	1.53E+00
Kr-85	2.8595E-01	1,017,446.76	2,034,893.51	0.00E+00	2.91E+05	5.82E+05
Np-237	9.5479E-06	1,017,446.76	2,034,893.51	0.00E+00	9.71E+00	1.94E+01
Pa-231	8.9297E-10	1,017,446.76	2,034,893.51	0.00E+00	9.09E-04	1.82E-03
Pb-210	3.7609E-12	1,017,446.76	2,034,893.51	0.00E+00	3.83E-06	7.65E-06
Pm-147	2.5452E+00	1,017,446.76	2,034,893.51	0.00E+00	2.59E+06	5.18E+06
Pu-238	2.0550E-02	1,017,446.76	2,034,893.51	0.00E+00	2.09E+04	4.18E+04
Pu-239	4.2838E-04	1,017,446.76	2,034,893.51	0.00E+00	4.36E+02	8.72E+02
Pu-240	2.4401E-04	1,017,446.76	2,034,893.51	0.00E+00	2.48E+02	4.97E+02
Pu-241	6.8764E-02	1,017,446.76	2,034,893.51	0.00E+00	7.00E+04	1.40E+05
Pu-242	3.6329E-07	1,017,446.76	2,034,893.51	0.00E+00	3.70E-01	7.39E-01
Ra-226	3.8045E-11	1,017,446.76	2,034,893.51	0.00E+00	3.87E-05	7.74E-05
Ra-228	2.9902E-15	1,017,446.76	2,034,893.51	0.00E+00	3.04E-09	6.08E-09
Ru-106	1.9055E-01	1,017,446.76	2,034,893.51	0.00E+00	1.94E+05	3.88E+05
Se-79	1.2936E-05	1,017,446.76	2,034,893.51	0.00E+00	1.32E+01	2.63E+01
Sn-126	1.1574E-05	1,017,446.76	2,034,893.51	0.00E+00	1.18E+01	2.36E+01
Sr-90	2.7505E+00	1,017,446.76	2,034,893.51	0.00E+00	2.80E+06	5.60E+06
Tc-99	4.2239E-04	1,017,446.76	2,034,893.51	0.00E+00	4.30E+02	8.60E+02
Th-229	1.8848E-12	1,017,446.76	2,034,893.51	0.00E+00	1.92E-06	3.84E-06
Th-230	1.7042E-08	1,017,446.76	2,034,893.51	0.00E+00	1.73E-02	3.47E-02
Th-232	7.8132E-15	1,017,446.76	2,034,893.51	0.00E+00	7.95E-09	1.59E-08
Tl-208	4.4063E-08	1,017,446.76	2,034,893.51	0.00E+00	4.48E-02	8.97E-02
U-232	1.3151E-07	1,017,446.76	2,034,893.51	0.00E+00	1.34E-01	2.68E-01
U-233	1.9564E-09	1,017,446.76	2,034,893.51	0.00E+00	1.99E-03	3.98E-03
U-234	1.8371E-04	1,017,446.76	2,034,893.51	0.00E+00	1.87E+02	3.74E+02
U-235	-2.7235E-06	1,017,446.76	0.00	9.60E+00	6.83E+00	9.60E+00
U-236	1.5493E-05	1,017,446.76	2,034,893.51	0.00E+00	1.58E+01	3.15E+01
U-238	-4.2851E-09	1,017,446.76	0.00	1.10E-01	1.05E-01	1.10E-01
Y-90	2.7505E+00	1,017,446.76	2,034,893.51	0.00E+00	2.80E+06	5.60E+06
Other Radionuclides					5.23E+06	1.05E+07

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.926E+17
0.0250	8.458E+16
0.0375	7.805E+16
0.0575	7.674E+16
0.0850	4.892E+16
0.1250	4.237E+16
0.2250	4.147E+16
0.3750	2.007E+16
0.5750	2.757E+17
0.8500	3.861E+16
1.2500	7.183E+15
1.7500	3.012E+14
2.2500	6.318E+14
2.7500	3.635E+12
3.5000	4.031E+11
5.0000	1.206E+06
7.0000	1.344E+05
11.0000	1.515E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.16E+04	1.03E+06
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 %:	93.154	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,017,446.76	1,006,053.94	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		2,034,893.51	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	0.99
Bounding:	1.36	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: 18"x10'
6.40

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	45,921.00	91,842.00	0.00E+00	9.22E-05	1.84E-04
Am-241	2.5251E-03	45,921.00	91,842.00	0.00E+00	1.16E+02	2.32E+02
Am-242m	3.9624E-07	45,921.00	91,842.00	0.00E+00	1.82E-02	3.64E-02
Am-243	1.4880E-06	45,921.00	91,842.00	0.00E+00	6.83E-02	1.37E-01
C-14	5.7053E-09	45,921.00	91,842.00	0.00E+00	2.62E-04	5.24E-04
Cl-36	1.3124E-32	45,921.00	91,842.00	0.00E+00	6.03E-28	1.21E-27
Cm-243	1.1419E-07	45,921.00	91,842.00	0.00E+00	5.24E-03	1.05E-02
Cm-244	1.6522E-05	45,921.00	91,842.00	0.00E+00	7.59E-01	1.52E+00
Co-60	7.4047E-07	45,921.00	91,842.00	0.00E+00	3.40E-02	6.80E-02
Cs-134	2.0455E-05	45,921.00	91,842.00	0.00E+00	9.39E-01	1.88E+00
Cs-135	3.4477E-06	45,921.00	91,842.00	0.00E+00	1.58E-01	3.17E-01
Cs-137	1.4365E+00	45,921.00	91,842.00	0.00E+00	6.60E+04	1.32E+05
Eu-154	7.3230E-03	45,921.00	91,842.00	0.00E+00	3.36E+02	6.73E+02
Eu-155	5.9259E-04	45,921.00	91,842.00	0.00E+00	2.72E+01	5.44E+01
Fe-55	2.2791E-06	45,921.00	91,842.00	0.00E+00	1.05E-01	2.09E-01
H-3	1.9698E-03	45,921.00	91,842.00	0.00E+00	9.05E+01	1.81E+02
I-129	7.5300E-07	45,921.00	91,842.00	0.00E+00	3.46E-02	6.92E-02
Kr-85	4.1176E-02	45,921.00	91,842.00	0.00E+00	1.89E+03	3.78E+03
Np-237	9.5752E-06	45,921.00	91,842.00	0.00E+00	4.40E-01	8.79E-01
Pa-231	3.9379E-09	45,921.00	91,842.00	0.00E+00	1.81E-04	3.62E-04
Pb-210	3.3115E-10	45,921.00	91,842.00	0.00E+00	1.52E-05	3.04E-05
Pm-147	9.2402E-04	45,921.00	91,842.00	0.00E+00	4.24E+01	8.49E+01
Pu-238	1.6217E-02	45,921.00	91,842.00	0.00E+00	7.45E+02	1.49E+03
Pu-239	4.2810E-04	45,921.00	91,842.00	0.00E+00	1.97E+01	3.93E+01
Pu-240	2.4333E-04	45,921.00	91,842.00	0.00E+00	1.12E+01	2.23E+01
Pu-241	1.6242E-02	45,921.00	91,842.00	0.00E+00	7.46E+02	1.49E+03
Pu-242	3.6329E-07	45,921.00	91,842.00	0.00E+00	1.67E-02	3.34E-02
Ra-226	9.0114E-10	45,921.00	91,842.00	0.00E+00	4.14E-05	8.28E-05
Ra-228	3.1019E-14	45,921.00	91,842.00	0.00E+00	1.42E-09	2.85E-09
Ru-106	2.1225E-10	45,921.00	91,842.00	0.00E+00	9.75E-06	1.95E-05
Se-79	1.2930E-05	45,921.00	91,842.00	0.00E+00	5.94E-01	1.19E+00
Sn-126	1.1571E-05	45,921.00	91,842.00	0.00E+00	5.31E-01	1.06E+00
Sr-90	1.3472E+00	45,921.00	91,842.00	0.00E+00	6.19E+04	1.24E+05
Tc-99	4.2239E-04	45,921.00	91,842.00	0.00E+00	1.94E+01	3.88E+01
Th-229	1.2407E-11	45,921.00	91,842.00	0.00E+00	5.70E-07	1.14E-06
Th-230	8.3497E-08	45,921.00	91,842.00	0.00E+00	3.83E-03	7.67E-03
Th-232	3.8371E-14	45,921.00	91,842.00	0.00E+00	1.76E-09	3.52E-09
Tl-208	4.0414E-08	45,921.00	91,842.00	0.00E+00	1.86E-03	3.71E-03
U-232	1.0948E-07	45,921.00	91,842.00	0.00E+00	5.03E-03	1.01E-02
U-233	3.6275E-09	45,921.00	91,842.00	0.00E+00	1.67E-04	3.33E-04
U-234	1.8562E-04	45,921.00	91,842.00	0.00E+00	8.52E+00	1.70E+01
U-235	-2.7235E-06	45,921.00	0.00	2.97E-01	1.72E-01	2.97E-01
U-236	1.5493E-05	45,921.00	91,842.00	0.00E+00	7.11E-01	1.42E+00
U-238	-4.2851E-09	45,921.00	0.00	3.40E-03	3.20E-03	3.40E-03
Y-90	1.3475E+00	45,921.00	91,842.00	0.00E+00	6.19E+04	1.24E+05
Other Radionuclides					6.28E+04	1.26E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.764E+15
0.0250	1.405E+15
0.0375	1.221E+15
0.0575	1.314E+15
0.0850	7.918E+14
0.1250	5.230E+14
0.2250	6.836E+14
0.3750	2.974E+14
0.5750	4.915E+15
0.8500	6.003E+13
1.2500	2.904E+13
1.7500	1.634E+12
2.2500	1.366E+08
2.7500	1.304E+08
3.5000	7.556E+04
5.0000	3.087E+04
7.0000	3.378E+03
11.0000	3.767E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.69E+02	1.54E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1542461	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	45,921.00	45,759.96	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		91,842.00	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.99	1.00
Bounding:	1.98	

Estimated EOL HM/Given EOL HM: 1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BCD B-17 (TURKEY POINT 3)
SNF ID #: 19
Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=458.98kg; EOL=411.809kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	44,857.39	89,714.78	0.00E+00	4.81E-05	9.63E-05
Am-241	1.4751E-01	44,857.39	89,714.78	0.00E+00	6.62E+03	1.32E+04
Am-242m	2.6809E-04	44,857.39	89,714.78	0.00E+00	1.20E+01	2.41E+01
Am-243	6.2484E-04	44,857.39	89,714.78	0.00E+00	2.80E+01	5.61E+01
C-14	4.7820E-05	44,857.39	89,714.78	0.00E+00	2.15E+00	4.29E+00
Cl-36	8.0297E-07	44,857.39	89,714.78	0.00E+00	3.60E-02	7.20E-02
Cm-243	1.7426E-04	44,857.39	89,714.78	0.00E+00	7.82E+00	1.56E+01
Cm-244	2.7616E-02	44,857.39	89,714.78	0.00E+00	1.24E+03	2.48E+03
Co-60	3.5610E-04	44,857.39	89,714.78	0.00E+00	1.60E+01	3.19E+01
Cs-134	2.6260E-07	44,857.39	89,714.78	0.00E+00	1.18E-02	2.36E-02
Cs-135	1.4433E-05	44,857.39	89,714.78	0.00E+00	6.47E-01	1.29E+00
Cs-137	9.8870E-01	44,857.39	89,714.78	0.00E+00	4.44E+04	8.87E+04
Eu-154	6.0320E-03	44,857.39	89,714.78	0.00E+00	2.71E+02	5.41E+02
Eu-155	2.1770E-04	44,857.39	89,714.78	0.00E+00	9.77E+00	1.95E+01
Fe-55	7.9296E-07	44,857.39	89,714.78	0.00E+00	3.56E-02	7.11E-02
H-3	8.9486E-03	44,857.39	89,714.78	0.00E+00	4.01E+02	8.03E+02
I-129	9.8288E-07	44,857.39	89,714.78	0.00E+00	4.41E-02	8.82E-02
Kr-85	1.0707E-02	44,857.39	89,714.78	0.00E+00	4.80E+02	9.61E+02
Np-237	1.1927E-05	44,857.39	89,714.78	0.00E+00	5.35E-01	1.07E+00
Pa-231	1.4703E-09	44,857.39	89,714.78	0.00E+00	6.60E-05	1.32E-04
Pb-210	1.6828E-10	44,857.39	89,714.78	0.00E+00	7.55E-06	1.51E-05
Pm-147	6.9606E-06	44,857.39	89,714.78	0.00E+00	3.12E-01	6.24E-01
Pu-238	6.6263E-02	44,857.39	89,714.78	0.00E+00	2.97E+03	5.94E+03
Pu-239	1.1618E-02	44,857.39	89,714.78	0.00E+00	5.21E+02	1.04E+03
Pu-240	1.5142E-02	44,857.39	89,714.78	0.00E+00	6.79E+02	1.36E+03
Pu-241	4.3766E-01	44,857.39	89,714.78	0.00E+00	1.96E+04	3.93E+04
Pu-242	6.4260E-05	44,857.39	89,714.78	0.00E+00	2.88E+00	5.77E+00
Ra-226	3.8501E-10	44,857.39	89,714.78	0.00E+00	1.73E-05	3.45E-05
Ra-228	5.2955E-12	44,857.39	89,714.78	0.00E+00	2.38E-07	4.75E-07
Ru-106	2.0413E-14	44,857.39	89,714.78	0.00E+00	9.16E-10	1.83E-09
Se-79	1.2376E-05	44,857.39	89,714.78	0.00E+00	5.55E-01	1.11E+00
Sn-126	2.5210E-05	44,857.39	89,714.78	0.00E+00	1.13E+00	2.26E+00
Sr-90	6.4163E-01	44,857.39	89,714.78	0.00E+00	2.88E+04	5.76E+04
Tc-99	3.9357E-04	44,857.39	89,714.78	0.00E+00	1.77E+01	3.53E+01
Th-229	1.5644E-10	44,857.39	89,714.78	0.00E+00	7.02E-06	1.40E-05
Th-230	2.7972E-08	44,857.39	89,714.78	0.00E+00	1.25E-03	2.51E-03
Th-232	5.3036E-12	44,857.39	89,714.78	0.00E+00	2.38E-07	4.76E-07
Tl-208	1.5136E-07	44,857.39	89,714.78	0.00E+00	6.79E-03	1.36E-02
U-232	4.1005E-07	44,857.39	89,714.78	0.00E+00	1.84E-02	3.68E-02
U-233	2.5856E-08	44,857.39	89,714.78	0.00E+00	1.16E-03	2.32E-03
U-234	5.2665E-05	44,857.39	89,714.78	0.00E+00	2.36E+00	4.72E+00
U-235	-1.4487E-06	44,857.39	0.00	2.54E-02	0.00E+00	2.54E-02
U-236	7.5888E-06	44,857.39	89,714.78	0.00E+00	3.40E-01	6.81E-01
U-238	-2.6129E-07	44,857.39	0.00	1.50E-01	1.39E-01	1.50E-01
Y-90	6.4180E-01	44,857.39	89,714.78	0.00E+00	2.88E+04	5.76E+04
Other Radionuclides					4.27E+04	8.55E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.414E+15
0.0250	6.841E+14
0.0375	6.446E+14
0.0575	8.066E+14
0.0850	3.769E+14
0.1250	2.508E+14
0.2250	3.218E+14
0.3750	1.390E+14
0.5750	3.273E+15
0.8500	3.196E+13
1.2500	2.033E+13
1.7500	8.940E+11
2.2500	1.469E+08
2.7500	5.179E+08
3.5000	3.695E+07
5.0000	1.579E+07
7.0000	1.819E+06
11.0000	2.089E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.11E+02	1.62E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.560002614	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	11,779.72	44,857.39	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		89,714.78	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.79	3.81
Bounding:	5.58	

Estimated EOL HM/Given EOL HM: 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II TRIGA (FLIP LEU 45/20) (GERMANY)
SNF ID #: 236
Fuel Units & Descr: 21 - 4 X 4 ROD ARRAY
Heavy Metal Mass: BOL=9.196kg; EOL=9.192kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	22.40	9.41	0.00E+00	1.50E-07	6.31E-08
Am-241	3.9068E-03	22.40	9.41	0.00E+00	8.75E-02	3.68E-02
Am-242m	1.2325E-06	22.40	9.41	0.00E+00	2.76E-05	1.16E-05
Am-243	1.4732E-07	22.40	9.41	0.00E+00	3.30E-06	1.39E-06
C-14	1.2824E-04	22.40	9.41	0.00E+00	2.87E-03	1.21E-03
Cl-36	2.8120E-06	22.40	9.41	0.00E+00	6.30E-05	2.65E-05
Cm-243	8.6556E-08	22.40	9.41	0.00E+00	1.94E-06	8.14E-07
Cm-244	5.3835E-07	22.40	9.41	0.00E+00	1.21E-05	5.06E-06
Co-60	2.4887E-02	22.40	9.41	0.00E+00	5.58E-01	2.34E-01
Cs-134	3.8030E-06	22.40	9.41	0.00E+00	8.52E-05	3.58E-05
Cs-135	3.2195E-05	22.40	9.41	0.00E+00	7.21E-04	3.03E-04
Cs-137	1.3788E+00	22.40	9.41	0.00E+00	3.09E+01	1.30E+01
Eu-154	1.3711E-03	22.40	9.41	0.00E+00	3.07E-02	1.29E-02
Eu-155	4.4361E-04	22.40	9.41	0.00E+00	9.94E-03	4.17E-03
Fe-55	2.6075E-04	22.40	9.41	0.00E+00	5.84E-03	2.45E-03
H-3	2.0647E-03	22.40	9.41	0.00E+00	4.63E-02	1.94E-02
I-129	7.3684E-07	22.40	9.41	0.00E+00	1.65E-05	6.93E-06
Kr-85	3.6346E-02	22.40	9.41	0.00E+00	8.14E-01	3.42E-01
Np-237	1.2844E-06	22.40	9.41	0.00E+00	2.88E-05	1.21E-05
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
Tl-208	1.3723E-08	22.40	9.41	0.00E+00	3.07E-07	1.29E-07
U-232	3.6932E-08	22.40	9.41	0.00E+00	8.27E-07	3.47E-07
U-233	1.2224E-07	22.40	9.41	0.00E+00	2.74E-06	1.15E-06
U-234	2.5714E-07	22.40	9.41	0.00E+00	5.76E-06	2.42E-06
U-235	-2.6194E-06	22.40	0.00	8.75E-03	8.69E-03	8.75E-03
U-236	1.2695E-05	22.40	9.41	0.00E+00	2.84E-04	1.19E-04
U-238	-3.6331E-08	22.40	0.00	1.73E-03	1.73E-03	1.73E-03
Y-90	1.2765E+00	22.40	9.41	0.00E+00	2.86E+01	1.20E+01
Other Radionuclides					3.08E+01	1.29E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.568E+11
0.0250	1.364E+11
0.0375	1.185E+11
0.0575	1.277E+11
0.0850	7.687E+10
0.1250	5.006E+10
0.2250	6.637E+10
0.3750	2.887E+10
0.5750	4.828E+11
0.8500	4.941E+09
1.2500	1.917E+10
1.7500	1.282E+08
2.2500	1.051E+05
2.7500	4.841E+03
3.5000	2.105E+01
5.0000	8.939E+00
7.0000	1.017E+00
11.0000	1.162E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.60E-01	1.82E-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 %:	44.026	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)[2]

	From SFD	Estimated
Nominal:	22.40	4.01
Bounding:	9.41	8.02

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	0.18
Bounding:	0.03	0.85

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: BMI (CPI-24)
SNF ID #: 774
Fuel Units & Descr: 2 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.550kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	528.25	528.25	0.00E+00	2.43E-05	2.43E-05
Am-241	1.1471E-04	528.25	528.25	0.00E+00	6.06E-02	6.06E-02
Am-242m	7.4210E-09	528.25	528.25	0.00E+00	3.92E-06	3.92E-06
Am-243	9.8236E-10	528.25	528.25	0.00E+00	5.19E-07	5.19E-07
C-14	2.2928E-04	528.25	528.25	0.00E+00	1.21E-01	1.21E-01
Cl-36	1.2260E-06	528.25	528.25	0.00E+00	6.48E-04	6.48E-04
Cm-243	1.2000E-10	528.25	528.25	0.00E+00	6.34E-08	6.34E-08
Cm-244	7.3577E-10	528.25	528.25	0.00E+00	3.89E-07	3.89E-07
Co-60	1.3732E-03	528.25	528.25	0.00E+00	7.25E-01	7.25E-01
Cs-134	1.2709E-10	528.25	528.25	0.00E+00	6.71E-08	6.71E-08
Cs-135	3.0316E-05	528.25	528.25	0.00E+00	1.60E-02	1.60E-02
Cs-137	7.2579E-01	528.25	528.25	0.00E+00	3.83E+02	3.83E+02
Eu-154	5.9750E-05	528.25	528.25	0.00E+00	3.16E-02	3.16E-02
Eu-155	1.0577E-05	528.25	528.25	0.00E+00	5.59E-03	5.59E-03
Fe-55	4.1631E-07	528.25	528.25	0.00E+00	2.20E-04	2.20E-04
H-3	4.6722E-04	528.25	528.25	0.00E+00	2.47E-01	2.47E-01
I-129	7.3195E-07	528.25	528.25	0.00E+00	3.87E-04	3.87E-04
Kr-85	5.9418E-03	528.25	528.25	0.00E+00	3.14E+00	3.14E+00
Np-237	1.1499E-06	528.25	528.25	0.00E+00	6.07E-04	6.07E-04
Pa-231	7.0899E-08	528.25	528.25	0.00E+00	3.75E-05	3.75E-05
Pb-210	2.2363E-12	528.25	528.25	0.00E+00	1.18E-09	1.18E-09
Pm-147	4.2296E-07	528.25	528.25	0.00E+00	2.23E-04	2.23E-04
Pu-238	2.3295E-04	528.25	528.25	0.00E+00	1.23E-01	1.23E-01
Pu-239	6.6722E-04	528.25	528.25	0.00E+00	3.52E-01	3.52E-01
Pu-240	8.6556E-05	528.25	528.25	0.00E+00	4.57E-02	4.57E-02
Pu-241	1.6889E-04	528.25	528.25	0.00E+00	8.92E-02	8.92E-02
Pu-242	1.9717E-09	528.25	528.25	0.00E+00	1.04E-06	1.04E-06
Ra-226	4.5740E-12	528.25	528.25	0.00E+00	2.42E-09	2.42E-09
Ra-228	8.3511E-12	528.25	528.25	0.00E+00	4.41E-09	4.41E-09
Ru-106	2.0516E-19	528.25	528.25	0.00E+00	1.08E-16	1.08E-16
Se-79	1.3220E-05	528.25	528.25	0.00E+00	6.98E-03	6.98E-03
Sn-126	1.1489E-05	528.25	528.25	0.00E+00	6.07E-03	6.07E-03
Sr-90	6.6872E-01	528.25	528.25	0.00E+00	3.53E+02	3.53E+02
Tc-99	4.6639E-04	528.25	528.25	0.00E+00	2.46E-01	2.46E-01
Th-229	2.3727E-11	528.25	528.25	0.00E+00	1.25E-08	1.25E-08
Th-230	2.7354E-10	528.25	528.25	0.00E+00	1.44E-07	1.44E-07
Th-232	8.3594E-12	528.25	528.25	0.00E+00	4.42E-09	4.42E-09
Tl-208	1.6228E-08	528.25	528.25	0.00E+00	8.57E-06	8.57E-06
U-232	4.3960E-08	528.25	528.25	0.00E+00	2.32E-05	2.32E-05
U-233	3.3344E-09	528.25	528.25	0.00E+00	1.76E-06	1.76E-06
U-234	4.0749E-07	528.25	528.25	0.00E+00	2.15E-04	2.15E-04
U-235	-2.7761E-06	528.25	0.00	2.26E-03	7.92E-04	2.26E-03
U-236	1.6190E-05	528.25	528.25	0.00E+00	8.55E-03	8.55E-03
U-238	-2.8547E-09	528.25	0.00	2.44E-05	2.29E-05	2.44E-05
Y-90	6.6889E-01	528.25	528.25	0.00E+00	3.53E+02	3.53E+02
Other Radionuclides					4.80E+02	4.80E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.928E+13
0.0250	4.006E+12
0.0375	3.481E+12
0.0575	3.736E+12
0.0850	2.256E+12
0.1250	1.463E+12
0.2250	1.945E+12
0.3750	8.482E+11
0.5750	1.427E+13
0.8500	1.386E+11
1.2500	1.003E+11
1.7500	3.565E+09
2.2500	6.742E+05
2.7500	3.019E+05
3.5000	3.051E+01
5.0000	1.260E+01
7.0000	1.393E+00
11.0000	1.564E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.30E+00	4.30E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	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

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

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

Estimated Canister usage: 18"x10'
0.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	1,215.10	1,215.10	0.00E+00	5.58E-05	5.58E-05
Am-241	1.1471E-04	1,215.10	1,215.10	0.00E+00	1.39E-01	1.39E-01
Am-242m	7.4210E-09	1,215.10	1,215.10	0.00E+00	9.02E-06	9.02E-06
Am-243	9.8236E-10	1,215.10	1,215.10	0.00E+00	1.19E-06	1.19E-06
C-14	2.2928E-04	1,215.10	1,215.10	0.00E+00	2.79E-01	2.79E-01
Cl-36	1.2260E-06	1,215.10	1,215.10	0.00E+00	1.49E-03	1.49E-03
Cm-243	1.2000E-10	1,215.10	1,215.10	0.00E+00	1.46E-07	1.46E-07
Cm-244	7.3577E-10	1,215.10	1,215.10	0.00E+00	8.94E-07	8.94E-07
Co-60	1.3732E-03	1,215.10	1,215.10	0.00E+00	1.67E+00	1.67E+00
Cs-134	1.2709E-10	1,215.10	1,215.10	0.00E+00	1.54E-07	1.54E-07
Cs-135	3.0316E-05	1,215.10	1,215.10	0.00E+00	3.68E-02	3.68E-02
Cs-137	7.2579E-01	1,215.10	1,215.10	0.00E+00	8.82E+02	8.82E+02
Eu-154	5.9750E-05	1,215.10	1,215.10	0.00E+00	7.26E-02	7.26E-02
Eu-155	1.0577E-05	1,215.10	1,215.10	0.00E+00	1.29E-02	1.29E-02
Fe-55	4.1631E-07	1,215.10	1,215.10	0.00E+00	5.06E-04	5.06E-04
H-3	4.6722E-04	1,215.10	1,215.10	0.00E+00	5.68E-01	5.68E-01
I-129	7.3195E-07	1,215.10	1,215.10	0.00E+00	8.89E-04	8.89E-04
Kr-85	5.9418E-03	1,215.10	1,215.10	0.00E+00	7.22E+00	7.22E+00
Np-237	1.1499E-06	1,215.10	1,215.10	0.00E+00	1.40E-03	1.40E-03
Pa-231	7.0899E-08	1,215.10	1,215.10	0.00E+00	8.61E-05	8.61E-05
Pb-210	2.2363E-12	1,215.10	1,215.10	0.00E+00	2.72E-09	2.72E-09
Pm-147	4.2296E-07	1,215.10	1,215.10	0.00E+00	5.14E-04	5.14E-04
Pu-238	2.3295E-04	1,215.10	1,215.10	0.00E+00	2.83E-01	2.83E-01
Pu-239	6.6722E-04	1,215.10	1,215.10	0.00E+00	8.11E-01	8.11E-01
Pu-240	8.6556E-05	1,215.10	1,215.10	0.00E+00	1.05E-01	1.05E-01
Pu-241	1.6889E-04	1,215.10	1,215.10	0.00E+00	2.05E-01	2.05E-01
Pu-242	1.9717E-09	1,215.10	1,215.10	0.00E+00	2.40E-06	2.40E-06
Ra-226	4.5740E-12	1,215.10	1,215.10	0.00E+00	5.56E-09	5.56E-09
Ra-228	8.3511E-12	1,215.10	1,215.10	0.00E+00	1.01E-08	1.01E-08
Ru-106	2.0516E-19	1,215.10	1,215.10	0.00E+00	2.49E-16	2.49E-16
Se-79	1.3220E-05	1,215.10	1,215.10	0.00E+00	1.61E-02	1.61E-02
Sn-126	1.1489E-05	1,215.10	1,215.10	0.00E+00	1.40E-02	1.40E-02
Sr-90	6.6872E-01	1,215.10	1,215.10	0.00E+00	8.13E+02	8.13E+02
Tc-99	4.6639E-04	1,215.10	1,215.10	0.00E+00	5.67E-01	5.67E-01
Th-229	2.3727E-11	1,215.10	1,215.10	0.00E+00	2.88E-08	2.88E-08
Th-230	2.7354E-10	1,215.10	1,215.10	0.00E+00	3.32E-07	3.32E-07
Th-232	8.3594E-12	1,215.10	1,215.10	0.00E+00	1.02E-08	1.02E-08
Tl-208	1.6228E-08	1,215.10	1,215.10	0.00E+00	1.97E-05	1.97E-05
U-232	4.3960E-08	1,215.10	1,215.10	0.00E+00	5.34E-05	5.34E-05
U-233	3.3344E-09	1,215.10	1,215.10	0.00E+00	4.05E-06	4.05E-06
U-234	4.0749E-07	1,215.10	1,215.10	0.00E+00	4.95E-04	4.95E-04
U-235	-2.7761E-06	1,215.10	0.00	5.20E-03	1.82E-03	5.20E-03
U-236	1.6190E-05	1,215.10	1,215.10	0.00E+00	1.97E-02	1.97E-02
U-238	-2.8547E-09	1,215.10	0.00	5.62E-05	5.27E-05	5.62E-05
Y-90	6.6889E-01	1,215.10	1,215.10	0.00E+00	8.13E+02	8.13E+02
Other Radionuclides					1.10E+03	1.10E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.435E+13
0.0250	9.215E+12
0.0375	8.008E+12
0.0575	8.593E+12
0.0850	5.190E+12
0.1250	3.365E+12
0.2250	4.473E+12
0.3750	1.951E+12
0.5750	3.282E+13
0.8500	3.188E+11
1.2500	2.307E+11
1.7500	8.199E+09
2.2500	1.551E+06
2.7500	6.945E+05
3.5000	7.018E+01
5.0000	2.898E+01
7.0000	3.203E+00
11.0000	3.597E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.89E+00	9.89E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,215.10
Bounding:		1,215.10

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

[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: 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

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	4.5940E-08	1,115.44	2,230.88	0.00E+00	5.12E-05	1.02E-04
Am-241	1.1471E-04	1,115.44	2,230.88	0.00E+00	1.28E-01	2.56E-01
Am-242m	7.4210E-09	1,115.44	2,230.88	0.00E+00	8.28E-06	1.66E-05
Am-243	9.8236E-10	1,115.44	2,230.88	0.00E+00	1.10E-06	2.19E-06
C-14	2.2928E-04	1,115.44	2,230.88	0.00E+00	2.56E-01	5.12E-01
Cl-36	1.2260E-06	1,115.44	2,230.88	0.00E+00	1.37E-03	2.73E-03
Cm-243	1.2000E-10	1,115.44	2,230.88	0.00E+00	1.34E-07	2.68E-07
Cm-244	7.3577E-10	1,115.44	2,230.88	0.00E+00	8.21E-07	1.64E-06
Co-60	1.3732E-03	1,115.44	2,230.88	0.00E+00	1.53E+00	3.06E+00
Cs-134	1.2709E-10	1,115.44	2,230.88	0.00E+00	1.42E-07	2.84E-07
Cs-135	3.0316E-05	1,115.44	2,230.88	0.00E+00	3.38E-02	6.76E-02
Cs-137	7.2579E-01	1,115.44	2,230.88	0.00E+00	8.10E+02	1.62E+03
Eu-154	5.9750E-05	1,115.44	2,230.88	0.00E+00	6.66E-02	1.33E-01
Eu-155	1.0577E-05	1,115.44	2,230.88	0.00E+00	1.18E-02	2.36E-02
Fe-55	4.1631E-07	1,115.44	2,230.88	0.00E+00	4.64E-04	9.29E-04
H-3	4.6722E-04	1,115.44	2,230.88	0.00E+00	5.21E-01	1.04E+00
I-129	7.3195E-07	1,115.44	2,230.88	0.00E+00	8.16E-04	1.63E-03
Kr-85	5.9418E-03	1,115.44	2,230.88	0.00E+00	6.63E+00	1.33E+01
Np-237	1.1499E-06	1,115.44	2,230.88	0.00E+00	1.28E-03	2.57E-03
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	6.6722E-04	1,115.44	2,230.88	0.00E+00	7.44E-01	1.49E+00
Pu-240	8.6556E-05	1,115.44	2,230.88	0.00E+00	9.65E-02	1.93E-01
Pu-241	1.6889E-04	1,115.44	2,230.88	0.00E+00	1.88E-01	3.77E-01
Pu-242	1.9717E-09	1,115.44	2,230.88	0.00E+00	2.20E-06	4.40E-06
Ra-226	4.5740E-12	1,115.44	2,230.88	0.00E+00	5.10E-09	1.02E-08
Ra-228	8.3511E-12	1,115.44	2,230.88	0.00E+00	9.32E-09	1.86E-08
Ru-106	2.0516E-19	1,115.44	2,230.88	0.00E+00	2.29E-16	4.58E-16
Se-79	1.3220E-05	1,115.44	2,230.88	0.00E+00	1.47E-02	2.95E-02
Sn-126	1.1489E-05	1,115.44	2,230.88	0.00E+00	1.28E-02	2.56E-02
Sr-90	6.6872E-01	1,115.44	2,230.88	0.00E+00	7.46E+02	1.49E+03
Tc-99	4.6639E-04	1,115.44	2,230.88	0.00E+00	5.20E-01	1.04E+00
Th-229	2.3727E-11	1,115.44	2,230.88	0.00E+00	2.65E-08	5.29E-08
Th-230	2.7354E-10	1,115.44	2,230.88	0.00E+00	3.05E-07	6.10E-07
Th-232	8.3594E-12	1,115.44	2,230.88	0.00E+00	9.32E-09	1.86E-08
Tl-208	1.6228E-08	1,115.44	2,230.88	0.00E+00	1.81E-05	3.62E-05
U-232	4.3960E-08	1,115.44	2,230.88	0.00E+00	4.90E-05	9.81E-05
U-233	3.3344E-09	1,115.44	2,230.88	0.00E+00	3.72E-06	7.44E-06
U-234	4.0749E-07	1,115.44	2,230.88	0.00E+00	4.55E-04	9.09E-04
U-235	-2.7761E-06	1,115.44	0.00	4.42E-02	4.11E-02	4.42E-02
U-236	1.6190E-05	1,115.44	2,230.88	0.00E+00	1.81E-02	3.61E-02
U-238	-2.8547E-09	1,115.44	0.00	5.18E-04	5.15E-04	5.18E-04
Y-90	6.6889E-01	1,115.44	2,230.88	0.00E+00	7.46E+02	1.49E+03
Other Radionuclides					1.01E+03	2.03E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.143E+13
0.0250	1.692E+13
0.0375	1.470E+13
0.0575	1.578E+13
0.0850	9.529E+12
0.1250	6.179E+12
0.2250	8.213E+12
0.3750	3.582E+12
0.5750	6.026E+13
0.8500	5.852E+11
1.2500	4.236E+11
1.7500	1.505E+10
2.2500	2.847E+08
2.7500	1.275E+08
3.5000	1.322E+02
5.0000	5.464E+01
7.0000	6.042E+00
11.0000	6.786E-01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,115.44	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,230.88	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

[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: BR-3
SNF ID #: 927
Fuel Units & Descr: 16 - ROD
Heavy Metal Mass: BOL=5.6kg; EOL=5.11kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1981
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	465.59	931.17	0.00E+00	4.09E-07	8.17E-07
Am-241	1.4352E-01	465.59	931.17	0.00E+00	6.68E+01	1.34E+02
Am-242m	2.8698E-04	465.59	931.17	0.00E+00	1.34E-01	2.67E-01
Am-243	6.2565E-04	465.59	931.17	0.00E+00	2.91E-01	5.83E-01
C-14	4.7901E-05	465.59	931.17	0.00E+00	2.23E-02	4.46E-02
Cl-36	8.0297E-07	465.59	931.17	0.00E+00	3.74E-04	7.48E-04
Cm-243	2.5081E-04	465.59	931.17	0.00E+00	1.17E-01	2.34E-01
Cm-244	4.9015E-02	465.59	931.17	0.00E+00	2.28E+01	4.56E+01
Co-60	2.5581E-03	465.59	931.17	0.00E+00	1.19E+00	2.38E+00
Cs-134	4.0536E-05	465.59	931.17	0.00E+00	1.89E-02	3.77E-02
Cs-135	1.4433E-05	465.59	931.17	0.00E+00	6.72E-03	1.34E-02
Cs-137	1.3979E+00	465.59	931.17	0.00E+00	6.51E+02	1.30E+03
Eu-154	2.0203E-02	465.59	931.17	0.00E+00	9.41E+00	1.88E+01
Eu-155	1.7684E-03	465.59	931.17	0.00E+00	8.23E-01	1.65E+00
Fe-55	4.3136E-05	465.59	931.17	0.00E+00	2.01E-02	4.02E-02
H-3	2.0769E-02	465.59	931.17	0.00E+00	9.67E+00	1.93E+01
I-129	9.8288E-07	465.59	931.17	0.00E+00	4.58E-04	9.15E-04
Kr-85	2.8214E-02	465.59	931.17	0.00E+00	1.31E+01	2.63E+01
Np-237	1.1218E-05	465.59	931.17	0.00E+00	5.22E-03	1.04E-02
Pa-231	1.3036E-09	465.59	931.17	0.00E+00	6.07E-07	1.21E-06
Pb-210	8.5078E-11	465.59	931.17	0.00E+00	3.96E-08	7.92E-08
Pm-147	3.6531E-04	465.59	931.17	0.00E+00	1.70E-01	3.40E-01
Pu-238	7.4564E-02	465.59	931.17	0.00E+00	3.47E+01	6.94E+01
Pu-239	1.1623E-02	465.59	931.17	0.00E+00	5.41E+00	1.08E+01
Pu-240	1.5132E-02	465.59	931.17	0.00E+00	7.05E+00	1.41E+01
Pu-241	9.0036E-01	465.59	931.17	0.00E+00	4.19E+02	8.38E+02
Pu-242	6.4260E-05	465.59	931.17	0.00E+00	2.99E-02	5.98E-02
Ra-226	2.2804E-10	465.59	931.17	0.00E+00	1.06E-07	2.12E-07
Ra-228	5.2713E-12	465.59	931.17	0.00E+00	2.45E-09	4.91E-09
Ru-106	6.1160E-10	465.59	931.17	0.00E+00	2.85E-07	5.70E-07
Se-79	1.2377E-05	465.59	931.17	0.00E+00	5.76E-03	1.15E-02
Sn-126	2.5210E-05	465.59	931.17	0.00E+00	1.17E-02	2.35E-02
Sr-90	9.1667E-01	465.59	931.17	0.00E+00	4.27E+02	8.54E+02
Tc-99	3.9357E-04	465.59	931.17	0.00E+00	1.83E-01	3.66E-01
Th-229	1.2057E-10	465.59	931.17	0.00E+00	5.61E-08	1.12E-07
Th-230	2.1043E-08	465.59	931.17	0.00E+00	9.80E-06	1.96E-05
Th-232	5.2972E-12	465.59	931.17	0.00E+00	2.47E-09	4.93E-09
Tl-208	1.7474E-07	465.59	931.17	0.00E+00	8.14E-05	1.63E-04
U-232	4.7368E-07	465.59	931.17	0.00E+00	2.21E-04	4.41E-04
U-233	2.5097E-08	465.59	931.17	0.00E+00	1.17E-05	2.34E-05
U-234	5.0000E-05	465.59	931.17	0.00E+00	2.33E-02	4.66E-02
U-235	-1.4489E-06	465.59	0.00	3.46E-03	2.78E-03	3.46E-03
U-236	7.5824E-06	465.59	931.17	0.00E+00	3.53E-03	7.06E-03
U-238	-2.6129E-07	465.59	0.00	1.34E-03	1.22E-03	1.34E-03
Y-90	9.1699E-01	465.59	931.17	0.00E+00	4.27E+02	8.54E+02
Other Radionuclides					6.25E+02	1.25E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.010E+13
0.0250	1.010E+13
0.0375	9.836E+12
0.0575	1.113E+13
0.0850	5.606E+12
0.1250	3.890E+12
0.2250	4.807E+12
0.3750	2.067E+12
0.5750	4.808E+13
0.8500	6.651E+11
1.2500	6.533E+11
1.7500	1.957E+10
2.2500	3.150E+06
2.7500	6.455E+06
3.5000	6.646E+05
5.0000	2.842E+05
7.0000	3.275E+04
11.0000	3.761E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+01	2.14E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	28.57142857	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:		465.59
Bounding:		931.17

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:	2.38	
Bounding:	4.75	

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: BR-3 FUEL
SNF ID #: 340
Fuel Units & Descr: 16 - ROD
Heavy Metal Mass: BOL=7.536kg; EOL=7.064kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.12

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	448.85	897.70	0.00E+00	3.94E-07	7.88E-07
Am-241	1.4352E-01	448.85	897.70	0.00E+00	6.44E+01	1.29E+02
Am-242m	2.8698E-04	448.85	897.70	0.00E+00	1.29E-01	2.58E-01
Am-243	6.2565E-04	448.85	897.70	0.00E+00	2.81E-01	5.62E-01
C-14	4.7901E-05	448.85	897.70	0.00E+00	2.15E-02	4.30E-02
Cl-36	8.0297E-07	448.85	897.70	0.00E+00	3.60E-04	7.21E-04
Cm-243	2.5081E-04	448.85	897.70	0.00E+00	1.13E-01	2.25E-01
Cm-244	4.9015E-02	448.85	897.70	0.00E+00	2.20E+01	4.40E+01
Co-60	2.5581E-03	448.85	897.70	0.00E+00	1.15E+00	2.30E+00
Cs-134	4.0536E-05	448.85	897.70	0.00E+00	1.82E-02	3.64E-02
Cs-135	1.4433E-05	448.85	897.70	0.00E+00	6.48E-03	1.30E-02
Cs-137	1.3979E+00	448.85	897.70	0.00E+00	6.27E+02	1.25E+03
Eu-154	2.0203E-02	448.85	897.70	0.00E+00	9.07E+00	1.81E+01
Eu-155	1.7684E-03	448.85	897.70	0.00E+00	7.94E-01	1.59E+00
Fe-55	4.3136E-05	448.85	897.70	0.00E+00	1.94E-02	3.87E-02
H-3	2.0769E-02	448.85	897.70	0.00E+00	9.32E+00	1.86E+01
I-129	9.8288E-07	448.85	897.70	0.00E+00	4.41E-04	8.82E-04
Kr-85	2.8214E-02	448.85	897.70	0.00E+00	1.27E+01	2.53E+01
Np-237	1.1218E-05	448.85	897.70	0.00E+00	5.04E-03	1.01E-02
Pa-231	1.3036E-09	448.85	897.70	0.00E+00	5.85E-07	1.17E-06
Pb-210	8.5078E-11	448.85	897.70	0.00E+00	3.82E-08	7.64E-08
Pm-147	3.6531E-04	448.85	897.70	0.00E+00	1.64E-01	3.28E-01
Pu-238	7.4564E-02	448.85	897.70	0.00E+00	3.35E+01	6.69E+01
Pu-239	1.1623E-02	448.85	897.70	0.00E+00	5.22E+00	1.04E+01
Pu-240	1.5132E-02	448.85	897.70	0.00E+00	6.79E+00	1.36E+01
Pu-241	9.0036E-01	448.85	897.70	0.00E+00	4.04E+02	8.08E+02
Pu-242	6.4260E-05	448.85	897.70	0.00E+00	2.88E-02	5.77E-02
Ra-226	2.2804E-10	448.85	897.70	0.00E+00	1.02E-07	2.05E-07
Ra-228	5.2713E-12	448.85	897.70	0.00E+00	2.37E-09	4.73E-09
Ru-106	6.1160E-10	448.85	897.70	0.00E+00	2.75E-07	5.49E-07
Se-79	1.2377E-05	448.85	897.70	0.00E+00	5.56E-03	1.11E-02
Sn-126	2.5210E-05	448.85	897.70	0.00E+00	1.13E-02	2.26E-02
Sr-90	9.1667E-01	448.85	897.70	0.00E+00	4.11E+02	8.23E+02
Tc-99	3.9357E-04	448.85	897.70	0.00E+00	1.77E-01	3.53E-01
Th-229	1.2057E-10	448.85	897.70	0.00E+00	5.41E-08	1.08E-07
Th-230	2.1043E-08	448.85	897.70	0.00E+00	9.45E-06	1.89E-05
Th-232	5.2972E-12	448.85	897.70	0.00E+00	2.38E-09	4.76E-09
Tl-208	1.7474E-07	448.85	897.70	0.00E+00	7.84E-05	1.57E-04
U-232	4.7368E-07	448.85	897.70	0.00E+00	2.13E-04	4.25E-04
U-233	2.5097E-08	448.85	897.70	0.00E+00	1.13E-05	2.25E-05
U-234	5.0000E-05	448.85	897.70	0.00E+00	2.24E-02	4.49E-02
U-235	-1.4489E-06	448.85	0.00	1.35E-03	6.98E-04	1.35E-03
U-236	7.5824E-06	448.85	897.70	0.00E+00	3.40E-03	6.81E-03
U-238	-2.6129E-07	448.85	0.00	2.32E-03	2.21E-03	2.32E-03
Y-90	9.1699E-01	448.85	897.70	0.00E+00	4.12E+02	8.23E+02
Other Radionuclides					6.03E+02	1.21E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.830E+13
0.0250	9.740E+12
0.0375	9.290E+12
0.0575	1.073E+13
0.0850	5.405E+12
0.1250	3.750E+12
0.2250	4.634E+12
0.3750	1.993E+12
0.5750	4.635E+13
0.8500	6.412E+11
1.2500	6.299E+11
1.7500	1.886E+10
2.2500	3.037E+08
2.7500	6.223E+06
3.5000	6.407E+05
5.0000	2.739E+05
7.0000	3.157E+04
11.0000	3.626E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.03E+01	2.06E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	8.280254777	0 to 5

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	293.90	448.85
Bounding:	316.51	897.70

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:	1.70	1.53
Bounding:	3.40	2.84

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: 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

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	11,990.37	23,980.74	0.00E+00	1.29E-05	2.57E-05
Am-241	1.4751E-01	11,990.37	23,980.74	0.00E+00	1.77E+03	3.54E+03
Am-242m	2.6809E-04	11,990.37	23,980.74	0.00E+00	3.21E+00	6.43E+00
Am-243	6.2484E-04	11,990.37	23,980.74	0.00E+00	7.49E+00	1.50E+01
C-14	4.7820E-05	11,990.37	23,980.74	0.00E+00	5.73E-01	1.15E+00
Cl-36	8.0297E-07	11,990.37	23,980.74	0.00E+00	9.63E-03	1.93E-02
Cm-243	1.7426E-04	11,990.37	23,980.74	0.00E+00	2.09E+00	4.18E+00
Cm-244	2.7616E-02	11,990.37	23,980.74	0.00E+00	3.31E+02	6.62E+02
Co-60	3.5610E-04	11,990.37	23,980.74	0.00E+00	4.27E+00	8.54E+00
Cs-134	2.6260E-07	11,990.37	23,980.74	0.00E+00	3.15E-03	6.30E-03
Cs-135	1.4433E-05	11,990.37	23,980.74	0.00E+00	1.73E-01	3.46E-01
Cs-137	9.8870E-01	11,990.37	23,980.74	0.00E+00	1.19E+04	2.37E+04
Eu-154	6.0320E-03	11,990.37	23,980.74	0.00E+00	7.23E+01	1.45E+02
Eu-155	2.1770E-04	11,990.37	23,980.74	0.00E+00	2.61E+00	5.22E+00
Fe-55	7.9296E-07	11,990.37	23,980.74	0.00E+00	9.51E-03	1.90E-02
H-3	8.9486E-03	11,990.37	23,980.74	0.00E+00	1.07E+02	2.15E+02
I-129	9.8288E-07	11,990.37	23,980.74	0.00E+00	1.18E-02	2.36E-02
Kr-85	1.0707E-02	11,990.37	23,980.74	0.00E+00	1.28E+02	2.57E+02
Np-237	1.1927E-05	11,990.37	23,980.74	0.00E+00	1.43E-01	2.86E-01
Pa-231	1.4703E-09	11,990.37	23,980.74	0.00E+00	1.76E-05	3.53E-05
Pb-210	1.6828E-10	11,990.37	23,980.74	0.00E+00	2.02E-06	4.04E-06
Pm-147	6.9606E-06	11,990.37	23,980.74	0.00E+00	8.35E-02	1.67E-01
Pu-238	6.6263E-02	11,990.37	23,980.74	0.00E+00	7.95E+02	1.59E+03
Pu-239	1.1618E-02	11,990.37	23,980.74	0.00E+00	1.39E+02	2.79E+02
Pu-240	1.5142E-02	11,990.37	23,980.74	0.00E+00	1.82E+02	3.63E+02
Pu-241	4.3766E-01	11,990.37	23,980.74	0.00E+00	5.25E+03	1.05E+04
Pu-242	6.4260E-05	11,990.37	23,980.74	0.00E+00	7.71E-01	1.54E+00
Ra-226	3.8501E-10	11,990.37	23,980.74	0.00E+00	4.62E-06	9.23E-06
Ra-228	5.2955E-12	11,990.37	23,980.74	0.00E+00	6.35E-08	1.27E-07
Ru-106	2.0413E-14	11,990.37	23,980.74	0.00E+00	2.45E-10	4.90E-10
Se-79	1.2376E-05	11,990.37	23,980.74	0.00E+00	1.48E-01	2.97E-01
Sn-126	2.5210E-05	11,990.37	23,980.74	0.00E+00	3.02E-01	6.05E-01
Sr-90	6.4163E-01	11,990.37	23,980.74	0.00E+00	7.69E+03	1.54E+04
Tc-99	3.9357E-04	11,990.37	23,980.74	0.00E+00	4.72E+00	9.44E+00
Th-229	1.5644E-10	11,990.37	23,980.74	0.00E+00	1.88E-06	3.75E-06
Th-230	2.7972E-08	11,990.37	23,980.74	0.00E+00	3.35E-04	6.71E-04
Th-232	5.3036E-12	11,990.37	23,980.74	0.00E+00	6.36E-08	1.27E-07
Tl-208	1.5136E-07	11,990.37	23,980.74	0.00E+00	1.81E-03	3.63E-03
U-232	4.1005E-07	11,990.37	23,980.74	0.00E+00	4.92E-03	9.83E-03
U-233	2.5856E-08	11,990.37	23,980.74	0.00E+00	3.10E-04	6.20E-04
U-234	5.2665E-05	11,990.37	23,980.74	0.00E+00	6.31E-01	1.26E+00
U-235	-1.4487E-06	11,990.37	0.00	1.69E-02	0.00E+00	1.69E-02
U-236	7.5888E-06	11,990.37	23,980.74	0.00E+00	9.10E-02	1.82E-01
U-238	-2.6129E-07	11,990.37	0.00	8.57E-02	8.25E-02	8.57E-02
Y-90	6.4180E-01	11,990.37	23,980.74	0.00E+00	7.70E+03	1.54E+04
Other Radionuclides					1.14E+04	2.29E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.125E+14
0.0250	1.829E+14
0.0375	1.723E+14
0.0575	2.156E+14
0.0850	1.007E+14
0.1250	6.703E+13
0.2250	8.601E+13
0.3750	3.715E+13
0.5750	8.748E+14
0.8500	8.542E+12
1.2500	5.435E+12
1.7500	2.390E+11
2.2500	3.928E+07
2.7500	1.384E+06
3.5000	9.877E+05
5.0000	4.221E+05
7.0000	4.863E+05
11.0000	5.584E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E+02	4.34E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.962	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	5,310.89	11,990.37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	5,318.51	23,980.74	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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: 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

[1]Fuel decay start date: 1968
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	11,298.83	11,722.29	0.00E+00	1.21E-05	1.26E-05
Am-241	1.4751E-01	11,298.83	11,722.29	0.00E+00	1.67E+03	1.73E+03
Am-242m	2.6809E-04	11,298.83	11,722.29	0.00E+00	3.03E+00	3.14E+00
Am-243	6.2484E-04	11,298.83	11,722.29	0.00E+00	7.06E+00	7.32E+00
C-14	4.7820E-05	11,298.83	11,722.29	0.00E+00	5.40E-01	5.61E-01
Cl-36	8.0297E-07	11,298.83	11,722.29	0.00E+00	9.07E-03	9.41E-03
Cm-243	1.7426E-04	11,298.83	11,722.29	0.00E+00	1.97E+00	2.04E+00
Cm-244	2.7616E-02	11,298.83	11,722.29	0.00E+00	3.12E+02	3.24E+02
Co-60	3.5610E-04	11,298.83	11,722.29	0.00E+00	4.02E+00	4.17E+00
Cs-134	2.6260E-07	11,298.83	11,722.29	0.00E+00	2.97E-03	3.08E-03
Cs-135	1.4433E-05	11,298.83	11,722.29	0.00E+00	1.63E-01	1.69E-01
Cs-137	9.8870E-01	11,298.83	11,722.29	0.00E+00	1.12E+04	1.16E+04
Eu-154	6.0320E-03	11,298.83	11,722.29	0.00E+00	6.82E+01	7.07E+01
Eu-155	2.1770E-04	11,298.83	11,722.29	0.00E+00	2.46E+00	2.55E+00
Fe-55	7.9296E-07	11,298.83	11,722.29	0.00E+00	8.96E-03	9.30E-03
H-3	8.9486E-03	11,298.83	11,722.29	0.00E+00	1.01E+02	1.05E+02
I-129	9.8288E-07	11,298.83	11,722.29	0.00E+00	1.11E-02	1.15E-02
Kr-85	1.0707E-02	11,298.83	11,722.29	0.00E+00	1.21E+02	1.26E+02
Np-237	1.1927E-05	11,298.83	11,722.29	0.00E+00	1.35E-01	1.40E-01
Pa-231	1.4703E-09	11,298.83	11,722.29	0.00E+00	1.66E-05	1.72E-05
Pb-210	1.6828E-10	11,298.83	11,722.29	0.00E+00	1.90E-06	1.97E-06
Pm-147	6.9606E-06	11,298.83	11,722.29	0.00E+00	7.86E-02	8.16E-02
Pu-238	6.6263E-02	11,298.83	11,722.29	0.00E+00	7.49E+02	7.77E+02
Pu-239	1.1618E-02	11,298.83	11,722.29	0.00E+00	1.31E+02	1.36E+02
Pu-240	1.5142E-02	11,298.83	11,722.29	0.00E+00	1.71E+02	1.78E+02
Pu-241	4.3766E-01	11,298.83	11,722.29	0.00E+00	4.95E+03	5.13E+03
Pu-242	6.4260E-05	11,298.83	11,722.29	0.00E+00	7.26E-01	7.53E-01
Ra-226	3.8501E-10	11,298.83	11,722.29	0.00E+00	4.35E-06	4.51E-06
Ra-228	5.2955E-12	11,298.83	11,722.29	0.00E+00	5.98E-08	6.21E-08
Ru-106	2.0413E-14	11,298.83	11,722.29	0.00E+00	2.31E-10	2.39E-10
Se-79	1.2376E-05	11,298.83	11,722.29	0.00E+00	1.40E-01	1.45E-01
Sn-126	2.5210E-05	11,298.83	11,722.29	0.00E+00	2.85E-01	2.96E-01
Sr-90	6.4163E-01	11,298.83	11,722.29	0.00E+00	7.25E+03	7.52E+03
Tc-99	3.9357E-04	11,298.83	11,722.29	0.00E+00	4.45E+00	4.61E+00
Th-229	1.5644E-10	11,298.83	11,722.29	0.00E+00	1.77E-06	1.83E-06
Th-230	2.7972E-08	11,298.83	11,722.29	0.00E+00	3.16E-04	3.28E-04
Th-232	5.3036E-12	11,298.83	11,722.29	0.00E+00	5.99E-08	6.22E-08
Tl-208	1.5136E-07	11,298.83	11,722.29	0.00E+00	1.71E-03	1.77E-03
U-232	4.1005E-07	11,298.83	11,722.29	0.00E+00	4.63E-03	4.81E-03
U-233	2.5856E-08	11,298.83	11,722.29	0.00E+00	2.92E-04	3.03E-04
U-234	5.2665E-05	11,298.83	11,722.29	0.00E+00	5.95E-01	6.17E-01
U-235	-1.4487E-06	11,298.83	0.00	3.67E-02	2.04E-02	3.67E-02
U-236	7.5888E-06	11,298.83	11,722.29	0.00E+00	8.57E-02	8.90E-02
U-238	-2.6129E-07	11,298.83	0.00	1.52E-01	1.49E-01	1.52E-01
Y-90	6.4180E-01	11,298.83	11,722.29	0.00E+00	7.25E+03	7.52E+03
Other Radionuclides					1.08E+04	1.12E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.460E+14
0.0250	8.939E+13
0.0375	8.423E+13
0.0575	1.054E+14
0.0850	4.925E+13
0.1250	3.276E+13
0.2250	4.205E+13
0.3750	1.816E+13
0.5750	4.276E+14
0.8500	4.175E+12
1.2500	2.657E+12
1.7500	1.168E+11
2.2500	1.920E+07
2.7500	6.767E+07
3.5000	4.828E+06
5.0000	2.064E+06
7.0000	2.377E+05
11.0000	2.730E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.04E+02	2.12E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3.626	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	11,298.83	8,657.09	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	11,722.29	17,314.19	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.69	0.77
Bounding:	0.71	1.48

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-D1
SNF ID #: 25
Fuel Units & Descr: 4 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=548.282kg; EOL=508.336kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1968
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	37,986.38	75,972.75	0.00E+00	4.08E-05	8.15E-05
Am-241	1.4751E-01	37,986.38	75,972.75	0.00E+00	5.60E+03	1.12E+04
Am-242m	2.6809E-04	37,986.38	75,972.75	0.00E+00	1.02E+01	2.04E+01
Am-243	6.2484E-04	37,986.38	75,972.75	0.00E+00	2.37E+01	4.75E+01
C-14	4.7820E-05	37,986.38	75,972.75	0.00E+00	1.82E+00	3.63E+00
Cl-36	8.0297E-07	37,986.38	75,972.75	0.00E+00	3.05E-02	6.10E-02
Cm-243	1.7426E-04	37,986.38	75,972.75	0.00E+00	6.62E+00	1.32E+01
Cm-244	2.7616E-02	37,986.38	75,972.75	0.00E+00	1.05E+03	2.10E+03
Co-60	3.5610E-04	37,986.38	75,972.75	0.00E+00	1.35E+01	2.71E+01
Cs-134	2.6260E-07	37,986.38	75,972.75	0.00E+00	9.98E-03	2.00E-02
Cs-135	1.4433E-05	37,986.38	75,972.75	0.00E+00	5.48E-01	1.10E+00
Cs-137	9.8870E-01	37,986.38	75,972.75	0.00E+00	3.76E+04	7.51E+04
Eu-154	6.0320E-03	37,986.38	75,972.75	0.00E+00	2.29E+02	4.58E+02
Eu-155	2.1770E-04	37,986.38	75,972.75	0.00E+00	8.27E+00	1.65E+01
Fe-55	7.9296E-07	37,986.38	75,972.75	0.00E+00	3.01E-02	6.02E-02
H-3	8.9486E-03	37,986.38	75,972.75	0.00E+00	3.40E+02	6.80E+02
I-129	9.8288E-07	37,986.38	75,972.75	0.00E+00	3.73E-02	7.47E-02
Kr-85	1.0707E-02	37,986.38	75,972.75	0.00E+00	4.07E+02	8.13E+02
Np-237	1.1927E-05	37,986.38	75,972.75	0.00E+00	4.53E-01	9.06E-01
Pa-231	1.4703E-09	37,986.38	75,972.75	0.00E+00	5.59E-05	1.12E-04
Pb-210	1.6828E-10	37,986.38	75,972.75	0.00E+00	6.39E-06	1.28E-05
Pm-147	6.9606E-06	37,986.38	75,972.75	0.00E+00	2.64E-01	5.29E-01
Pu-238	6.6263E-02	37,986.38	75,972.75	0.00E+00	2.52E+03	5.03E+03
Pu-239	1.1618E-02	37,986.38	75,972.75	0.00E+00	4.41E+02	8.83E+02
Pu-240	1.5142E-02	37,986.38	75,972.75	0.00E+00	5.75E+02	1.15E+03
Pu-241	4.3766E-01	37,986.38	75,972.75	0.00E+00	1.66E+04	3.33E+04
Pu-242	6.4260E-05	37,986.38	75,972.75	0.00E+00	2.44E+00	4.88E+00
Ra-226	3.8501E-10	37,986.38	75,972.75	0.00E+00	1.46E-05	2.93E-05
Ra-228	5.2955E-12	37,986.38	75,972.75	0.00E+00	2.01E-07	4.02E-07
Ru-106	2.0413E-14	37,986.38	75,972.75	0.00E+00	7.75E-10	1.55E-09
Se-79	1.2376E-05	37,986.38	75,972.75	0.00E+00	4.70E-01	9.40E-01
Sn-126	2.5210E-05	37,986.38	75,972.75	0.00E+00	9.58E-01	1.92E+00
Sr-90	6.4163E-01	37,986.38	75,972.75	0.00E+00	2.44E+04	4.87E+04
Tc-99	3.9357E-04	37,986.38	75,972.75	0.00E+00	1.50E+01	2.99E+01
Th-229	1.5644E-10	37,986.38	75,972.75	0.00E+00	5.94E-06	1.19E-05
Th-230	2.7972E-08	37,986.38	75,972.75	0.00E+00	1.06E-03	2.13E-03
Th-232	5.3036E-12	37,986.38	75,972.75	0.00E+00	2.01E-07	4.03E-07
Tl-208	1.5136E-07	37,986.38	75,972.75	0.00E+00	5.75E-03	1.15E-02
U-232	4.1005E-07	37,986.38	75,972.75	0.00E+00	1.56E-02	3.12E-02
U-233	2.5856E-08	37,986.38	75,972.75	0.00E+00	9.82E-04	1.96E-03
U-234	5.2665E-05	37,986.38	75,972.75	0.00E+00	2.00E+00	4.00E+00
U-235	-1.4487E-06	37,986.38	0.00	3.40E-02	0.00E+00	3.40E-02
U-236	7.5888E-06	37,986.38	75,972.75	0.00E+00	2.88E-01	5.77E-01
U-238	-2.6129E-07	37,986.38	0.00	1.79E-01	1.69E-01	1.79E-01
Y-90	6.4180E-01	37,986.38	75,972.75	0.00E+00	2.44E+04	4.88E+04
Other Radionuclides					3.62E+04	7.24E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.891E+15
0.0250	5.793E+14
0.0375	5.459E+14
0.0575	6.831E+14
0.0850	3.192E+14
0.1250	2.123E+14
0.2250	2.725E+14
0.3750	1.177E+14
0.5750	2.771E+15
0.8500	2.706E+13
1.2500	1.722E+13
1.7500	7.571E+11
2.2500	1.244E+08
2.7500	4.386E+08
3.5000	3.129E+07
5.0000	1.337E+07
7.0000	1.540E+06
11.0000	1.769E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.87E+02	1.37E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	900.83	37,986.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	926.60	75,972.75	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-D2
SNF ID #: 26
Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY
Heavy Metal Mass: BOL=233.593kg; EOL=217.098kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1968
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	15,685.20	31,370.41	0.00E+00	1.68E-05	3.37E-05
Am-241	1.4751E-01	15,685.20	31,370.41	0.00E+00	2.31E+03	4.63E+03
Am-242m	2.6809E-04	15,685.20	31,370.41	0.00E+00	4.21E+00	8.41E+00
Am-243	6.2484E-04	15,685.20	31,370.41	0.00E+00	9.80E+00	1.96E+01
C-14	4.7820E-05	15,685.20	31,370.41	0.00E+00	7.50E-01	1.50E+00
Cl-36	8.0297E-07	15,685.20	31,370.41	0.00E+00	1.26E-02	2.52E-02
Cm-243	1.7426E-04	15,685.20	31,370.41	0.00E+00	2.73E+00	5.47E+00
Cm-244	2.7616E-02	15,685.20	31,370.41	0.00E+00	4.33E+02	8.66E+02
Co-60	3.5610E-04	15,685.20	31,370.41	0.00E+00	5.59E+00	1.12E+01
Cs-134	2.6260E-07	15,685.20	31,370.41	0.00E+00	4.12E-03	8.24E-03
Cs-135	1.4433E-05	15,685.20	31,370.41	0.00E+00	2.26E-01	4.53E-01
Cs-137	9.8870E-01	15,685.20	31,370.41	0.00E+00	1.55E+04	3.10E+04
Eu-154	6.0320E-03	15,685.20	31,370.41	0.00E+00	9.46E+01	1.89E+02
Eu-155	2.1770E-04	15,685.20	31,370.41	0.00E+00	3.41E+00	6.83E+00
Fe-55	7.9296E-07	15,685.20	31,370.41	0.00E+00	1.24E-02	2.49E-02
H-3	8.9486E-03	15,685.20	31,370.41	0.00E+00	1.40E+02	2.81E+02
I-129	9.8288E-07	15,685.20	31,370.41	0.00E+00	1.54E-02	3.08E-02
Kr-85	1.0707E-02	15,685.20	31,370.41	0.00E+00	1.68E+02	3.36E+02
Np-237	1.1927E-05	15,685.20	31,370.41	0.00E+00	1.87E-01	3.74E-01
Pa-231	1.4703E-09	15,685.20	31,370.41	0.00E+00	2.31E-05	4.61E-05
Pb-210	1.6828E-10	15,685.20	31,370.41	0.00E+00	2.64E-06	5.28E-06
Pm-147	6.9606E-06	15,685.20	31,370.41	0.00E+00	1.09E-01	2.18E-01
Pu-238	6.6263E-02	15,685.20	31,370.41	0.00E+00	1.04E+03	2.08E+03
Pu-239	1.1618E-02	15,685.20	31,370.41	0.00E+00	1.82E+02	3.64E+02
Pu-240	1.5142E-02	15,685.20	31,370.41	0.00E+00	2.38E+02	4.75E+02
Pu-241	4.3766E-01	15,685.20	31,370.41	0.00E+00	6.86E+03	1.37E+04
Pu-242	6.4260E-05	15,685.20	31,370.41	0.00E+00	1.01E+00	2.02E+00
Ra-226	3.8501E-10	15,685.20	31,370.41	0.00E+00	6.04E-06	1.21E-05
Ra-228	5.2955E-12	15,685.20	31,370.41	0.00E+00	8.31E-08	1.66E-07
Ru-106	2.0413E-14	15,685.20	31,370.41	0.00E+00	3.20E-10	6.40E-10
Se-79	1.2376E-05	15,685.20	31,370.41	0.00E+00	1.94E-01	3.88E-01
Sn-126	2.5210E-05	15,685.20	31,370.41	0.00E+00	3.95E-01	7.91E-01
Sr-90	6.4163E-01	15,685.20	31,370.41	0.00E+00	1.01E+04	2.01E+04
Tc-99	3.9357E-04	15,685.20	31,370.41	0.00E+00	6.17E+00	1.23E+01
Th-229	1.5644E-10	15,685.20	31,370.41	0.00E+00	2.45E-06	4.91E-06
Th-230	2.7972E-08	15,685.20	31,370.41	0.00E+00	4.39E-04	8.77E-04
Th-232	5.3036E-12	15,685.20	31,370.41	0.00E+00	8.32E-08	1.66E-07
Tl-208	1.5136E-07	15,685.20	31,370.41	0.00E+00	2.37E-03	4.75E-03
U-232	4.1005E-07	15,685.20	31,370.41	0.00E+00	6.43E-03	1.29E-02
U-233	2.5856E-08	15,685.20	31,370.41	0.00E+00	4.06E-04	8.11E-04
U-234	5.2665E-05	15,685.20	31,370.41	0.00E+00	8.26E-01	1.65E+00
U-235	-1.4487E-06	15,685.20	0.00	1.42E-02	0.00E+00	1.42E-02
U-236	7.5888E-06	15,685.20	31,370.41	0.00E+00	1.19E-01	2.38E-01
U-238	-2.6129E-07	15,685.20	0.00	7.63E-02	7.22E-02	7.63E-02
Y-90	6.4180E-01	15,685.20	31,370.41	0.00E+00	1.01E+04	2.01E+04
Other Radionuclides					1.49E+04	2.99E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.194E+15
0.0250	2.392E+14
0.0375	2.254E+14
0.0575	2.821E+14
0.0850	1.318E+14
0.1250	8.768E+13
0.2250	1.125E+14
0.3750	4.860E+13
0.5750	1.144E+15
0.8500	1.117E+13
1.2500	7.110E+12
1.7500	3.126E+11
2.2500	5.138E+07
2.7500	1.811E+08
3.5000	1.292E+07
5.0000	5.522E+06
7.0000	6.361E+05
11.0000	7.304E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.84E+02	6.67E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,061.91	15,685.20	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1,641.46	31,370.41	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-E
SNF ID #: 27
Fuel Units & Descr: 18 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=2443.466kg; EOL=2420.588kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	29,160.32	33,700.28	0.00E+00	3.13E-05	3.62E-05
Am-241	1.4751E-01	29,160.32	33,700.28	0.00E+00	4.30E+03	4.97E+03
Am-242m	2.6809E-04	29,160.32	33,700.28	0.00E+00	7.82E+00	9.03E+00
Am-243	6.2484E-04	29,160.32	33,700.28	0.00E+00	1.82E+01	2.11E+01
C-14	4.7820E-05	29,160.32	33,700.28	0.00E+00	1.39E+00	1.61E+00
Cl-36	8.0297E-07	29,160.32	33,700.28	0.00E+00	2.34E-02	2.71E-02
Cm-243	1.7426E-04	29,160.32	33,700.28	0.00E+00	5.08E+00	5.87E+00
Cm-244	2.7616E-02	29,160.32	33,700.28	0.00E+00	8.05E+02	9.31E+02
Co-60	3.5610E-04	29,160.32	33,700.28	0.00E+00	1.04E+01	1.20E+01
Cs-134	2.6260E-07	29,160.32	33,700.28	0.00E+00	7.66E-03	8.85E-03
Cs-135	1.4433E-05	29,160.32	33,700.28	0.00E+00	4.21E-01	4.86E-01
Cs-137	9.8870E-01	29,160.32	33,700.28	0.00E+00	2.88E+04	3.33E+04
Eu-154	6.0320E-03	29,160.32	33,700.28	0.00E+00	1.76E+02	2.03E+02
Eu-155	2.1770E-04	29,160.32	33,700.28	0.00E+00	6.35E+00	7.34E+00
Fe-55	7.9296E-07	29,160.32	33,700.28	0.00E+00	2.31E-02	2.67E-02
H-3	8.9486E-03	29,160.32	33,700.28	0.00E+00	2.61E+02	3.02E+02
I-129	9.8288E-07	29,160.32	33,700.28	0.00E+00	2.87E-02	3.31E-02
Kr-85	1.0707E-02	29,160.32	33,700.28	0.00E+00	3.12E+02	3.61E+02
Np-237	1.1927E-05	29,160.32	33,700.28	0.00E+00	3.48E-01	4.02E-01
Pa-231	1.4703E-09	29,160.32	33,700.28	0.00E+00	4.29E-05	4.95E-05
Pb-210	1.6828E-10	29,160.32	33,700.28	0.00E+00	4.91E-06	5.67E-06
Pm-147	6.9606E-06	29,160.32	33,700.28	0.00E+00	2.03E-01	2.35E-01
Pu-238	6.6263E-02	29,160.32	33,700.28	0.00E+00	1.93E+03	2.23E+03
Pu-239	1.1618E-02	29,160.32	33,700.28	0.00E+00	3.39E+02	3.92E+02
Pu-240	1.5142E-02	29,160.32	33,700.28	0.00E+00	4.42E+02	5.10E+02
Pu-241	4.3766E-01	29,160.32	33,700.28	0.00E+00	1.28E+04	1.47E+04
Pu-242	6.4260E-05	29,160.32	33,700.28	0.00E+00	1.87E+00	2.17E+00
Ra-226	3.8501E-10	29,160.32	33,700.28	0.00E+00	1.12E-05	1.30E-05
Ra-228	5.2955E-12	29,160.32	33,700.28	0.00E+00	1.54E-07	1.78E-07
Ru-106	2.0413E-14	29,160.32	33,700.28	0.00E+00	5.95E-10	6.88E-10
Se-79	1.2376E-05	29,160.32	33,700.28	0.00E+00	3.61E-01	4.17E-01
Sn-126	2.5210E-05	29,160.32	33,700.28	0.00E+00	7.35E-01	8.50E-01
Sr-90	6.4163E-01	29,160.32	33,700.28	0.00E+00	1.87E+04	2.16E+04
Tc-99	3.9357E-04	29,160.32	33,700.28	0.00E+00	1.15E+01	1.33E+01
Th-229	1.5644E-10	29,160.32	33,700.28	0.00E+00	4.56E-06	5.27E-06
Th-230	2.7972E-08	29,160.32	33,700.28	0.00E+00	8.16E-04	9.43E-04
Th-232	5.3036E-12	29,160.32	33,700.28	0.00E+00	1.55E-07	1.79E-07
Tl-208	1.5136E-07	29,160.32	33,700.28	0.00E+00	4.41E-03	5.10E-03
U-232	4.1005E-07	29,160.32	33,700.28	0.00E+00	1.20E-02	1.38E-02
U-233	2.5856E-08	29,160.32	33,700.28	0.00E+00	7.54E-04	8.71E-04
U-234	5.2665E-05	29,160.32	33,700.28	0.00E+00	1.54E+00	1.77E+00
U-235	-1.4487E-06	29,160.32	0.00	1.58E-01	1.16E-01	1.58E-01
U-236	7.5888E-06	29,160.32	33,700.28	0.00E+00	2.21E-01	2.56E-01
U-238	-2.6129E-07	29,160.32	0.00	7.97E-01	7.89E-01	7.97E-01
Y-90	6.4180E-01	29,160.32	33,700.28	0.00E+00	1.87E+04	2.16E+04
Other Radionuclides					2.78E+04	3.21E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.282E+15
0.0250	2.570E+14
0.0375	2.421E+14
0.0575	3.030E+14
0.0850	1.416E+14
0.1250	9.419E+13
0.2250	1.209E+14
0.3750	5.220E+13
0.5750	1.229E+15
0.8500	1.200E+13
1.2500	7.636E+12
1.7500	3.358E+11
2.2500	5.520E+07
2.7500	1.945E+08
3.5000	1.388E+07
5.0000	5.933E+06
7.0000	6.835E+05
11.0000	7.849E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.27E+02	6.10E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.995	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	29,160.32	21,755.90	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	33,700.28	43,511.79	Bounding burnup taken directly from SFD (converted to MWd).

Checks

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

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: BRP-EG
SNF ID #: 28
Fuel Units & Descr: 33 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=4566.956kg; EOL=4419.278kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	140,435.08	280,870.16	0.00E+00	1.51E-04	3.01E-04
Am-241	1.4751E-01	140,435.08	280,870.16	0.00E+00	2.07E+04	4.14E+04
Am-242m	2.6809E-04	140,435.08	280,870.16	0.00E+00	3.76E+01	7.53E+01
Am-243	6.2484E-04	140,435.08	280,870.16	0.00E+00	8.77E+01	1.75E+02
C-14	4.7820E-05	140,435.08	280,870.16	0.00E+00	6.72E+00	1.34E+01
Cl-36	8.0297E-07	140,435.08	280,870.16	0.00E+00	1.13E-01	2.26E-01
Cm-243	1.7426E-04	140,435.08	280,870.16	0.00E+00	2.45E+01	4.89E+01
Cm-244	2.7616E-02	140,435.08	280,870.16	0.00E+00	3.88E+03	7.76E+03
Co-60	3.5610E-04	140,435.08	280,870.16	0.00E+00	5.00E+01	1.00E+02
Cs-134	2.6260E-07	140,435.08	280,870.16	0.00E+00	3.69E-02	7.38E-02
Cs-135	1.4433E-05	140,435.08	280,870.16	0.00E+00	2.03E+00	4.05E+00
Cs-137	9.8870E-01	140,435.08	280,870.16	0.00E+00	1.39E+05	2.78E+05
Eu-154	6.0320E-03	140,435.08	280,870.16	0.00E+00	8.47E+02	1.69E+03
Eu-155	2.1770E-04	140,435.08	280,870.16	0.00E+00	3.06E+01	6.11E+01
Fe-55	7.9296E-07	140,435.08	280,870.16	0.00E+00	1.11E-01	2.23E-01
H-3	8.9486E-03	140,435.08	280,870.16	0.00E+00	1.26E+03	2.51E+03
I-129	9.8288E-07	140,435.08	280,870.16	0.00E+00	1.38E-01	2.76E-01
Kr-85	1.0707E-02	140,435.08	280,870.16	0.00E+00	1.50E+03	3.01E+03
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
Tl-208	1.5136E-07	140,435.08	280,870.16	0.00E+00	2.13E-02	4.25E-02
U-232	4.1005E-07	140,435.08	280,870.16	0.00E+00	5.76E-02	1.15E-01
U-233	2.5856E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.069E+16
0.0250	2.142E+15
0.0375	2.018E+15
0.0575	2.525E+15
0.0850	1.180E+15
0.1250	7.850E+14
0.2250	1.007E+15
0.3750	4.351E+14
0.5750	1.025E+16
0.8500	1.000E+14
1.2500	6.366E+13
1.7500	2.799E+12
2.2500	4.600E+08
2.7500	1.621E+09
3.5000	1.157E+08
5.0000	4.944E+07
7.0000	5.695E+06
11.0000	6.540E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.54E+03	5.08E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	60,840.99	140,435.08	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	83,858.44	280,870.16	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.88	2.31
Bounding:	1.76	3.35

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: BRP-EG/F
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

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	11,962.22	23,924.45	0.00E+00	1.28E-05	2.57E-05
Am-241	1.4751E-01	11,962.22	23,924.45	0.00E+00	1.76E+03	3.53E+03
Am-242m	2.6809E-04	11,962.22	23,924.45	0.00E+00	3.21E+00	6.41E+00
Am-243	6.2484E-04	11,962.22	23,924.45	0.00E+00	7.47E+00	1.49E+01
C-14	4.7820E-05	11,962.22	23,924.45	0.00E+00	5.72E-01	1.14E+00
Cl-36	8.0297E-07	11,962.22	23,924.45	0.00E+00	9.61E-03	1.92E-02
Cm-243	1.7426E-04	11,962.22	23,924.45	0.00E+00	2.08E+00	4.17E+00
Cm-244	2.7616E-02	11,962.22	23,924.45	0.00E+00	3.30E+02	6.61E+02
Co-60	3.5610E-04	11,962.22	23,924.45	0.00E+00	4.26E+00	8.52E+00
Cs-134	2.6260E-07	11,962.22	23,924.45	0.00E+00	3.14E-03	6.28E-03
Cs-135	1.4433E-05	11,962.22	23,924.45	0.00E+00	1.73E-01	3.45E-01
Cs-137	9.8870E-01	11,962.22	23,924.45	0.00E+00	1.18E+04	2.37E+04
Eu-154	6.0320E-03	11,962.22	23,924.45	0.00E+00	7.22E+01	1.44E+02
Eu-155	2.1770E-04	11,962.22	23,924.45	0.00E+00	2.60E+00	5.21E+00
Fe-55	7.9296E-07	11,962.22	23,924.45	0.00E+00	9.49E-03	1.90E-02
H-3	8.9486E-03	11,962.22	23,924.45	0.00E+00	1.07E+02	2.14E+02
I-129	9.8288E-07	11,962.22	23,924.45	0.00E+00	1.18E-02	2.35E-02
Kr-85	1.0707E-02	11,962.22	23,924.45	0.00E+00	1.28E+02	2.56E+02
Np-237	1.1927E-05	11,962.22	23,924.45	0.00E+00	1.43E-01	2.85E-01
Pa-231	1.4703E-09	11,962.22	23,924.45	0.00E+00	1.76E-05	3.52E-05
Pb-210	1.6828E-10	11,962.22	23,924.45	0.00E+00	2.01E-06	4.03E-06
Pm-147	6.9606E-06	11,962.22	23,924.45	0.00E+00	8.33E-02	1.67E-01
Pu-238	6.6263E-02	11,962.22	23,924.45	0.00E+00	7.93E+02	1.59E+03
Pu-239	1.1618E-02	11,962.22	23,924.45	0.00E+00	1.39E+02	2.78E+02
Pu-240	1.5142E-02	11,962.22	23,924.45	0.00E+00	1.81E+02	3.62E+02
Pu-241	4.3766E-01	11,962.22	23,924.45	0.00E+00	5.24E+03	1.05E+04
Pu-242	6.4260E-05	11,962.22	23,924.45	0.00E+00	7.69E-01	1.54E+00
Ra-226	3.8501E-10	11,962.22	23,924.45	0.00E+00	4.61E-06	9.21E-06
Ra-228	5.2955E-12	11,962.22	23,924.45	0.00E+00	6.33E-08	1.27E-07
Ru-106	2.0413E-14	11,962.22	23,924.45	0.00E+00	2.44E-10	4.88E-10
Se-79	1.2376E-05	11,962.22	23,924.45	0.00E+00	1.48E-01	2.96E-01
Sn-126	2.5210E-05	11,962.22	23,924.45	0.00E+00	3.02E-01	6.03E-01
Sr-90	6.4163E-01	11,962.22	23,924.45	0.00E+00	7.68E+03	1.54E+04
Tc-99	3.9357E-04	11,962.22	23,924.45	0.00E+00	4.71E+00	9.42E+00
Th-229	1.5644E-10	11,962.22	23,924.45	0.00E+00	1.87E-06	3.74E-06
Th-230	2.7972E-08	11,962.22	23,924.45	0.00E+00	3.35E-04	6.69E-04
Th-232	5.3036E-12	11,962.22	23,924.45	0.00E+00	6.34E-08	1.27E-07
Tl-208	1.5136E-07	11,962.22	23,924.45	0.00E+00	1.81E-03	3.62E-03
U-232	4.1005E-07	11,962.22	23,924.45	0.00E+00	4.91E-03	9.81E-03
U-233	2.5856E-08	11,962.22	23,924.45	0.00E+00	3.09E-04	6.19E-04
U-234	5.2665E-05	11,962.22	23,924.45	0.00E+00	6.30E-01	1.26E+00
U-235	-1.4487E-06	11,962.22	0.00	4.16E-02	2.43E-02	4.16E-02
U-236	7.5888E-06	11,962.22	23,924.45	0.00E+00	9.08E-02	1.82E-01
U-238	-2.6129E-07	11,962.22	0.00	1.80E-01	1.76E-01	1.80E-01
Y-90	6.4180E-01	11,962.22	23,924.45	0.00E+00	7.68E+03	1.54E+04
Other Radionuclides					1.14E+04	2.28E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.103E+14
0.0250	1.824E+14
0.0375	1.719E+14
0.0575	2.151E+14
0.0850	1.005E+14
0.1250	6.687E+13
0.2250	8.581E+13
0.3750	3.706E+13
0.5750	8.727E+14
0.8500	8.522E+12
1.2500	5.423E+12
1.7500	2.384E+11
2.2500	3.918E+07
2.7500	1.381E+08
3.5000	9.854E+06
5.0000	4.211E+06
7.0000	4.851E+05
11.0000	5.571E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.16E+02	4.33E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	8,552.79	11,962.22	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	8,583.24	23,924.45	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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: 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

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: (Worst Case)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	17,236.64	34,473.28	0.00E+00	4.34E-02	8.69E-02
Am-241	8.6432E+00	17,236.64	34,473.28	0.00E+00	1.49E+05	2.98E+05
Am-242m	1.5728E-02	17,236.64	34,473.28	0.00E+00	2.71E+02	5.42E+02
Am-243	1.6288E-02	17,236.64	34,473.28	0.00E+00	2.81E+02	5.62E+02
C-14	1.2068E-01	17,236.64	34,473.28	0.00E+00	2.08E+03	4.16E+03
Cl-36	2.2849E-03	17,236.64	34,473.28	0.00E+00	3.94E+01	7.88E+01
Cm-243	6.0144E-04	17,236.64	34,473.28	0.00E+00	1.04E+01	2.07E+01
Cm-244	9.4880E-02	17,236.64	34,473.28	0.00E+00	1.64E+03	3.27E+03
Co-60	3.9052E+00	17,236.64	34,473.28	0.00E+00	6.73E+04	1.35E+05
Cs-134	2.2139E-06	17,236.64	34,473.28	0.00E+00	3.82E-02	7.63E-02
Cs-135	4.3976E-04	17,236.64	34,473.28	0.00E+00	7.58E+00	1.52E+01
Cs-137	1.4887E+01	17,236.64	34,473.28	0.00E+00	2.57E+05	5.13E+05
Eu-154	3.7342E-01	17,236.64	34,473.28	0.00E+00	6.44E+03	1.29E+04
Eu-155	8.4893E-03	17,236.64	34,473.28	0.00E+00	1.46E+02	2.93E+02
Fe-55	5.3750E-03	17,236.64	34,473.28	0.00E+00	9.26E+01	1.85E+02
H-3	1.0472E-01	17,236.64	34,473.28	0.00E+00	1.80E+03	3.61E+03
I-129	1.0618E-05	17,236.64	34,473.28	0.00E+00	1.83E-01	3.66E-01
Kr-85	2.2717E-01	17,236.64	34,473.28	0.00E+00	3.92E+03	7.83E+03
Np-237	1.6400E-04	17,236.64	34,473.28	0.00E+00	2.83E+00	5.65E+00
Pa-231	2.8688E-06	17,236.64	34,473.28	0.00E+00	4.94E-02	9.89E-02
Pb-210	4.7312E-06	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
Tl-208	7.5795E-05	17,236.64	34,473.28	0.00E+00	1.31E+00	2.61E+00
U-232	2.0521E-04	17,236.64	34,473.28	0.00E+00	3.54E+00	7.07E+00
U-233	3.6128E-04	17,236.64	34,473.28	0.00E+00	6.23E+00	1.25E+01
U-234	1.2788E-02	17,236.64	34,473.28	0.00E+00	2.20E+02	4.41E+02
U-235	5.7486E-04	17,236.64	34,473.28	1.59E-01	1.01E+01	2.00E+01
U-236	2.3485E-04	17,236.64	34,473.28	0.00E+00	4.05E+00	8.10E+00
U-238	1.1581E-04	17,236.64	34,473.28	1.98E-02	2.02E+00	4.01E+00
Y-90	1.3861E+01	17,236.64	34,473.28	0.00E+00	2.39E+05	4.78E+05
Other Radionuclides					8.86E+05	1.77E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.953E+16
0.0250	5.771E+15
0.0375	4.879E+15
0.0575	9.216E+15
0.0850	3.089E+15
0.1250	2.186E+15
0.2250	2.674E+15
0.3750	1.157E+15
0.5750	1.915E+16
0.8500	4.194E+14
1.2500	1.028E+16
1.7500	1.236E+13
2.2500	5.344E+10
2.7500	9.197E+10
3.5000	5.569E+07
5.0000	2.353E+07
7.0000	2.678E+06
11.0000	3.055E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.04E+04	2.05E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:	0.7	0 to 100

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:	6,607.65	17,236.64
Bounding:	7,131.56	34,473.28

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:	1.39	2.61
Bounding:	2.79	4.83

Estimated EOL HM/Given EOL HM: 31.12

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-F
SNF ID #: 30
Fuel Units & Descr: 13 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=1799.104kg; EOL=1756.759kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	40,268.00	80,535.99	0.00E+00	4.32E-05	8.64E-05
Am-241	1.4751E-01	40,268.00	80,535.99	0.00E+00	5.94E+03	1.19E+04
Am-242m	2.6809E-04	40,268.00	80,535.99	0.00E+00	1.08E+01	2.16E+01
Am-243	6.2484E-04	40,268.00	80,535.99	0.00E+00	2.52E+01	5.03E+01
C-14	4.7820E-05	40,268.00	80,535.99	0.00E+00	1.93E+00	3.85E+00
Cl-36	8.0297E-07	40,268.00	80,535.99	0.00E+00	3.23E-02	6.47E-02
Cm-243	1.7426E-04	40,268.00	80,535.99	0.00E+00	7.02E+00	1.40E+01
Cm-244	2.7616E-02	40,268.00	80,535.99	0.00E+00	1.11E+03	2.22E+03
Co-60	3.5610E-04	40,268.00	80,535.99	0.00E+00	1.43E+01	2.87E+01
Cs-134	2.6260E-07	40,268.00	80,535.99	0.00E+00	1.06E-02	2.11E-02
Cs-135	1.4433E-05	40,268.00	80,535.99	0.00E+00	5.81E-01	1.16E+00
Cs-137	9.8870E-01	40,268.00	80,535.99	0.00E+00	3.98E+04	7.96E+04
Eu-154	6.0320E-03	40,268.00	80,535.99	0.00E+00	2.43E+02	4.86E+02
Eu-155	2.1770E-04	40,268.00	80,535.99	0.00E+00	8.77E+00	1.75E+01
Fe-55	7.9296E-07	40,268.00	80,535.99	0.00E+00	3.19E-02	6.39E-02
H-3	8.9486E-03	40,268.00	80,535.99	0.00E+00	3.60E+02	7.21E+02
I-129	9.8288E-07	40,268.00	80,535.99	0.00E+00	3.96E-02	7.92E-02
Kr-85	1.0707E-02	40,268.00	80,535.99	0.00E+00	4.31E+02	8.62E+02
Np-237	1.1927E-05	40,268.00	80,535.99	0.00E+00	4.80E-01	9.61E-01
Pa-231	1.4703E-09	40,268.00	80,535.99	0.00E+00	5.92E-05	1.18E-04
Pb-210	1.6828E-10	40,268.00	80,535.99	0.00E+00	6.78E-06	1.36E-05
Pm-147	6.9606E-06	40,268.00	80,535.99	0.00E+00	2.80E-01	5.61E-01
Pu-238	6.6263E-02	40,268.00	80,535.99	0.00E+00	2.67E+03	5.34E+03
Pu-239	1.1618E-02	40,268.00	80,535.99	0.00E+00	4.68E+02	9.36E+02
Pu-240	1.5142E-02	40,268.00	80,535.99	0.00E+00	6.10E+02	1.22E+03
Pu-241	4.3766E-01	40,268.00	80,535.99	0.00E+00	1.76E+04	3.52E+04
Pu-242	6.4260E-05	40,268.00	80,535.99	0.00E+00	2.59E+00	5.18E+00
Ra-226	3.8501E-10	40,268.00	80,535.99	0.00E+00	1.55E-05	3.10E-05
Ra-228	5.2955E-12	40,268.00	80,535.99	0.00E+00	2.13E-07	4.26E-07
Ru-106	2.0413E-14	40,268.00	80,535.99	0.00E+00	8.22E-10	1.64E-09
Se-79	1.2376E-05	40,268.00	80,535.99	0.00E+00	4.98E-01	9.97E-01
Sn-126	2.5210E-05	40,268.00	80,535.99	0.00E+00	1.02E+00	2.03E+00
Sr-90	6.4163E-01	40,268.00	80,535.99	0.00E+00	2.58E+04	5.17E+04
Tc-99	3.9357E-04	40,268.00	80,535.99	0.00E+00	1.58E+01	3.17E+01
Th-229	1.5644E-10	40,268.00	80,535.99	0.00E+00	6.30E-06	1.26E-05
Th-230	2.7972E-08	40,268.00	80,535.99	0.00E+00	1.13E-03	2.25E-03
Th-232	5.3036E-12	40,268.00	80,535.99	0.00E+00	2.14E-07	4.27E-07
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.064E+15
0.0250	6.141E+14
0.0375	5.787E+14
0.0575	7.241E+14
0.0850	3.383E+14
0.1250	2.251E+14
0.2250	2.889E+14
0.3750	1.248E+14
0.5750	2.938E+15
0.8500	2.869E+13
1.2500	1.825E+13
1.7500	8.025E+11
2.2500	1.319E+08
2.7500	4.649E+08
3.5000	3.317E+07
5.0000	1.418E+07
7.0000	1.633E+06
11.0000	1.875E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.28E+02	1.45E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

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: BRP-F-PU
SNF ID #: 1082
Fuel Units & Descr: 2 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=269.592kg; EOL=263.82kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	5,489.09	10,978.18	0.00E+00	5.89E-06	1.18E-05
Am-241	1.4751E-01	5,489.09	10,978.18	0.00E+00	8.10E+02	1.62E+03
Am-242m	2.6809E-04	5,489.09	10,978.18	0.00E+00	1.47E+00	2.94E+00
Am-243	6.2484E-04	5,489.09	10,978.18	0.00E+00	3.43E+00	6.86E+00
C-14	4.7820E-05	5,489.09	10,978.18	0.00E+00	2.62E-01	5.25E-01
Cl-36	8.0297E-07	5,489.09	10,978.18	0.00E+00	4.41E-03	8.82E-03
Cm-243	1.7426E-04	5,489.09	10,978.18	0.00E+00	9.57E-01	1.91E+00
Cm-244	2.7616E-02	5,489.09	10,978.18	0.00E+00	1.52E+02	3.03E+02
Co-60	3.5810E-04	5,489.09	10,978.18	0.00E+00	1.95E+00	3.91E+00
Cs-134	2.6260E-07	5,489.09	10,978.18	0.00E+00	1.44E-03	2.88E-03
Cs-135	1.4433E-05	5,489.09	10,978.18	0.00E+00	7.92E-02	1.58E-01
Cs-137	9.6870E-01	5,489.09	10,978.18	0.00E+00	5.43E+03	1.09E+04
Eu-154	6.0320E-03	5,489.09	10,978.18	0.00E+00	3.31E+01	6.62E+01
Eu-155	2.1770E-04	5,489.09	10,978.18	0.00E+00	1.19E+00	2.39E+00
Fe-55	7.9296E-07	5,489.09	10,978.18	0.00E+00	4.35E-03	8.71E-03
H-3	8.9486E-03	5,489.09	10,978.18	0.00E+00	4.91E+01	9.82E+01
I-129	9.8288E-07	5,489.09	10,978.18	0.00E+00	5.40E-03	1.08E-02
Kr-85	1.0707E-02	5,489.09	10,978.18	0.00E+00	5.88E+01	1.18E+02
Np-237	1.1927E-05	5,489.09	10,978.18	0.00E+00	6.55E-02	1.31E-01
Pa-231	1.4703E-09	5,489.09	10,978.18	0.00E+00	8.07E-06	1.61E-05
Pb-210	1.6828E-10	5,489.09	10,978.18	0.00E+00	9.24E-07	1.85E-06
Pm-147	6.9606E-06	5,489.09	10,978.18	0.00E+00	3.82E-02	7.64E-02
Pu-238	6.6263E-02	5,489.09	10,978.18	0.00E+00	3.64E+02	7.27E+02
Pu-239	1.1618E-02	5,489.09	10,978.18	0.00E+00	6.38E+01	1.28E+02
Pu-240	1.5142E-02	5,489.09	10,978.18	0.00E+00	8.31E+01	1.66E+02
Pu-241	4.3766E-01	5,489.09	10,978.18	0.00E+00	2.40E+03	4.80E+03
Pu-242	6.4260E-05	5,489.09	10,978.18	0.00E+00	3.53E-01	7.05E-01
Ra-226	3.8501E-10	5,489.09	10,978.18	0.00E+00	2.11E-06	4.23E-06
Ra-228	5.2955E-12	5,489.09	10,978.18	0.00E+00	2.91E-08	5.81E-08
Ru-106	2.0413E-14	5,489.09	10,978.18	0.00E+00	1.12E-10	2.24E-10
Se-79	1.2376E-05	5,489.09	10,978.18	0.00E+00	6.79E-02	1.36E-01
Sn-126	2.5210E-05	5,489.09	10,978.18	0.00E+00	1.38E-01	2.77E-01
Sr-90	6.4163E-01	5,489.09	10,978.18	0.00E+00	3.52E+03	7.04E+03
Tc-99	3.9357E-04	5,489.09	10,978.18	0.00E+00	2.16E+00	4.32E+00
Th-229	1.5644E-10	5,489.09	10,978.18	0.00E+00	8.59E-07	1.72E-06
Th-230	2.7972E-08	5,489.09	10,978.18	0.00E+00	1.54E-04	3.07E-04
Th-232	5.3036E-12	5,489.09	10,978.18	0.00E+00	2.91E-08	5.82E-08
Tl-208	1.5136E-07	5,489.09	10,978.18	0.00E+00	8.31E-04	1.66E-03
U-232	4.1005E-07	5,489.09	10,978.18	0.00E+00	2.25E-03	4.50E-03
U-233	2.5856E-08	5,489.09	10,978.18	0.00E+00	1.42E-04	2.84E-04
U-234	5.2665E-05	5,489.09	10,978.18	0.00E+00	2.89E-01	5.78E-01
U-235	-1.4487E-06	5,489.09	0.00	2.05E-02	1.26E-02	2.05E-02
U-236	7.5888E-06	5,489.09	10,978.18	0.00E+00	4.17E-02	8.33E-02
U-238	-2.6129E-07	5,489.09	0.00	8.74E-02	8.60E-02	8.74E-02
Y-90	6.4180E-01	5,489.09	10,978.18	0.00E+00	3.52E+03	7.05E+03
Other Radionuclides					5.23E+03	1.05E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.177E+14
0.0250	8.371E+13
0.0375	7.888E+13
0.0575	9.871E+13
0.0850	4.612E+13
0.1250	3.068E+13
0.2250	3.938E+13
0.3750	1.701E+13
0.5750	4.005E+14
0.8500	3.910E+12
1.2500	2.488E+12
1.7500	1.094E+11
2.2500	1.798E+07
2.7500	6.337E+07
3.5000	4.522E+06
5.0000	1.932E+06
7.0000	2.226E+05
11.0000	2.556E+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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3.525	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	4,154.69	5,489.09	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	4,193.24	10,978.18	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.58	1.32
Bounding:	1.16	2.62

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

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

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-06	13,290.34	26,580.68	0.00E+00	4.56E-04	9.11E-04
Am-241	1.1458E-04	13,290.34	26,580.68	0.00E+00	1.52E+00	3.05E+00
Am-242m	7.9468E-09	13,290.34	26,580.68	0.00E+00	1.06E-04	2.11E-04
Am-243	9.8386E-10	13,290.34	26,580.68	0.00E+00	1.31E-05	2.62E-05
C-14	2.2978E-04	13,290.34	26,580.68	0.00E+00	3.05E+00	6.11E+00
Cl-36	1.2261E-06	13,290.34	26,580.68	0.00E+00	1.63E-02	3.26E-02
Cm-243	1.7271E-10	13,290.34	26,580.68	0.00E+00	2.30E-06	4.59E-06
Cm-244	1.3058E-09	13,290.34	26,580.68	0.00E+00	1.74E-05	3.47E-05
Co-60	9.8636E-03	13,290.34	26,580.68	0.00E+00	1.31E+02	2.62E+02
Cs-134	1.9617E-08	13,290.34	26,580.68	0.00E+00	2.61E-04	5.21E-04
Cs-135	3.0316E-05	13,290.34	26,580.68	0.00E+00	4.03E-01	8.06E-01
Cs-137	1.0263E+00	13,290.34	26,580.68	0.00E+00	1.36E+04	2.73E+04
Eu-154	2.0017E-04	13,290.34	26,580.68	0.00E+00	2.66E+00	5.32E+00
Eu-155	8.5957E-05	13,290.34	26,580.68	0.00E+00	1.14E+00	2.28E+00
Fe-55	2.2646E-05	13,290.34	26,580.68	0.00E+00	3.01E-01	6.02E-01
H-3	1.0835E-03	13,290.34	26,580.68	0.00E+00	1.44E+01	2.88E+01
I-129	7.3195E-07	13,290.34	26,580.68	0.00E+00	9.73E-03	1.95E-02
Kr-85	1.5661E-02	13,290.34	26,580.68	0.00E+00	2.08E+02	4.16E+02
Np-237	1.1494E-06	13,290.34	26,580.68	0.00E+00	1.53E-02	3.06E-02
Pa-231	5.8070E-08	13,290.34	26,580.68	0.00E+00	7.72E-04	1.54E-03
Pb-210	1.2985E-12	13,290.34	26,580.68	0.00E+00	1.73E-08	3.45E-08
Pm-147	2.2196E-05	13,290.34	26,580.68	0.00E+00	2.95E-01	5.90E-01
Pu-238	2.6223E-04	13,290.34	26,580.68	0.00E+00	3.49E+00	6.97E+00
Pu-239	6.6739E-04	13,290.34	26,580.68	0.00E+00	8.87E+00	1.77E+01
Pu-240	8.6705E-05	13,290.34	26,580.68	0.00E+00	1.15E+00	2.30E+00
Pu-241	3.4759E-04	13,290.34	26,580.68	0.00E+00	4.62E+00	9.24E+00
Pu-242	1.9717E-09	13,290.34	26,580.68	0.00E+00	2.62E-05	5.24E-05
Ra-226	3.0000E-12	13,290.34	26,580.68	0.00E+00	3.99E-08	7.97E-08
Ra-228	8.3328E-12	13,290.34	26,580.68	0.00E+00	1.11E-07	2.21E-07
Ru-106	6.1464E-15	13,290.34	26,580.68	0.00E+00	8.17E-11	1.63E-10
Se-79	1.3221E-05	13,290.34	26,580.68	0.00E+00	1.76E-01	3.51E-01
Sn-126	1.1491E-05	13,290.34	26,580.68	0.00E+00	1.53E-01	3.05E-01
Sr-90	9.5541E-01	13,290.34	26,580.68	0.00E+00	1.27E+04	2.54E+04
Tc-99	4.6656E-04	13,290.34	26,580.68	0.00E+00	6.20E+00	1.24E+01
Th-229	1.9085E-11	13,290.34	26,580.68	0.00E+00	2.54E-07	5.07E-07
Th-230	2.1913E-10	13,290.34	26,580.68	0.00E+00	2.91E-06	5.82E-06
Th-232	8.3478E-12	13,290.34	26,580.68	0.00E+00	1.11E-07	2.22E-07
Tl-208	1.8752E-08	13,290.34	26,580.68	0.00E+00	2.49E-04	4.98E-04
U-232	5.0782E-08	13,290.34	26,580.68	0.00E+00	6.75E-04	1.35E-03
U-233	3.2596E-09	13,290.34	26,580.68	0.00E+00	4.33E-05	8.66E-05
U-234	3.9817E-07	13,290.34	26,580.68	0.00E+00	5.29E-03	1.06E-02
U-235	-2.7761E-06	13,290.34	0.00	3.53E-02	0.00E+00	3.53E-02
U-236	1.6190E-05	13,290.34	26,580.68	0.00E+00	2.15E-01	4.30E-01
U-238	-2.8547E-09	13,290.34	0.00	1.32E-01	1.32E-01	1.32E-01
Y-90	9.5557E-01	13,290.34	26,580.68	0.00E+00	1.27E+04	2.54E+04
Other Radionuclides					1.62E+04	3.24E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.386E+15
0.0250	2.880E+14
0.0375	2.497E+14
0.0575	2.686E+14
0.0850	1.622E+14
0.1250	1.053E+14
0.2250	1.398E+14
0.3750	6.099E+13
0.5750	1.015E+15
0.8500	1.003E+13
1.2500	2.283E+13
1.7500	2.581E+11
2.2500	1.308E+08
2.7500	1.782E+07
3.5000	2.250E+03
5.0000	9.405E+02
7.0000	1.053E+02
11.0000	1.191E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+02	3.10E+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 %:	4.000000037	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

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

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.70	1.01
Bounding:	1.40	

Estimated EOL HM/Given EOL HM: 1.00

[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: 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

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

Estimated Canister usage: HIC 1.00

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.2320E-09	24.54	49.08	0.00E+00	1.53E-07	3.06E-07
Am-241	2.3540E-02	24.54	49.08	0.00E+00	5.78E-01	1.16E+00
Am-242m	3.3060E-06	24.54	49.08	0.00E+00	8.11E-05	1.62E-04
Am-243	2.0560E-06	24.54	49.08	0.00E+00	5.05E-05	1.01E-04
C-14	1.1244E-03	24.54	49.08	0.00E+00	2.76E-02	5.52E-02
Cl-36	8.3760E-11	24.54	49.08	0.00E+00	2.06E-09	4.11E-09
Cm-243	3.4960E-07	24.54	49.08	0.00E+00	8.58E-06	1.72E-05
Cm-244	5.8860E-06	24.54	49.08	0.00E+00	1.44E-04	2.89E-04
Co-60	8.9560E-03	24.54	49.08	0.00E+00	2.20E-01	4.40E-01
Cs-134	5.1180E-08	24.54	49.08	0.00E+00	1.26E-06	2.51E-06
Cs-135	7.9140E-06	24.54	49.08	0.00E+00	1.94E-04	3.88E-04
Cs-137	1.0122E+00	24.54	49.08	0.00E+00	2.48E+01	4.97E+01
Eu-154	2.0260E-03	24.54	49.08	0.00E+00	4.97E-02	9.94E-02
Eu-155	7.7180E-05	24.54	49.08	0.00E+00	1.89E-03	3.79E-03
Fe-55	1.0538E-06	24.54	49.08	0.00E+00	2.59E-05	5.17E-05
H-3	1.0256E-02	24.54	49.08	0.00E+00	2.52E-01	5.03E-01
I-129	7.5020E-07	24.54	49.08	0.00E+00	1.84E-05	3.68E-05
Kr-85	1.4492E-02	24.54	49.08	0.00E+00	3.56E-01	7.11E-01
Np-237	5.6900E-06	24.54	49.08	0.00E+00	1.40E-04	2.79E-04
Pa-231	9.4900E-09	24.54	49.08	0.00E+00	2.33E-07	4.66E-07
Pb-210	8.6720E-09	24.54	49.08	0.00E+00	2.13E-07	4.26E-07
Pm-147	1.8906E-05	24.54	49.08	0.00E+00	4.64E-04	9.28E-04
Pu-238	5.7080E-03	24.54	49.08	0.00E+00	1.40E-01	2.80E-01
Pu-239	1.8736E-02	24.54	49.08	0.00E+00	4.60E-01	9.20E-01
Pu-240	8.3420E-03	24.54	49.08	0.00E+00	2.05E-01	4.09E-01
Pu-241	7.0960E-02	24.54	49.08	0.00E+00	1.74E+00	3.48E+00
Pu-242	2.0400E-06	24.54	49.08	0.00E+00	5.01E-05	1.00E-04
Ra-226	1.9722E-08	24.54	49.08	0.00E+00	4.84E-07	9.68E-07
Ra-228	1.1912E-09	24.54	49.08	0.00E+00	2.92E-08	5.85E-08
Ru-106	1.0798E-14	24.54	49.08	0.00E+00	2.65E-13	5.30E-13
Se-79	1.2522E-05	24.54	49.08	0.00E+00	3.07E-04	6.15E-04
Sn-126	1.2052E-05	24.54	49.08	0.00E+00	2.96E-04	5.91E-04
Sr-90	8.8440E-01	24.54	49.08	0.00E+00	2.17E+01	4.34E+01
Tc-99	4.4120E-04	24.54	49.08	0.00E+00	1.08E-02	2.17E-02
Th-229	5.6400E-09	24.54	49.08	0.00E+00	1.38E-07	2.77E-07
Th-230	1.3922E-06	24.54	49.08	0.00E+00	3.42E-05	6.83E-05
Th-232	1.1926E-09	24.54	49.08	0.00E+00	2.93E-08	5.85E-08
Tl-208	4.0060E-08	24.54	49.08	0.00E+00	9.83E-07	1.97E-06
U-232	1.0738E-07	24.54	49.08	0.00E+00	2.63E-06	5.27E-06
U-233	9.1640E-07	24.54	49.08	0.00E+00	2.25E-05	4.50E-05
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.395E+12
0.0250	4.954E+11
0.0375	4.358E+11
0.0575	4.768E+11
0.0850	2.782E+11
0.1250	1.817E+11
0.2250	2.396E+11
0.3750	1.043E+11
0.5750	1.846E+12
0.8500	1.876E+10
1.2500	4.005E+10
1.7500	4.935E+08
2.2500	2.207E+06
2.7500	6.985E+04
3.5000	2.484E+02
5.0000	1.042E+02
7.0000	1.172E+01
11.0000	1.330E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.16E-01	6.32E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	93	0 to 5

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		24.54
Bounding:		49.08

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.37	
Bounding:	2.73	

Estimated EOL HM/Given EOL HM: 1.01

[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: DOE TEST & EXPERIMENTAL (ALUM)
SNF ID #: 42
Fuel Units & Descr: 10 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=31.05kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	29,508.45	29,508.45	0.00E+00	7.44E-02	7.44E-02
Am-241	8.6432E+00	29,508.45	29,508.45	0.00E+00	2.55E+05	2.55E+05
Am-242m	1.5728E-02	29,508.45	29,508.45	0.00E+00	4.64E+02	4.64E+02
Am-243	1.6288E-02	29,508.45	29,508.45	0.00E+00	4.81E+02	4.81E+02
C-14	1.2068E-01	29,508.45	29,508.45	0.00E+00	3.56E+03	3.56E+03
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01
Cm-243	6.0144E-04	29,508.45	29,508.45	0.00E+00	1.77E+01	1.77E+01
Cm-244	9.4880E-02	29,508.45	29,508.45	0.00E+00	2.80E+03	2.80E+03
Co-60	3.9052E+00	29,508.45	29,508.45	0.00E+00	1.15E+05	1.15E+05
Cs-134	2.2139E-06	29,508.45	29,508.45	0.00E+00	6.53E-02	6.53E-02
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01
Cs-137	1.4887E+01	29,508.45	29,508.45	0.00E+00	4.39E+05	4.39E+05
Eu-154	3.7342E-01	29,508.45	29,508.45	0.00E+00	1.10E+04	1.10E+04
Eu-155	8.4893E-03	29,508.45	29,508.45	0.00E+00	2.51E+02	2.51E+02
Fe-55	5.3750E-03	29,508.45	29,508.45	0.00E+00	1.59E+02	1.59E+02
H-3	1.0472E-01	29,508.45	29,508.45	0.00E+00	3.09E+03	3.09E+03
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01
Kr-85	2.2717E-01	29,508.45	29,508.45	0.00E+00	6.70E+03	6.70E+03
Np-237	1.6400E-04	29,508.45	29,508.45	0.00E+00	4.84E+00	4.84E+00
Pa-231	2.8688E-06	29,508.45	29,508.45	0.00E+00	8.47E-02	8.47E-02
Pb-210	4.7312E-08	29,508.45	29,508.45	0.00E+00	1.40E-03	1.40E-03
Pm-147	3.2198E-04	29,508.45	29,508.45	0.00E+00	9.50E+00	9.50E+00
Pu-238	-1.1924E+00	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03
Pu-239	-4.8600E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02
Pu-240	-3.0127E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-241	-1.2917E+02	29,508.45	0.00	3.17E+05	0.00E+00	3.17E+05
Pu-242	-1.1381E-04	29,508.45	0.00	5.34E+00	1.98E+00	5.34E+00
Ra-226	1.0760E-07	29,508.45	29,508.45	0.00E+00	3.18E-03	3.18E-03
Ra-228	6.0160E-07	29,508.45	29,508.45	0.00E+00	1.78E-02	1.78E-02
Ru-106	1.3388E-13	29,508.45	29,508.45	0.00E+00	3.95E-09	3.95E-09
Se-79	1.9179E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00
Sn-126	1.6669E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00
Sr-90	1.3859E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02
Th-229	2.2592E-06	29,508.45	29,508.45	0.00E+00	6.67E-02	6.67E-02
Th-230	7.5955E-06	29,508.45	29,508.45	0.00E+00	2.24E-01	2.24E-01
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03
Tl-208	7.5795E-05	29,508.45	29,508.45	0.00E+00	2.24E+00	2.24E+00
U-232	2.0521E-04	29,508.45	29,508.45	0.00E+00	6.06E+00	6.06E+00
U-233	3.6128E-04	29,508.45	29,508.45	0.00E+00	1.07E+01	1.07E+01
U-234	1.2788E-02	29,508.45	29,508.45	0.00E+00	3.77E+02	3.77E+02
U-235	5.7486E-04	29,508.45	29,508.45	2.67E-02	1.70E+01	1.70E+01
U-236	2.3485E-04	29,508.45	29,508.45	0.00E+00	6.93E+00	6.93E+00
U-238	1.1581E-04	29,508.45	29,508.45	3.32E-03	3.42E+00	3.42E+00
Y-90	1.3861E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05
Other Radionuclides					1.52E+06	1.52E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.501E+16
0.0250	4.939E+15
0.0375	4.176E+15
0.0575	7.889E+15
0.0850	2.644E+15
0.1250	1.871E+15
0.2250	2.288E+15
0.3750	9.906E+14
0.5750	1.639E+16
0.8500	3.590E+14
1.2500	8.800E+15
1.7500	1.058E+13
2.2500	4.573E+10
2.7500	7.572E+10
3.5000	4.286E+07
5.0000	1.811E+07
7.0000	2.063E+06
11.0000	2.353E+05

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	(Worst Case)
Fuel Cladding:	ALUM	SST/Inconel
BOL HM Constituents:	Other	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:		29,508.45
Bounding:		29,508.45

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: 586.76

[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: DOE TEST & EXPERIMENTAL (SST)
SNF ID #: 857
Fuel Units & Descr: 10 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=31.05kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	29,508.45	29,508.45	0.00E+00	7.44E-02	7.44E-02
Am-241	8.6432E+00	29,508.45	29,508.45	0.00E+00	2.55E+05	2.55E+05
Am-242m	1.5728E-02	29,508.45	29,508.45	0.00E+00	4.64E+02	4.64E+02
Am-243	1.6288E-02	29,508.45	29,508.45	0.00E+00	4.81E+02	4.81E+02
C-14	1.2068E-01	29,508.45	29,508.45	0.00E+00	3.56E+03	3.56E+03
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01
Cm-243	6.0144E-04	29,508.45	29,508.45	0.00E+00	1.77E+01	1.77E+01
Cm-244	9.4880E-02	29,508.45	29,508.45	0.00E+00	2.80E+03	2.80E+03
Co-60	3.9052E+00	29,508.45	29,508.45	0.00E+00	1.15E+05	1.15E+05
Cs-134	2.2139E-06	29,508.45	29,508.45	0.00E+00	6.53E-02	6.53E-02
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01
Cs-137	1.4887E+01	29,508.45	29,508.45	0.00E+00	4.39E+05	4.39E+05
Eu-154	3.7342E-01	29,508.45	29,508.45	0.00E+00	1.10E+04	1.10E+04
Eu-155	8.4893E-03	29,508.45	29,508.45	0.00E+00	2.51E+02	2.51E+02
Fe-55	5.3750E-03	29,508.45	29,508.45	0.00E+00	1.59E+02	1.59E+02
H-3	1.0472E-01	29,508.45	29,508.45	0.00E+00	3.09E+03	3.09E+03
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01
Kr-85	2.2717E-01	29,508.45	29,508.45	0.00E+00	6.70E+03	6.70E+03
Np-237	1.6400E-04	29,508.45	29,508.45	0.00E+00	4.84E+00	4.84E+00
Pa-231	2.8688E-06	29,508.45	29,508.45	0.00E+00	8.47E-02	8.47E-02
Pb-210	4.7312E-08	29,508.45	29,508.45	0.00E+00	1.40E-03	1.40E-03
Pm-147	3.2198E-04	29,508.45	29,508.45	0.00E+00	9.50E+00	9.50E+00
Pu-238	-1.1924E+00	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03
Pu-239	-4.8600E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02
Pu-240	-3.0127E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-241	-1.2917E+02	29,508.45	0.00	3.17E+05	0.00E+00	3.17E+05
Pu-242	-1.1381E-04	29,508.45	0.00	5.34E+00	1.98E+00	5.34E+00
Ra-226	1.0760E-07	29,508.45	29,508.45	0.00E+00	3.18E-03	3.18E-03
Ra-228	6.0160E-07	29,508.45	29,508.45	0.00E+00	1.78E-02	1.78E-02
Ru-106	1.3388E-13	29,508.45	29,508.45	0.00E+00	3.95E-09	3.95E-09
Se-79	1.9179E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00
Sn-126	1.6669E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00
Sr-90	1.3859E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02
Th-229	2.2592E-06	29,508.45	29,508.45	0.00E+00	6.67E-02	6.67E-02
Th-230	7.5955E-06	29,508.45	29,508.45	0.00E+00	2.24E-01	2.24E-01
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03
Tl-208	7.5795E-05	29,508.45	29,508.45	0.00E+00	2.24E+00	2.24E+00
U-232	2.0521E-04	29,508.45	29,508.45	0.00E+00	6.06E+00	6.06E+00
U-233	3.6128E-04	29,508.45	29,508.45	0.00E+00	1.07E+01	1.07E+01
U-234	1.2788E-02	29,508.45	29,508.45	0.00E+00	3.77E+02	3.77E+02
U-235	5.7486E-04	29,508.45	29,508.45	2.67E-02	1.70E+01	1.70E+01
U-236	2.3485E-04	29,508.45	29,508.45	0.00E+00	6.93E+00	6.93E+00
U-238	1.1581E-04	29,508.45	29,508.45	3.32E-03	3.42E+00	3.42E+00
Y-90	1.3861E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05
Other Radionuclides					1.52E+06	1.52E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.501E+16
0.0250	4.939E+15
0.0375	4.176E+15
0.0575	7.889E+15
0.0850	2.644E+15
0.1250	1.871E+15
0.2250	2.288E+15
0.3750	9.906E+14
0.5750	1.639E+16
0.8500	3.590E+14
1.2500	8.800E+15
1.7500	1.058E+13
2.2500	4.573E+10
2.7500	7.872E+10
3.5000	4.286E+07
5.0000	1.811E+07
7.0000	2.063E+06
11.0000	2.353E+05

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	(Worst Case)
Fuel Cladding:	SST	SST/Inconel
BOL HM Constituents:	Other	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:		29,508.45
Bounding:		29,508.45

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: 598.76

[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: DOE TEST & EXPERIMENTAL (ZIRC)
SNF ID #: 858
Fuel Units & Descr: 10 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=31.05kg
ROD Storage Site: INEEL

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

Estimated Canister usage:
16"x10'
0.08

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.5200E-06	29,508.45	29,508.45	0.00E+00	7.44E-02	7.44E-02
Am-241	8.6432E+00	29,508.45	29,508.45	0.00E+00	2.55E+05	2.55E+05
Am-242m	1.5728E-02	29,508.45	29,508.45	0.00E+00	4.64E+02	4.64E+02
Am-243	1.6288E-02	29,508.45	29,508.45	0.00E+00	4.81E+02	4.81E+02
C-14	1.2068E-01	29,508.45	29,508.45	0.00E+00	3.56E+03	3.56E+03
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01
Cm-243	6.0144E-04	29,508.45	29,508.45	0.00E+00	1.77E+01	1.77E+01
Cm-244	9.4880E-02	29,508.45	29,508.45	0.00E+00	2.80E+03	2.80E+03
Co-60	3.9052E+00	29,508.45	29,508.45	0.00E+00	1.15E+05	1.15E+05
Cs-134	2.2139E-06	29,508.45	29,508.45	0.00E+00	6.53E-02	6.53E-02
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01
Cs-137	1.4887E+01	29,508.45	29,508.45	0.00E+00	4.39E+05	4.39E+05
Eu-154	3.7342E-01	29,508.45	29,508.45	0.00E+00	1.10E+04	1.10E+04
Eu-155	8.4893E-03	29,508.45	29,508.45	0.00E+00	2.51E+02	2.51E+02
Fe-55	5.3750E-03	29,508.45	29,508.45	0.00E+00	1.59E+02	1.59E+02
H-3	1.0472E-01	29,508.45	29,508.45	0.00E+00	3.09E+03	3.09E+03
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01
Kr-85	2.2717E-01	29,508.45	29,508.45	0.00E+00	6.70E+03	6.70E+03
Np-237	1.6400E-04	29,508.45	29,508.45	0.00E+00	4.84E+00	4.84E+00
Pa-231	2.8688E-06	29,508.45	29,508.45	0.00E+00	8.47E-02	8.47E-02
Pb-210	4.7312E-08	29,508.45	29,508.45	0.00E+00	1.40E-03	1.40E-03
Pm-147	3.2198E-04	29,508.45	29,508.45	0.00E+00	9.50E+00	9.50E+00
Pu-238	-1.1924E+00	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03
Pu-239	-4.8600E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02
Pu-240	-3.0127E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-241	-1.2917E+02	29,508.45	0.00	3.17E+05	0.00E+00	3.17E+05
Pu-242	-1.1381E-04	29,508.45	0.00	5.34E+00	1.98E+00	5.34E+00
Ra-226	1.0760E-07	29,508.45	29,508.45	0.00E+00	3.18E-03	3.18E-03
Ra-228	6.0160E-07	29,508.45	29,508.45	0.00E+00	1.78E-02	1.78E-02
Ru-106	1.3388E-13	29,508.45	29,508.45	0.00E+00	3.95E-09	3.95E-09
Se-79	1.9179E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00
Sn-126	1.6669E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00
Sr-90	1.3859E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02
Th-229	2.2592E-06	29,508.45	29,508.45	0.00E+00	6.67E-02	6.67E-02
Th-230	7.5955E-06	29,508.45	29,508.45	0.00E+00	2.24E-01	2.24E-01
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03
Tl-208	7.5795E-05	29,508.45	29,508.45	0.00E+00	2.24E+00	2.24E+00
U-232	2.0521E-04	29,508.45	29,508.45	0.00E+00	6.06E+00	6.06E+00
U-233	3.6128E-04	29,508.45	29,508.45	0.00E+00	1.07E+01	1.07E+01
U-234	1.2788E-02	29,508.45	29,508.45	0.00E+00	3.77E+02	3.77E+02
U-235	5.7486E-04	29,508.45	29,508.45	2.67E-02	1.70E+01	1.70E+01
U-236	2.3485E-04	29,508.45	29,508.45	0.00E+00	6.93E+00	6.93E+00
U-238	1.1581E-04	29,508.45	29,508.45	3.32E-03	3.42E+00	3.42E+00
Y-90	1.3861E+01	29,508.45	29,508.45	0.00E+00	4.09E+05	4.09E+05
Other Radionuclides					1.52E+06	1.52E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.501E+16
0.0250	4.939E+15
0.0375	4.176E+15
0.0575	7.869E+15
0.0850	2.644E+15
0.1250	1.871E+15
0.2250	2.288E+15
0.3750	9.906E+14
0.5750	1.639E+16
0.8500	3.590E+14
1.2500	8.800E+15
1.7500	1.058E+13
2.2500	4.573E+10
2.7500	7.872E+10
3.5000	4.286E+07
5.0000	1.811E+07
7.0000	2.063E+06
11.0000	2.353E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.88E+04	1.82E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Other	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:		29,508.45
Bounding:		29,508.45

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: 586.76

[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: DRCT
SNF ID #: 701
Fuel Units & Descr: 2856 - ROD
Heavy Metal Mass: BOL=6338.892kg; EOL=6144.97kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x15' 3.50

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	185,919.70	224,650.33	0.00E+00	1.63E-04	1.97E-04
Am-241	1.4352E-01	185,919.70	224,650.33	0.00E+00	2.67E+04	3.22E+04
Am-242m	2.8698E-04	185,919.70	224,650.33	0.00E+00	5.34E+01	6.45E+01
Am-243	6.2565E-04	185,919.70	224,650.33	0.00E+00	1.16E+02	1.41E+02
C-14	4.7901E-05	185,919.70	224,650.33	0.00E+00	8.91E+00	1.08E+01
Cl-36	8.0297E-07	185,919.70	224,650.33	0.00E+00	1.49E-01	1.80E-01
Cm-243	2.5081E-04	185,919.70	224,650.33	0.00E+00	4.66E+01	5.63E+01
Cm-244	4.9015E-02	185,919.70	224,650.33	0.00E+00	9.11E+03	1.10E+04
Co-60	2.5581E-03	185,919.70	224,650.33	0.00E+00	4.76E+02	5.75E+02
Cs-134	4.0536E-05	185,919.70	224,650.33	0.00E+00	7.54E+00	9.11E+00
Cs-135	1.4433E-05	185,919.70	224,650.33	0.00E+00	2.68E+00	3.24E+00
Cs-137	1.3979E+00	185,919.70	224,650.33	0.00E+00	2.60E+05	3.14E+05
Eu-154	2.0203E-02	185,919.70	224,650.33	0.00E+00	3.76E+03	4.54E+03
Eu-155	1.7684E-03	185,919.70	224,650.33	0.00E+00	3.29E+02	3.97E+02
Fe-55	4.3136E-05	185,919.70	224,650.33	0.00E+00	8.02E+00	9.69E+00
H-3	2.0769E-02	185,919.70	224,650.33	0.00E+00	3.86E+03	4.67E+03
I-129	9.8288E-07	185,919.70	224,650.33	0.00E+00	1.83E-01	2.21E-01
Kr-85	2.8214E-02	185,919.70	224,650.33	0.00E+00	5.25E+03	6.34E+03
Np-237	1.1218E-05	185,919.70	224,650.33	0.00E+00	2.09E+00	2.52E+00
Pa-231	1.3036E-09	185,919.70	224,650.33	0.00E+00	2.42E-04	2.93E-04
Pb-210	8.5078E-11	185,919.70	224,650.33	0.00E+00	1.58E-05	1.91E-05
Pm-147	3.6531E-04	185,919.70	224,650.33	0.00E+00	6.79E+01	8.21E+01
Pu-238	7.4564E-02	185,919.70	224,650.33	0.00E+00	1.39E+04	1.68E+04
Pu-239	1.1623E-02	185,919.70	224,650.33	0.00E+00	2.16E+03	2.61E+03
Pu-240	1.5132E-02	185,919.70	224,650.33	0.00E+00	2.81E+03	3.40E+03
Pu-241	9.0036E-01	185,919.70	224,650.33	0.00E+00	1.67E+05	2.02E+05
Pu-242	6.4260E-05	185,919.70	224,650.33	0.00E+00	1.19E+01	1.44E+01
Ra-226	2.2804E-10	185,919.70	224,650.33	0.00E+00	4.24E-05	5.12E-05
Ra-228	5.2713E-12	185,919.70	224,650.33	0.00E+00	9.80E-07	1.18E-06
Ru-106	6.1160E-10	185,919.70	224,650.33	0.00E+00	1.14E-04	1.37E-04
Se-79	1.2377E-05	185,919.70	224,650.33	0.00E+00	2.30E+00	2.78E+00
Sn-126	2.5210E-05	185,919.70	224,650.33	0.00E+00	4.69E+00	5.66E+00
Sr-90	9.1667E-01	185,919.70	224,650.33	0.00E+00	1.70E+05	2.06E+05
Tc-99	3.9357E-04	185,919.70	224,650.33	0.00E+00	7.32E+01	8.84E+01
Th-229	1.2057E-10	185,919.70	224,650.33	0.00E+00	2.24E-05	2.71E-05
Th-230	2.1043E-08	185,919.70	224,650.33	0.00E+00	3.91E-03	4.73E-03
Th-232	5.2972E-12	185,919.70	224,650.33	0.00E+00	9.85E-07	1.19E-06
Tl-208	1.7474E-07	185,919.70	224,650.33	0.00E+00	3.25E-02	3.93E-02
U-232	4.7368E-07	185,919.70	224,650.33	0.00E+00	8.81E-02	1.06E-01
U-233	2.5097E-08	185,919.70	224,650.33	0.00E+00	4.67E-03	5.64E-03
U-234	5.0000E-05	185,919.70	224,650.33	0.00E+00	9.30E+00	1.12E+01
U-235	-1.4489E-06	185,919.70	0.00	3.60E-01	9.11E-02	3.60E-01
U-236	7.5824E-06	185,919.70	224,650.33	0.00E+00	1.41E+00	1.70E+00
U-238	-2.6129E-07	185,919.70	0.00	2.07E+00	2.03E+00	2.07E+00
Y-90	9.1699E-01	185,919.70	224,650.33	0.00E+00	1.70E+05	2.06E+05
Other Radionuclides					2.50E+05	3.02E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.209E+16
0.0250	2.437E+15
0.0375	2.325E+15
0.0575	2.686E+15
0.0850	1.353E+15
0.1250	9.385E+14
0.2250	1.160E+15
0.3750	4.987E+14
0.5750	1.160E+16
0.8500	1.605E+14
1.2500	1.576E+14
1.7500	4.720E+12
2.2500	7.601E+08
2.7500	1.557E+09
3.5000	1.603E+08
5.0000	6.856E+07
7.0000	7.902E+06
11.0000	9.075E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.28E+03	5.17E+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 %:	2.631414612	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.99
Bounding:	1.01	1.64

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: DRCT
SNF ID #: 756
Fuel Units & Descr: 6936 - ROD
Heavy Metal Mass: BOL=15512.364kg; EOL=15006.036kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x15' 8.50

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	481,493.98	962,987.96	0.00E+00	4.23E-04	8.45E-04
Am-241	1.4352E-01	481,493.98	962,987.96	0.00E+00	6.91E+04	1.38E+05
Am-242m	2.8698E-04	481,493.98	962,987.96	0.00E+00	1.38E+02	2.76E+02
Am-243	6.2565E-04	481,493.98	962,987.96	0.00E+00	3.01E+02	6.02E+02
C-14	4.7901E-05	481,493.98	962,987.96	0.00E+00	2.31E+01	4.61E+01
Cl-36	8.0297E-07	481,493.98	962,987.96	0.00E+00	3.87E-01	7.73E-01
Cm-243	2.5081E-04	481,493.98	962,987.96	0.00E+00	1.21E+02	2.42E+02
Cm-244	4.9015E-02	481,493.98	962,987.96	0.00E+00	2.36E+04	4.72E+04
Co-60	2.5581E-03	481,493.98	962,987.96	0.00E+00	1.23E+03	2.46E+03
Cs-134	4.0536E-05	481,493.98	962,987.96	0.00E+00	1.95E+01	3.90E+01
Cs-135	1.4433E-05	481,493.98	962,987.96	0.00E+00	6.95E+00	1.39E+01
Cs-137	1.3979E+00	481,493.98	962,987.96	0.00E+00	6.73E+05	1.35E+06
Eu-154	2.0203E-02	481,493.98	962,987.96	0.00E+00	9.73E+03	1.95E+04
Eu-155	1.7684E-03	481,493.98	962,987.96	0.00E+00	8.51E+02	1.70E+03
Fe-55	4.3136E-05	481,493.98	962,987.96	0.00E+00	2.08E+01	4.15E+01
H-3	2.0769E-02	481,493.98	962,987.96	0.00E+00	1.00E+04	2.00E+04
I-129	9.8288E-07	481,493.98	962,987.96	0.00E+00	4.73E-01	9.47E-01
Kr-85	2.8214E-02	481,493.98	962,987.96	0.00E+00	1.36E+04	2.72E+04
Np-237	1.1218E-05	481,493.98	962,987.96	0.00E+00	5.40E+00	1.08E+01
Pa-231	1.3036E-09	481,493.98	962,987.96	0.00E+00	6.28E-04	1.26E-03
Pb-210	8.5078E-11	481,493.98	962,987.96	0.00E+00	4.10E-05	8.19E-05
Pm-147	3.6531E-04	481,493.98	962,987.96	0.00E+00	1.76E+02	3.52E+02
Pu-238	7.4564E-02	481,493.98	962,987.96	0.00E+00	3.59E+04	7.18E+04
Pu-239	1.1623E-02	481,493.98	962,987.96	0.00E+00	5.60E+03	1.12E+04
Pu-240	1.5132E-02	481,493.98	962,987.96	0.00E+00	7.29E+03	1.46E+04
Pu-241	9.0036E-01	481,493.98	962,987.96	0.00E+00	4.34E+05	8.67E+05
Pu-242	6.4260E-05	481,493.98	962,987.96	0.00E+00	3.09E+01	6.19E+01
Ra-226	2.2804E-10	481,493.98	962,987.96	0.00E+00	1.10E-04	2.20E-04
Ra-228	5.2713E-12	481,493.98	962,987.96	0.00E+00	2.54E-06	5.08E-06
Ru-106	6.1160E-10	481,493.98	962,987.96	0.00E+00	2.94E-04	5.89E-04
Se-79	1.2377E-05	481,493.98	962,987.96	0.00E+00	5.96E+00	1.19E+01
Sn-126	2.5210E-05	481,493.98	962,987.96	0.00E+00	1.21E+01	2.43E+01
Sr-90	9.1667E-01	481,493.98	962,987.96	0.00E+00	4.41E+05	8.83E+05
Tc-99	3.9357E-04	481,493.98	962,987.96	0.00E+00	1.90E+02	3.79E+02
Th-229	1.2057E-10	481,493.98	962,987.96	0.00E+00	5.81E-05	1.16E-04
Th-230	2.1043E-08	481,493.98	962,987.96	0.00E+00	1.01E-02	2.03E-02
Th-232	5.2972E-12	481,493.98	962,987.96	0.00E+00	2.55E-06	5.10E-06
Tl-208	1.7474E-07	481,493.98	962,987.96	0.00E+00	8.41E-02	1.68E-01
U-232	4.7368E-07	481,493.98	962,987.96	0.00E+00	2.28E-01	4.56E-01
U-233	2.5097E-08	481,493.98	962,987.96	0.00E+00	1.21E-02	2.42E-02
U-234	5.0000E-05	481,493.98	962,987.96	0.00E+00	2.41E+01	4.81E+01
U-235	-1.4489E-06	481,493.98	0.00	9.81E-01	2.83E-01	9.81E-01
U-236	7.5824E-06	481,493.98	962,987.96	0.00E+00	3.65E+00	7.30E+00
U-238	-2.6129E-07	481,493.98	0.00	5.06E+00	4.94E+00	5.06E+00
Y-90	9.1699E-01	481,493.98	962,987.96	0.00E+00	4.42E+05	8.83E+05
Other Radionuclides					6.46E+05	1.29E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.181E+16
0.0250	1.045E+16
0.0375	9.965E+15
0.0575	1.151E+16
0.0850	5.798E+15
0.1250	4.023E+15
0.2250	4.971E+15
0.3750	2.138E+15
0.5750	4.972E+16
0.8500	6.879E+14
1.2500	6.757E+14
1.7500	2.023E+13
2.2500	3.258E+09
2.7500	6.675E+09
3.5000	6.873E+08
5.0000	2.939E+08
7.0000	3.387E+07
11.0000	3.890E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.11E+04	2.22E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.925317534	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	454,977.64	481,493.98	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	549,758.18	962,987.96	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.89	1.06
Bounding:	1.77	1.75

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: DRESDEN I (E00161)
SNF ID #: 928
Fuel Units & Descr: 1 - 6 X 6 ROD ARRAY
Heavy Metal Mass: BOL=111.5kg; EOL=109.853kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%. U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	1,566.22	3,132.44	0.00E+00	1.68E-06	3.36E-06
Am-241	1.4751E-01	1,566.22	3,132.44	0.00E+00	2.31E+02	4.62E+02
Am-242m	2.6809E-04	1,566.22	3,132.44	0.00E+00	4.20E-01	8.40E-01
Am-243	6.2484E-04	1,566.22	3,132.44	0.00E+00	9.79E-01	1.96E+00
C-14	4.7820E-05	1,566.22	3,132.44	0.00E+00	7.49E-02	1.50E-01
Cl-36	8.0297E-07	1,566.22	3,132.44	0.00E+00	1.26E-03	2.52E-03
Cm-243	1.7426E-04	1,566.22	3,132.44	0.00E+00	2.73E-01	5.46E-01
Cm-244	2.7616E-02	1,566.22	3,132.44	0.00E+00	4.33E+01	8.65E+01
Co-60	3.5610E-04	1,566.22	3,132.44	0.00E+00	5.58E-01	1.12E+00
Cs-134	2.6260E-07	1,566.22	3,132.44	0.00E+00	4.11E-04	8.23E-04
Cs-135	1.4433E-05	1,566.22	3,132.44	0.00E+00	2.26E-02	4.52E-02
Cs-137	9.8870E-01	1,566.22	3,132.44	0.00E+00	1.55E+03	3.10E+03
Eu-154	6.0320E-03	1,566.22	3,132.44	0.00E+00	9.45E+00	1.89E+01
Eu-155	2.1770E-04	1,566.22	3,132.44	0.00E+00	3.41E-01	6.82E-01
Fe-55	7.9296E-07	1,566.22	3,132.44	0.00E+00	1.24E-03	2.48E-03
H-3	8.9486E-03	1,566.22	3,132.44	0.00E+00	1.40E+01	2.80E+01
I-129	9.8288E-07	1,566.22	3,132.44	0.00E+00	1.54E-03	3.08E-03
Kr-85	1.0707E-02	1,566.22	3,132.44	0.00E+00	1.68E+01	3.35E+01
Np-237	1.1927E-05	1,566.22	3,132.44	0.00E+00	1.87E-02	3.74E-02
Pa-231	1.4703E-09	1,566.22	3,132.44	0.00E+00	2.30E-06	4.61E-06
Pb-210	1.6828E-10	1,566.22	3,132.44	0.00E+00	2.64E-07	5.27E-07
Pm-147	6.9606E-06	1,566.22	3,132.44	0.00E+00	1.09E-02	2.18E-02
Pu-238	6.6263E-02	1,566.22	3,132.44	0.00E+00	1.04E+02	2.08E+02
Pu-239	1.1618E-02	1,566.22	3,132.44	0.00E+00	1.82E+01	3.64E+01
Pu-240	1.5142E-02	1,566.22	3,132.44	0.00E+00	2.37E+01	4.74E+01
Pu-241	4.3766E-01	1,566.22	3,132.44	0.00E+00	6.85E+02	1.37E+03
Pu-242	6.4260E-05	1,566.22	3,132.44	0.00E+00	1.01E-01	2.01E-01
Ra-226	3.8501E-10	1,566.22	3,132.44	0.00E+00	6.03E-07	1.21E-06
Ra-228	5.2955E-12	1,566.22	3,132.44	0.00E+00	8.29E-09	1.66E-08
Ru-106	2.0413E-14	1,566.22	3,132.44	0.00E+00	3.20E-11	6.39E-11
Se-79	1.2376E-05	1,566.22	3,132.44	0.00E+00	1.94E-02	3.88E-02
Sn-126	2.5210E-05	1,566.22	3,132.44	0.00E+00	3.95E-02	7.90E-02
Sr-90	6.4163E-01	1,566.22	3,132.44	0.00E+00	1.00E+03	2.01E+03
Tc-99	3.9357E-04	1,566.22	3,132.44	0.00E+00	6.16E-01	1.23E+00
Th-229	1.5644E-10	1,566.22	3,132.44	0.00E+00	2.45E-07	4.90E-07
Th-230	2.7972E-08	1,566.22	3,132.44	0.00E+00	4.38E-05	8.76E-05
Th-232	5.3036E-12	1,566.22	3,132.44	0.00E+00	8.31E-09	1.66E-08
Tl-208	1.5136E-07	1,566.22	3,132.44	0.00E+00	2.37E-04	4.74E-04
U-232	4.1005E-07	1,566.22	3,132.44	0.00E+00	6.42E-04	1.28E-03
U-233	2.5856E-08	1,566.22	3,132.44	0.00E+00	4.05E-05	8.10E-05
U-234	5.2665E-05	1,566.22	3,132.44	0.00E+00	8.25E-02	1.65E-01
U-235	-1.4487E-06	1,566.22	0.00	3.62E-03	1.35E-03	3.62E-03
U-236	7.5888E-06	1,566.22	3,132.44	0.00E+00	1.19E-02	2.38E-02
U-238	-2.6129E-07	1,566.22	0.00	3.69E-02	3.65E-02	3.69E-02
Y-90	6.4180E-01	1,566.22	3,132.44	0.00E+00	1.01E+03	2.01E+03
Other Radionuclides					1.49E+03	2.98E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.192E+14
0.0250	2.389E+13
0.0375	2.251E+13
0.0575	2.816E+13
0.0850	1.316E+13
0.1250	8.755E+12
0.2250	1.124E+13
0.3750	4.852E+12
0.5750	1.143E+14
0.8500	1.116E+12
1.2500	7.100E+11
1.7500	3.122E+10
2.2500	5.131E+06
2.7500	1.808E+07
3.5000	1.290E+06
5.0000	5.514E+05
7.0000	6.352E+04
11.0000	7.294E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.83E+01	5.67E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.50044843	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	1.02
Bounding:	0.80	

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: 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

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	1,489.19	2,978.38	0.00E+00	1.60E-06	3.20E-06
Am-241	1.4751E-01	1,489.19	2,978.38	0.00E+00	2.20E+02	4.39E+02
Am-242m	2.6809E-04	1,489.19	2,978.38	0.00E+00	3.99E-01	7.98E-01
Am-243	6.2484E-04	1,489.19	2,978.38	0.00E+00	9.31E-01	1.86E+00
C-14	4.7820E-05	1,489.19	2,978.38	0.00E+00	7.12E-02	1.42E-01
Cl-36	8.0297E-07	1,489.19	2,978.38	0.00E+00	1.20E-03	2.39E-03
Cm-243	1.7426E-04	1,489.19	2,978.38	0.00E+00	2.60E-01	5.19E-01
Cm-244	2.7616E-02	1,489.19	2,978.38	0.00E+00	4.11E+01	8.23E+01
Co-60	3.5610E-04	1,489.19	2,978.38	0.00E+00	5.30E-01	1.06E+00
Cs-134	2.6260E-07	1,489.19	2,978.38	0.00E+00	3.91E-04	7.82E-04
Cs-135	1.4433E-05	1,489.19	2,978.38	0.00E+00	2.15E-02	4.30E-02
Cs-137	9.8870E-01	1,489.19	2,978.38	0.00E+00	1.47E+03	2.94E+03
Eu-154	6.0320E-03	1,489.19	2,978.38	0.00E+00	8.98E+00	1.80E+01
Eu-155	2.1770E-04	1,489.19	2,978.38	0.00E+00	3.24E-01	6.48E-01
Fe-55	7.9296E-07	1,489.19	2,978.38	0.00E+00	1.18E-03	2.36E-03
H-3	8.9486E-03	1,489.19	2,978.38	0.00E+00	1.33E+01	2.67E+01
I-129	9.8288E-07	1,489.19	2,978.38	0.00E+00	1.46E-03	2.93E-03
Kr-85	1.0707E-02	1,489.19	2,978.38	0.00E+00	1.59E+01	3.19E+01
Np-237	1.1927E-05	1,489.19	2,978.38	0.00E+00	1.78E-02	3.55E-02
Pa-231	1.4703E-09	1,489.19	2,978.38	0.00E+00	2.19E-06	4.38E-06
Pb-210	1.6828E-10	1,489.19	2,978.38	0.00E+00	2.51E-07	5.01E-07
Pm-147	6.9606E-06	1,489.19	2,978.38	0.00E+00	1.04E-02	2.07E-02
Pu-238	6.6263E-02	1,489.19	2,978.38	0.00E+00	9.87E+01	1.97E+02
Pu-239	1.1618E-02	1,489.19	2,978.38	0.00E+00	1.73E+01	3.46E+01
Pu-240	1.5142E-02	1,489.19	2,978.38	0.00E+00	2.25E+01	4.51E+01
Pu-241	4.3766E-01	1,489.19	2,978.38	0.00E+00	6.52E+02	1.30E+03
Pu-242	6.4260E-05	1,489.19	2,978.38	0.00E+00	9.57E-02	1.91E-01
Ra-226	3.8501E-10	1,489.19	2,978.38	0.00E+00	5.73E-07	1.15E-06
Ra-228	5.2955E-12	1,489.19	2,978.38	0.00E+00	7.89E-09	1.58E-08
Ru-106	2.0413E-14	1,489.19	2,978.38	0.00E+00	3.04E-11	6.08E-11
Se-79	1.2376E-05	1,489.19	2,978.38	0.00E+00	1.84E-02	3.69E-02
Sn-126	2.5210E-05	1,489.19	2,978.38	0.00E+00	3.75E-02	7.51E-02
Sr-90	6.4163E-01	1,489.19	2,978.38	0.00E+00	9.56E+02	1.91E+03
Tc-99	3.9357E-04	1,489.19	2,978.38	0.00E+00	5.86E-01	1.17E+00
Th-229	1.5644E-10	1,489.19	2,978.38	0.00E+00	2.33E-07	4.66E-07
Th-230	2.7972E-08	1,489.19	2,978.38	0.00E+00	4.17E-05	8.33E-05
Th-232	5.3036E-12	1,489.19	2,978.38	0.00E+00	7.90E-09	1.58E-08
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.133E+14
0.0250	2.271E+13
0.0375	2.140E+13
0.0575	2.678E+13
0.0850	1.251E+13
0.1250	8.325E+12
0.2250	1.068E+13
0.3750	4.614E+12
0.5750	1.066E+14
0.8500	1.061E+12
1.2500	6.751E+11
1.7500	2.968E+10
2.2500	4.878E+06
2.7500	1.719E+07
3.5000	1.227E+06
5.0000	5.243E+05
7.0000	6.040E+04
11.0000	6.935E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.69E+01	6.39E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.5005013	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

[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: DRESII, HBR, BR-3, BRP, TMI
SNF ID #: 50
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=19.608kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1979
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	18,646.28	18,646.28	0.00E+00	2.00E-05	2.00E-05
Am-241	1.4751E-01	18,646.28	18,646.28	0.00E+00	2.75E+03	2.75E+03
Am-242m	2.6809E-04	18,646.28	18,646.28	0.00E+00	5.00E+00	5.00E+00
Am-243	6.2484E-04	18,646.28	18,646.28	0.00E+00	1.17E+01	1.17E+01
C-14	4.7820E-05	18,646.28	18,646.28	0.00E+00	8.92E-01	8.92E-01
Cl-36	8.0297E-07	18,646.28	18,646.28	0.00E+00	1.50E-02	1.50E-02
Cm-243	1.7426E-04	18,646.28	18,646.28	0.00E+00	3.25E+00	3.25E+00
Cm-244	2.7616E-02	18,646.28	18,646.28	0.00E+00	5.15E+02	5.15E+02
Co-60	3.5610E-04	18,646.28	18,646.28	0.00E+00	6.64E+00	6.64E+00
Cs-134	2.6260E-07	18,646.28	18,646.28	0.00E+00	4.90E-03	4.90E-03
Cs-135	1.4433E-05	18,646.28	18,646.28	0.00E+00	2.69E-01	2.69E-01
Cs-137	9.8870E-01	18,646.28	18,646.28	0.00E+00	1.84E+04	1.84E+04
Eu-154	6.0320E-03	18,646.28	18,646.28	0.00E+00	1.12E+02	1.12E+02
Eu-155	2.1770E-04	18,646.28	18,646.28	0.00E+00	4.06E+00	4.06E+00
Fe-55	7.9296E-07	18,646.28	18,646.28	0.00E+00	1.48E-02	1.48E-02
H-3	8.9486E-03	18,646.28	18,646.28	0.00E+00	1.67E+02	1.67E+02
I-129	9.8288E-07	18,646.28	18,646.28	0.00E+00	1.83E-02	1.83E-02
Kr-85	1.0707E-02	18,646.28	18,646.28	0.00E+00	2.00E+02	2.00E+02
Np-237	1.1927E-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-05	2.74E-05
Pb-210	1.6828E-10	18,646.28	18,646.28	0.00E+00	3.14E-06	3.14E-06
Pm-147	6.9606E-06	18,646.28	18,646.28	0.00E+00	1.30E-01	1.30E-01
Pu-238	6.6263E-02	18,646.28	18,646.28	0.00E+00	1.24E+03	1.24E+03
Pu-239	1.1618E-02	18,646.28	18,646.28	0.00E+00	2.17E+02	2.17E+02
Pu-240	1.5142E-02	18,646.28	18,646.28	0.00E+00	2.82E+02	2.82E+02
Pu-241	4.3766E-01	18,646.28	18,646.28	0.00E+00	8.16E+03	8.16E+03
Pu-242	6.4260E-05	18,646.28	18,646.28	0.00E+00	1.20E+00	1.20E+00
Ra-226	3.8501E-10	18,646.28	18,646.28	0.00E+00	7.18E-06	7.18E-06
Ra-228	5.2955E-12	18,646.28	18,646.28	0.00E+00	9.87E-08	9.87E-08
Ru-106	2.0413E-14	18,646.28	18,646.28	0.00E+00	3.81E-10	3.81E-10
Se-79	1.2376E-05	18,646.28	18,646.28	0.00E+00	2.31E-01	2.31E-01
Sn-126	2.5210E-05	18,646.28	18,646.28	0.00E+00	4.70E-01	4.70E-01
Sr-90	6.4163E-01	18,646.28	18,646.28	0.00E+00	1.20E+04	1.20E+04
Tc-99	3.9357E-04	18,646.28	18,646.28	0.00E+00	7.34E+00	7.34E+00
Th-229	1.5644E-10	18,646.28	18,646.28	0.00E+00	2.92E-06	2.92E-06
Th-230	2.7972E-08	18,646.28	18,646.28	0.00E+00	5.22E-04	5.22E-04
Th-232	5.3036E-12	18,646.28	18,646.28	0.00E+00	9.89E-08	9.89E-08
Tl-208	1.5136E-07	18,646.28	18,646.28	0.00E+00	2.82E-03	2.82E-03
U-232	4.1005E-07	18,646.28	18,646.28	0.00E+00	7.65E-03	7.65E-03
U-233	2.5856E-08	18,646.28	18,646.28	0.00E+00	4.82E-04	4.82E-04
U-234	5.2665E-05	18,646.28	18,646.28	0.00E+00	9.82E-01	9.82E-01
U-235	-1.4487E-06	18,646.28	0.00	2.71E-03	0.00E+00	2.71E-03
U-236	7.5888E-06	18,646.28	18,646.28	0.00E+00	1.42E-01	1.42E-01
U-238	-2.6129E-07	18,646.28	0.00	1.28E-02	7.88E-03	1.28E-02
Y-90	6.4180E-01	18,646.28	18,646.28	0.00E+00	1.20E+04	1.20E+04
Other Radionuclides					1.78E+04	1.78E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.095E+14
0.0250	1.422E+14
0.0375	1.340E+14
0.0575	1.677E+14
0.0850	7.834E+13
0.1250	5.212E+13
0.2250	6.688E+13
0.3750	2.888E+13
0.5750	6.802E+14
0.8500	6.642E+12
1.2500	4.226E+12
1.7500	1.858E+11
2.2500	3.054E+07
2.7500	1.076E+08
3.5000	7.679E+06
5.0000	3.282E+06
7.0000	3.781E+05
11.0000	4.341E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.37E+02	3.37E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	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:		18,646.28
Bounding:		18,646.28

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:	13.58	
Bounding:	13.58	

Estimated EOL HM/Given EOL HM: 1.58

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

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	833.80	1,563.38	0.00E+00	5.15E-09	9.67E-09
Am-241	1.1066E-01	833.80	1,563.38	2.01E+01	1.12E+02	1.93E+02
Am-242m	1.9247E-03	833.80	1,563.38	0.00E+00	1.60E+00	3.01E+00
Am-243	1.0740E-04	833.80	1,563.38	0.00E+00	8.96E-02	1.68E-01
C-14	2.6042E-05	833.80	1,563.38	0.00E+00	2.17E-02	4.07E-02
Cl-36	3.4243E-10	833.80	1,563.38	0.00E+00	2.86E-07	5.35E-07
Cm-243	4.0629E-04	833.80	1,563.38	0.00E+00	3.39E-01	6.35E-01
Cm-244	1.6024E-03	833.80	1,563.38	0.00E+00	1.34E+00	2.51E+00
Co-60	3.4275E-03	833.80	1,563.38	0.00E+00	2.86E+00	5.36E+00
Cs-134	1.5566E-03	833.80	1,563.38	0.00E+00	1.30E+00	2.43E+00
Cs-135	4.7693E-05	833.80	1,563.38	0.00E+00	3.98E-02	7.46E-02
Cs-137	1.4007E+00	833.80	1,563.38	0.00E+00	1.17E+03	2.19E+03
Eu-154	1.6184E-02	833.80	1,563.38	0.00E+00	1.35E+01	2.53E+01
Eu-155	1.3774E-02	833.80	1,563.38	0.00E+00	1.15E+01	2.15E+01
Fe-55	3.8028E-04	833.80	1,563.38	0.00E+00	3.17E-01	5.95E-01
H-3	3.8454E-03	833.80	1,563.38	0.00E+00	3.21E+00	6.01E+00
I-129	1.2891E-06	833.80	1,563.38	0.00E+00	1.07E-03	2.02E-03
Kr-85	2.7848E-02	833.80	1,563.38	0.00E+00	2.32E+01	4.35E+01
Np-237	3.7516E-06	833.80	1,563.38	0.00E+00	3.13E-03	5.87E-03
Pa-231	1.2488E-11	833.80	1,563.38	0.00E+00	1.04E-08	1.95E-08
Pb-210	2.4206E-12	833.80	1,563.38	0.00E+00	2.02E-09	3.78E-09
Pm-147	1.5671E-02	833.80	1,563.38	0.00E+00	1.31E+01	2.45E+01
Pu-238	1.4877E-02	833.80	1,563.38	0.00E+00	1.24E+01	2.33E+01
Pu-239	-3.5520E-02	833.80	0.00	1.65E+02	1.35E+02	1.65E+02
Pu-240	2.0690E-02	833.80	1,563.38	8.38E+01	1.01E+02	1.16E+02
Pu-241	-1.4799E+00	833.80	0.00	3.76E+03	2.53E+03	3.76E+03
Pu-242	1.1252E-05	833.80	1,563.38	2.24E-02	3.17E-02	3.99E-02
Ra-226	7.8524E-12	833.80	1,563.38	0.00E+00	6.55E-09	1.23E-08
Ra-228	2.4086E-16	833.80	1,563.38	0.00E+00	2.01E-13	3.77E-13
Ru-106	1.5066E-05	833.80	1,563.38	0.00E+00	1.26E-02	2.36E-02
Se-79	1.0127E-05	833.80	1,563.38	0.00E+00	8.44E-03	1.58E-02
Sn-126	4.3902E-05	833.80	1,563.38	0.00E+00	3.66E-02	6.86E-02
Sr-90	5.0088E-01	833.80	1,563.38	0.00E+00	4.18E+02	7.83E+02
Tc-99	3.9412E-04	833.80	1,563.38	0.00E+00	3.29E-01	6.16E-01
Th-229	2.7219E-12	833.80	1,563.38	0.00E+00	2.27E-09	4.26E-09
Th-230	1.0441E-09	833.80	1,563.38	0.00E+00	8.71E-07	1.63E-06
Th-232	3.1689E-16	833.80	1,563.38	0.00E+00	2.64E-13	4.95E-13
Tl-208	4.8636E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.131E+13
0.0250	1.017E+13
0.0375	1.181E+13
0.0575	1.181E+13
0.0850	5.658E+12
0.1250	3.982E+12
0.2250	4.566E+12
0.3750	1.979E+12
0.5750	8.019E+13
0.8500	8.379E+11
1.2500	1.003E+12
1.7500	2.269E+10
2.2500	4.553E+06
2.7500	2.591E+07
3.5000	1.288E+05
5.0000	4.430E+04
7.0000	5.054E+03
11.0000	5.781E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.03E+01	3.24E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		833.80
Bounding:		1,563.38

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=10.423kg
Bounding burnup taken from SFD and converted to MWd using BOL=10.423kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.53	
Bounding:	0.99	

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

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	8,040.82	20,102.04	0.00E+00	4.97E-08	1.24E-07
Am-241	1.1066E-01	8,040.82	20,102.04	1.94E+02	1.08E+03	2.42E+03
Am-242m	1.9247E-03	8,040.82	20,102.04	0.00E+00	1.55E+01	3.87E+01
Am-243	1.0740E-04	8,040.82	20,102.04	0.00E+00	8.64E-01	2.16E+00
C-14	2.6042E-05	8,040.82	20,102.04	0.00E+00	2.09E-01	5.23E-01
Cl-36	3.4243E-10	8,040.82	20,102.04	0.00E+00	2.75E-06	6.88E-06
Cm-243	4.0629E-04	8,040.82	20,102.04	0.00E+00	3.27E+00	8.17E+00
Cm-244	1.6024E-03	8,040.82	20,102.04	0.00E+00	1.29E+01	3.22E+01
Co-60	3.4275E-03	8,040.82	20,102.04	0.00E+00	2.76E+01	6.89E+01
Cs-134	1.5566E-03	8,040.82	20,102.04	0.00E+00	1.25E+01	3.13E+01
Cs-135	4.7693E-05	8,040.82	20,102.04	0.00E+00	3.83E-01	9.59E-01
Cs-137	1.4007E+00	8,040.82	20,102.04	0.00E+00	1.13E+04	2.82E+04
Eu-154	1.6184E-02	8,040.82	20,102.04	0.00E+00	1.30E+02	3.25E+02
Eu-155	1.3774E-02	8,040.82	20,102.04	0.00E+00	1.11E+02	2.77E+02
Fe-55	3.8028E-04	8,040.82	20,102.04	0.00E+00	3.06E+00	7.64E+00
H-3	3.8454E-03	8,040.82	20,102.04	0.00E+00	3.09E+01	7.73E+01
I-129	1.2891E-06	8,040.82	20,102.04	0.00E+00	1.04E-02	2.59E-02
Kr-85	2.7848E-02	8,040.82	20,102.04	0.00E+00	2.24E+02	5.60E+02
Np-237	3.7516E-06	8,040.82	20,102.04	0.00E+00	3.02E-02	7.54E-02
Pa-231	1.2488E-11	8,040.82	20,102.04	0.00E+00	1.00E-07	2.51E-07
Pb-210	2.4206E-12	8,040.82	20,102.04	0.00E+00	1.95E-08	4.87E-08
Pm-147	1.5671E-02	8,040.82	20,102.04	0.00E+00	1.26E+02	3.15E+02
Pu-238	1.4877E-02	8,040.82	20,102.04	0.00E+00	1.20E+02	2.99E+02
Pu-239	-3.5520E-02	8,040.82	0.00	1.59E+03	1.31E+03	1.59E+03
Pu-240	2.0690E-02	8,040.82	20,102.04	8.09E+02	9.75E+02	1.22E+03
Pu-241	-1.4799E+00	8,040.82	0.00	3.63E+04	2.44E+04	3.63E+04
Pu-242	1.1252E-05	8,040.82	20,102.04	2.16E-01	3.06E-01	4.42E-01
Ra-226	7.8524E-12	8,040.82	20,102.04	0.00E+00	6.31E-08	1.58E-07
Ra-228	2.4086E-16	8,040.82	20,102.04	0.00E+00	1.94E-12	4.84E-12
Ru-106	1.5066E-05	8,040.82	20,102.04	0.00E+00	1.21E-01	3.03E-01
Se-79	1.0127E-05	8,040.82	20,102.04	0.00E+00	8.14E-02	2.04E-01
Sn-126	4.3902E-05	8,040.82	20,102.04	0.00E+00	3.53E-01	8.83E-01
Sr-90	5.0088E-01	8,040.82	20,102.04	0.00E+00	4.03E+03	1.01E+04
Tc-99	3.9412E-04	8,040.82	20,102.04	0.00E+00	3.17E+00	7.92E+00
Th-229	2.7219E-12	8,040.82	20,102.04	0.00E+00	2.19E-08	5.47E-08
Th-230	1.0441E-09	8,040.82	20,102.04	0.00E+00	8.40E-06	2.10E-05
Th-232	3.1689E-16	8,040.82	20,102.04	0.00E+00	2.55E-12	6.37E-12
Tl-208	4.6636E-07	8,040.82	20,102.04	0.00E+00	3.75E-03	9.37E-03
U-232	1.2638E-06	8,040.82	20,102.04	0.00E+00	1.02E-02	2.54E-02
U-233	5.7451E-10	8,040.82	20,102.04	0.00E+00	4.62E-06	1.15E-05
U-234	4.3044E-06	8,040.82	20,102.04	0.00E+00	3.46E-02	8.65E-02
U-235	-7.7765E-09	8,040.82	0.00	3.27E-04	2.64E-04	3.27E-04
U-236	1.8050E-07	8,040.82	20,102.04	0.00E+00	1.45E-03	3.63E-03
U-238	-1.7914E-07	8,040.82	0.00	2.38E-02	2.23E-02	2.38E-02
Y-90	5.0088E-01	8,040.82	20,102.04	0.00E+00	4.03E+03	1.01E+04
Other Radionuclides					1.14E+04	2.85E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.563E+14
0.0250	1.307E+14
0.0375	1.519E+14
0.0575	1.510E+14
0.0850	7.276E+13
0.1250	5.119E+13
0.2250	5.871E+13
0.3750	2.545E+13
0.5750	1.031E+15
0.8500	1.077E+13
1.2500	1.289E+13
1.7500	2.917E+11
2.2500	5.825E+07
2.7500	3.330E+08
3.5000	1.505E+06
5.0000	5.056E+05
7.0000	5.770E+04
11.0000	6.600E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.96E+02	3.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.1622E-12	4,956.09	12,390.22	0.00E+00	3.06E-08	7.66E-08
Am-241	1.1066E-01	4,956.09	12,390.22	1.19E+02	6.68E+02	1.49E+03
Am-242m	1.9247E-03	4,956.09	12,390.22	0.00E+00	9.54E+00	2.38E+01
Am-243	1.0740E-04	4,956.09	12,390.22	0.00E+00	5.32E-01	1.33E+00
C-14	2.6042E-05	4,956.09	12,390.22	0.00E+00	1.29E-01	3.23E-01
Cl-36	3.4243E-10	4,956.09	12,390.22	0.00E+00	1.70E-06	4.24E-06
Cm-243	4.0629E-04	4,956.09	12,390.22	0.00E+00	2.01E+00	5.03E+00
Cm-244	1.6024E-03	4,956.09	12,390.22	0.00E+00	7.94E+00	1.99E+01
Co-60	3.4275E-03	4,956.09	12,390.22	0.00E+00	1.70E+01	4.25E+01
Cs-134	1.5566E-03	4,956.09	12,390.22	0.00E+00	7.71E+00	1.93E+01
Cs-135	4.7693E-05	4,956.09	12,390.22	0.00E+00	2.36E-01	5.91E-01
Cs-137	1.4007E+00	4,956.09	12,390.22	0.00E+00	6.94E+03	1.74E+04
Eu-154	1.6184E-02	4,956.09	12,390.22	0.00E+00	8.02E+01	2.01E+02
Eu-155	1.3774E-02	4,956.09	12,390.22	0.00E+00	6.83E+01	1.71E+02
Fe-55	3.8028E-04	4,956.09	12,390.22	0.00E+00	1.88E+00	4.71E+00
H-3	3.8454E-03	4,956.09	12,390.22	0.00E+00	1.91E+01	4.76E+01
I-129	1.2891E-06	4,956.09	12,390.22	0.00E+00	6.39E-03	1.60E-02
Kr-85	2.7848E-02	4,956.09	12,390.22	0.00E+00	1.38E+02	3.45E+02
Np-237	3.7516E-06	4,956.09	12,390.22	0.00E+00	1.86E-02	4.65E-02
Pa-231	1.2488E-11	4,956.09	12,390.22	0.00E+00	6.19E-08	1.55E-07
Pb-210	2.4206E-12	4,956.09	12,390.22	0.00E+00	1.20E-08	3.00E-08
Pm-147	1.5671E-02	4,956.09	12,390.22	0.00E+00	7.77E+01	1.94E+02
Pu-238	1.4877E-02	4,956.09	12,390.22	0.00E+00	7.37E+01	1.84E+02
Pu-239	-3.5520E-02	4,956.09	0.00	9.81E+02	8.04E+02	9.81E+02
Pu-240	2.0690E-02	4,956.09	12,390.22	4.98E+02	6.01E+02	7.55E+02
Pu-241	-1.4799E+00	4,956.09	0.00	2.24E+04	1.50E+04	2.24E+04
Pu-242	1.1252E-06	4,956.09	12,390.22	1.33E-01	1.89E-01	2.72E-01
Ra-226	7.8524E-12	4,956.09	12,390.22	0.00E+00	3.89E-08	9.73E-08
Ra-228	2.4086E-16	4,956.09	12,390.22	0.00E+00	1.19E-12	2.98E-12
Ru-106	1.5066E-05	4,956.09	12,390.22	0.00E+00	7.47E-02	1.87E-01
Se-79	1.0127E-05	4,956.09	12,390.22	0.00E+00	5.02E-02	1.25E-01
Sn-126	4.3902E-05	4,956.09	12,390.22	0.00E+00	2.18E-01	5.44E-01
Sr-90	5.0088E-01	4,956.09	12,390.22	0.00E+00	2.48E+03	6.21E+03
Tc-99	3.9412E-04	4,956.09	12,390.22	0.00E+00	1.95E+00	4.88E+00
Th-229	2.7219E-12	4,956.09	12,390.22	0.00E+00	1.35E-08	3.37E-08
Th-230	1.0441E-09	4,956.09	12,390.22	0.00E+00	5.17E-06	1.29E-05
Th-232	3.1689E-16	4,956.09	12,390.22	0.00E+00	1.57E-12	3.93E-12
Tl-208	4.6636E-07	4,956.09	12,390.22	0.00E+00	2.31E-03	5.78E-03
U-232	1.2638E-06	4,956.09	12,390.22	0.00E+00	6.26E-03	1.57E-02
U-233	5.7451E-10	4,956.09	12,390.22	0.00E+00	2.85E-06	7.12E-06
U-234	4.3044E-06	4,956.09	12,390.22	0.00E+00	2.13E-02	5.33E-02
U-235	-7.7765E-09	4,956.09	0.00	2.01E-04	1.63E-04	2.01E-04
U-236	1.8050E-07	4,956.09	12,390.22	0.00E+00	8.95E-04	2.24E-03
U-238	-1.7914E-07	4,956.09	0.00	1.47E-02	1.38E-02	1.47E-02
Y-90	5.0088E-01	4,956.09	12,390.22	0.00E+00	2.48E+03	6.21E+03
Other Radionuclides					7.02E+03	1.76E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.045E+14
0.0250	8.058E+13
0.0375	9.362E+13
0.0575	9.306E+13
0.0850	4.484E+13
0.1250	3.155E+13
0.2250	3.619E+13
0.3750	1.569E+13
0.5750	6.355E+14
0.8500	6.640E+12
1.2500	7.948E+12
1.7500	1.798E+11
2.2500	3.591E+07
2.7500	2.053E+08
3.5000	9.275E+05
5.0000	3.116E+05
7.0000	3.557E+04
11.0000	4.068E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+02	2.40E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,956.09
Bounding:		12,390.22

Basis for burnup used in estimate:
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
Nominal:	0.53	
Bounding:	1.31	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FAST REACTOR FUEL
SNF ID #: 906
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=9.044kg; EOL=5.812kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	3,071.54	6,143.08	0.00E+00	7.09E-03	1.42E-02
Am-241	8.4448E+00	3,071.54	6,143.08	0.00E+00	2.59E+04	5.19E+04
Am-242m	1.6848E-02	3,071.54	6,143.08	0.00E+00	5.17E+01	1.03E+02
Am-243	1.6320E-02	3,071.54	6,143.08	0.00E+00	5.01E+01	1.00E+02
C-14	1.2090E-01	3,071.54	6,143.08	0.00E+00	3.71E+02	7.43E+02
Cl-36	2.2849E-03	3,071.54	6,143.08	0.00E+00	7.02E+00	1.40E+01
Cm-243	8.6624E-04	3,071.54	6,143.08	0.00E+00	2.66E+00	5.32E+00
Cm-244	1.6848E-01	3,071.54	6,143.08	0.00E+00	5.17E+02	1.03E+03
Co-60	2.8086E+01	3,071.54	6,143.08	0.00E+00	8.63E+04	1.73E+05
Cs-134	3.4148E-04	3,071.54	6,143.08	0.00E+00	1.05E+00	2.10E+00
Cs-135	4.3976E-04	3,071.54	6,143.08	0.00E+00	1.35E+00	2.70E+00
Cs-137	2.1049E+01	3,071.54	6,143.08	0.00E+00	6.47E+04	1.29E+05
Eu-154	1.2500E+00	3,071.54	6,143.08	0.00E+00	3.84E+03	7.68E+03
Eu-155	6.8986E-02	3,071.54	6,143.08	0.00E+00	2.12E+02	4.24E+02
Fe-55	2.9308E-01	3,071.54	6,143.08	0.00E+00	9.00E+02	1.80E+03
H-3	2.4311E-01	3,071.54	6,143.08	0.00E+00	7.47E+02	1.49E+03
I-129	1.0618E-05	3,071.54	6,143.08	0.00E+00	3.26E-02	6.52E-02
Kr-85	5.9882E-01	3,071.54	6,143.08	0.00E+00	1.84E+03	3.68E+03
Np-237	1.5668E-04	3,071.54	6,143.08	0.00E+00	4.81E-01	9.62E-01
Pa-231	2.8656E-06	3,071.54	6,143.08	0.00E+00	8.80E-03	1.76E-02
Pb-210	2.3918E-06	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-06	3,071.54	6,143.08	0.00E+00	1.98E-04	3.96E-04
Ra-228	5.9952E-07	3,071.54	6,143.08	0.00E+00	1.84E-03	3.68E-03
Ru-106	8.5526E-07	3,071.54	6,143.08	0.00E+00	2.63E-03	5.25E-03
Se-79	1.9181E-04	3,071.54	6,143.08	0.00E+00	5.89E-01	1.18E+00
Sn-126	1.6671E-04	3,071.54	6,143.08	0.00E+00	5.12E-01	1.02E+00
Sr-90	1.9799E+01	3,071.54	6,143.08	0.00E+00	6.08E+04	1.22E+05
Tc-99	6.7678E-03	3,071.54	6,143.08	0.00E+00	2.08E+01	4.16E+01
Th-229	1.7488E-06	3,071.54	6,143.08	0.00E+00	5.37E-03	1.07E-02
Th-230	5.8704E-06	3,071.54	6,143.08	0.00E+00	1.80E-02	3.61E-02
Th-232	-4.2431E-09	3,071.54	0.00	1.83E-04	1.70E-04	1.83E-04
Tl-208	8.7573E-05	3,071.54	6,143.08	0.00E+00	2.69E-01	5.38E-01
U-232	2.3706E-04	3,071.54	6,143.08	0.00E+00	7.28E-01	1.46E+00
U-233	3.6128E-04	3,071.54	6,143.08	0.00E+00	1.11E+00	2.22E+00
U-234	1.2788E-02	3,071.54	6,143.08	0.00E+00	3.93E+01	7.86E+01
U-235	5.7486E-04	3,071.54	6,143.08	3.89E-03	1.77E+00	3.54E+00
U-236	2.3485E-04	3,071.54	6,143.08	0.00E+00	7.21E-01	1.44E+00
U-238	1.1581E-04	3,071.54	6,143.08	4.84E-04	3.56E-01	7.12E-01
Y-90	1.9804E+01	3,071.54	6,143.08	0.00E+00	6.08E+04	1.22E+05
Other Radionuclides					1.89E+05	3.79E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.645E+15
0.0250	1.498E+15
0.0375	1.309E+15
0.0575	2.059E+15
0.0850	8.037E+14
0.1250	6.299E+14
0.2250	6.962E+14
0.3750	2.978E+14
0.5750	4.842E+15
0.8500	1.850E+14
1.2500	1.294E+16
1.7500	5.722E+12
2.2500	6.784E+10
2.7500	1.912E+10
3.5000	1.737E+07
5.0000	7.369E+08
7.0000	8.423E+05
11.0000	9.631E+04

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)[2]

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	3,998.94	7,997.88	0.00E+00	2.47E-08	4.94E-08
Am-241	1.1066E-01	3,998.94	7,997.88	2.57E+01	4.68E+02	9.11E+02
Am-242m	1.9247E-03	3,998.94	7,997.88	0.00E+00	7.70E+00	1.54E+01
Am-243	1.0740E-04	3,998.94	7,997.88	0.00E+00	4.29E-01	8.59E-01
C-14	2.6042E-05	3,998.94	7,997.88	0.00E+00	1.04E-01	2.08E-01
Cl-36	3.4243E-10	3,998.94	7,997.88	0.00E+00	1.37E-06	2.74E-06
Cm-243	4.0629E-04	3,998.94	7,997.88	0.00E+00	1.62E+00	3.25E+00
Cm-244	1.6024E-03	3,998.94	7,997.88	0.00E+00	6.41E+00	1.28E+01
Co-60	3.4275E-03	3,998.94	7,997.88	0.00E+00	1.37E+01	2.74E+01
Cs-134	1.5566E-03	3,998.94	7,997.88	0.00E+00	6.22E+00	1.24E+01
Cs-135	4.7693E-05	3,998.94	7,997.88	0.00E+00	1.91E-01	3.81E-01
Cs-137	1.4007E+00	3,998.94	7,997.88	0.00E+00	5.60E+03	1.12E+04
Eu-154	1.6184E-02	3,998.94	7,997.88	0.00E+00	6.47E+01	1.29E+02
Eu-155	1.3774E-02	3,998.94	7,997.88	0.00E+00	5.51E+01	1.10E+02
Fe-55	3.8028E-04	3,998.94	7,997.88	0.00E+00	1.52E+00	3.04E+00
H-3	3.8454E-03	3,998.94	7,997.88	0.00E+00	1.54E+01	3.08E+01
I-129	1.2891E-06	3,998.94	7,997.88	0.00E+00	5.16E-03	1.03E-02
Kr-85	2.7848E-02	3,998.94	7,997.88	0.00E+00	1.11E+02	2.23E+02
Np-237	3.7516E-06	3,998.94	7,997.88	0.00E+00	1.50E-02	3.00E-02
Pa-231	1.2488E-11	3,998.94	7,997.88	0.00E+00	4.99E-08	9.99E-08
Pb-210	2.4206E-12	3,998.94	7,997.88	0.00E+00	9.68E-09	1.94E-08
Pm-147	1.5671E-02	3,998.94	7,997.88	0.00E+00	6.27E+01	1.25E+02
Pu-238	1.4877E-02	3,998.94	7,997.88	0.00E+00	5.95E+01	1.19E+02
Pu-239	-3.5520E-02	3,998.94	0.00	2.11E+02	6.89E+01	2.11E+02
Pu-240	2.0690E-02	3,998.94	7,997.88	1.07E+02	1.90E+02	2.73E+02
Pu-241	-1.4799E+00	3,998.94	0.00	4.81E+03	0.00E+00	4.81E+03
Pu-242	1.1252E-05	3,998.94	7,997.88	2.86E-02	7.36E-02	1.19E-01
Ra-226	7.8524E-12	3,998.94	7,997.88	0.00E+00	3.14E-08	6.28E-08
Ra-228	2.4066E-16	3,998.94	7,997.88	0.00E+00	9.63E-13	1.93E-12
Ru-106	1.5066E-05	3,998.94	7,997.88	0.00E+00	6.02E-02	1.20E-01
Se-79	1.0127E-05	3,998.94	7,997.88	0.00E+00	4.05E-02	8.10E-02
Sn-126	4.3902E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.583E+14
0.0250	5.197E+13
0.0375	6.043E+13
0.0575	5.936E+13
0.0850	2.895E+13
0.1250	2.037E+13
0.2250	2.336E+13
0.3750	1.012E+13
0.5750	4.102E+14
0.8500	4.286E+12
1.2500	5.130E+12
1.7500	1.161E+11
2.2500	2.294E+07
2.7500	1.324E+08
3.5000	4.788E+05
5.0000	1.502E+05
7.0000	1.716E+04
11.0000	1.963E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.75E+01	1.33E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	Pu and U	Pu and U
BOL Enrichment %:	31.101	10 to 30

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	3,998.94	2,231.05
Bounding:		7,997.88

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.83

[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: FERMI CORE I & 2 (CORE FOIL)
SNF ID #: 457
Fuel Units & Descr: 136 - ROD
Heavy Metal Mass: BOL=18.21kg; EOL=17.734kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: FERMI (Fast, Zirc, 10 to 40%. U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4291E-07	419.74	839.48	0.00E+00	6.00E-05	1.20E-04
Am-241	6.7476E-07	419.74	839.48	0.00E+00	2.83E-04	5.66E-04
Am-242m	0.0000E+00	419.74	839.48	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3651E-15	419.74	839.48	0.00E+00	3.51E-12	7.02E-12
C-14	2.1680E-05	419.74	839.48	0.00E+00	9.10E-03	1.82E-02
Cl-36	5.5188E-08	419.74	839.48	0.00E+00	2.32E-05	4.63E-05
Cm-243	1.0760E-14	419.74	839.48	0.00E+00	4.52E-12	9.03E-12
Cm-244	2.9486E-16	419.74	839.48	0.00E+00	1.24E-13	2.48E-13
Co-60	2.9128E-04	419.74	839.48	0.00E+00	1.22E-01	2.45E-01
Cs-134	4.0326E-09	419.74	839.48	0.00E+00	1.69E-06	3.39E-06
Cs-135	4.4996E-05	419.74	839.48	0.00E+00	1.89E-02	3.78E-02
Cs-137	9.7388E-01	419.74	839.48	0.00E+00	4.09E+02	8.18E+02
Eu-154	5.5290E-05	419.74	839.48	0.00E+00	2.32E-02	4.64E-02
Eu-155	1.7402E-04	419.74	839.48	0.00E+00	7.30E-02	1.46E-01
Fe-55	2.5992E-07	419.74	839.48	0.00E+00	1.09E-04	2.18E-04
H-3	1.5242E-03	419.74	839.48	0.00E+00	6.40E-01	1.28E+00
I-129	1.1426E-06	419.74	839.48	0.00E+00	4.80E-04	9.59E-04
Kr-85	1.4635E-02	419.74	839.48	0.00E+00	6.14E+00	1.23E+01
Np-237	3.3099E-06	419.74	839.48	0.00E+00	1.39E-03	2.78E-03
Pa-231	2.4492E-07	419.74	839.48	0.00E+00	1.03E-04	2.06E-04
Pb-210	1.7794E-11	419.74	839.48	0.00E+00	7.47E-09	1.49E-08
Pm-147	2.2021E-05	419.74	839.48	0.00E+00	9.24E-03	1.85E-02
Pu-238	1.5235E-04	419.74	839.48	0.00E+00	6.39E-02	1.28E-01
Pu-239	1.9464E-02	419.74	839.48	0.00E+00	8.17E+00	1.63E+01
Pu-240	6.7817E-05	419.74	839.48	0.00E+00	2.85E-02	5.69E-02
Pu-241	2.0282E-06	419.74	839.48	0.00E+00	8.51E-04	1.70E-03
Pu-242	4.3751E-13	419.74	839.48	0.00E+00	1.84E-10	3.67E-10
Ra-226	4.0632E-11	419.74	839.48	0.00E+00	1.71E-08	3.41E-08
Ra-228	2.3674E-11	419.74	839.48	0.00E+00	9.94E-09	1.99E-08
Ru-106	1.0255E-14	419.74	839.48	0.00E+00	4.30E-12	8.61E-12
Se-79	1.6485E-05	419.74	839.48	0.00E+00	6.92E-03	1.38E-02
Sn-126	3.7564E-05	419.74	839.48	0.00E+00	1.58E-02	3.15E-02
Sr-90	8.4333E-01	419.74	839.48	0.00E+00	3.54E+02	7.08E+02
Tc-99	4.4825E-04	419.74	839.48	0.00E+00	1.88E-01	3.76E-01
Th-229	6.0880E-11	419.74	839.48	0.00E+00	2.56E-08	5.11E-08
Th-230	2.8889E-09	419.74	839.48	0.00E+00	1.21E-06	2.43E-06
Th-232	2.3708E-11	419.74	839.48	0.00E+00	9.95E-09	1.99E-08
Tl-208	5.0432E-09	419.74	839.48	0.00E+00	2.12E-06	4.23E-06
U-232	1.3640E-08	419.74	839.48	0.00E+00	5.73E-06	1.15E-05
U-233	1.0327E-08	419.74	839.48	0.00E+00	4.33E-06	8.67E-06
U-234	4.9103E-06	419.74	839.48	0.00E+00	2.06E-03	4.12E-03
U-235	-2.3191E-06	419.74	0.00	1.01E-02	9.14E-03	1.01E-02
U-236	1.2633E-05	419.74	839.48	0.00E+00	5.30E-03	1.06E-02
U-238	-9.5407E-08	419.74	0.00	4.55E-03	4.51E-03	4.55E-03
Y-90	8.4350E-01	419.74	839.48	0.00E+00	3.54E+02	7.08E+02
Other Radionuclides					4.11E+02	8.23E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.886E+13
0.0250	8.068E+12
0.0375	7.113E+12
0.0575	7.517E+12
0.0850	4.540E+12
0.1250	2.941E+12
0.2250	3.904E+12
0.3750	1.701E+12
0.5750	3.037E+13
0.8500	2.768E+11
1.2500	1.100E+11
1.7500	7.130E+09
2.2500	8.771E+05
2.7500	1.492E+05
3.5000	1.653E+02
5.0000	5.689E+01
7.0000	4.932E+00
11.0000	4.595E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.81E+00	9.23E+00
Total	Total

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	Basis for burnup used in estimate:
Nominal:	29.14	419.74	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	50.35	839.48	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	7.38	14.41
Bounding:	14.75	16.67

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: FERMI (Fast, Zirc, 10 to 40%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4291E-07	592.57	1,185.14	0.00E+00	8.47E-05	1.69E-04
Am-241	6.7476E-07	592.57	1,185.14	0.00E+00	4.00E-04	8.00E-04
Am-242m	0.0000E+00	592.57	1,185.14	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3651E-15	592.57	1,185.14	0.00E+00	4.96E-12	9.91E-12
C-14	2.1680E-05	592.57	1,185.14	0.00E+00	1.28E-02	2.57E-02
Cl-36	5.5188E-08	592.57	1,185.14	0.00E+00	3.27E-05	6.54E-05
Cm-243	1.0760E-14	592.57	1,185.14	0.00E+00	6.38E-12	1.28E-11
Cm-244	2.9486E-16	592.57	1,185.14	0.00E+00	1.75E-13	3.49E-13
Co-60	2.9128E-04	592.57	1,185.14	0.00E+00	1.73E-01	3.45E-01
Cs-134	4.0326E-09	592.57	1,185.14	0.00E+00	2.39E-06	4.78E-06
Cs-135	4.4996E-05	592.57	1,185.14	0.00E+00	2.67E-02	5.33E-02
Cs-137	9.7388E-01	592.57	1,185.14	0.00E+00	5.77E+02	1.15E+03
Eu-154	5.5290E-05	592.57	1,185.14	0.00E+00	3.28E-02	6.55E-02
Eu-155	1.7402E-04	592.57	1,185.14	0.00E+00	1.03E-01	2.06E-01
Fe-55	2.5992E-07	592.57	1,185.14	0.00E+00	1.54E-04	3.08E-04
H-3	1.5242E-03	592.57	1,185.14	0.00E+00	9.03E-01	1.81E+00
I-129	1.1426E-06	592.57	1,185.14	0.00E+00	6.77E-04	1.35E-03
Kr-85	1.4635E-02	592.57	1,185.14	0.00E+00	8.67E+00	1.73E+01
Np-237	3.3099E-06	592.57	1,185.14	0.00E+00	1.96E-03	3.92E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.486E+13
0.0250	1.139E+13
0.0375	1.004E+13
0.0575	1.061E+13
0.0850	6.410E+12
0.1250	4.152E+12
0.2250	5.512E+12
0.3750	2.402E+12
0.5750	4.288E+13
0.8500	3.907E+11
1.2500	1.553E+11
1.7500	1.007E+10
2.2500	1.238E+06
2.7500	2.106E+05
3.5000	2.570E+02
5.0000	9.051E+01
7.0000	8.138E+00
11.0000	7.839E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.51E+00	1.30E+01
Total	Total

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 %:	13.55265123	10 to 40

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	69.99	592.57	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	103.67	1,185.14	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	5.06	9.88
Bounding:	10.11	11.43

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

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

Estimated Canister usage: 18"x10'
0.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4291E-07	17,384.91	34,769.81	0.00E+00	2.48E-03	4.97E-03
Am-241	6.7476E-07	17,384.91	34,769.81	0.00E+00	1.17E-02	2.35E-02
Am-242m	0.0000E+00	17,384.91	34,769.81	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3651E-15	17,384.91	34,769.81	0.00E+00	1.45E-10	2.91E-10
C-14	2.1680E-05	17,384.91	34,769.81	0.00E+00	3.77E-01	7.54E-01
Cl-36	5.5188E-08	17,384.91	34,769.81	0.00E+00	9.59E-04	1.92E-03
Cm-243	1.0760E-14	17,384.91	34,769.81	0.00E+00	1.87E-10	3.74E-10
Cm-244	2.9486E-16	17,384.91	34,769.81	0.00E+00	5.13E-12	1.03E-11
Co-60	2.9128E-04	17,384.91	34,769.81	0.00E+00	5.06E+00	1.01E+01
Cs-134	4.0326E-09	17,384.91	34,769.81	0.00E+00	7.01E-05	1.40E-04
Cs-135	4.4996E-05	17,384.91	34,769.81	0.00E+00	7.82E-01	1.56E+00
Cs-137	9.7388E-01	17,384.91	34,769.81	0.00E+00	1.69E+04	3.39E+04
Eu-154	5.5290E-05	17,384.91	34,769.81	0.00E+00	9.61E-01	1.92E+00
Eu-155	1.7402E-04	17,384.91	34,769.81	0.00E+00	3.03E+00	6.05E+00
Fe-55	2.5992E-07	17,384.91	34,769.81	0.00E+00	4.52E-03	9.04E-03
H-3	1.5242E-03	17,384.91	34,769.81	0.00E+00	2.65E+01	5.30E+01
I-129	1.1426E-08	17,384.91	34,769.81	0.00E+00	1.99E-02	3.97E-02
Kr-85	1.4635E-02	17,384.91	34,769.81	0.00E+00	2.54E+02	5.09E+02
Np-237	3.3099E-08	17,384.91	34,769.81	0.00E+00	5.75E-02	1.15E-01
Pa-231	2.4492E-07	17,384.91	34,769.81	0.00E+00	4.26E-03	8.52E-03
Pb-210	1.7794E-11	17,384.91	34,769.81	0.00E+00	3.09E-07	6.19E-07
Pm-147	2.2021E-05	17,384.91	34,769.81	0.00E+00	3.83E-01	7.66E-01
Pu-238	1.5235E-04	17,384.91	34,769.81	0.00E+00	2.65E+00	5.30E+00
Pu-239	1.9464E-02	17,384.91	34,769.81	0.00E+00	3.38E+02	6.77E+02
Pu-240	6.7817E-05	17,384.91	34,769.81	0.00E+00	1.18E+00	2.36E+00
Pu-241	2.0282E-06	17,384.91	34,769.81	0.00E+00	3.53E-02	7.05E-02
Pu-242	4.3751E-13	17,384.91	34,769.81	0.00E+00	7.61E-09	1.52E-08
Ra-226	4.0632E-11	17,384.91	34,769.81	0.00E+00	7.06E-07	1.41E-06
Ra-228	2.3674E-11	17,384.91	34,769.81	0.00E+00	4.12E-07	8.23E-07
Ru-106	1.0255E-14	17,384.91	34,769.81	0.00E+00	1.78E-10	3.57E-10
Se-79	1.6485E-05	17,384.91	34,769.81	0.00E+00	2.87E-01	5.73E-01
Sn-126	3.7564E-05	17,384.91	34,769.81	0.00E+00	6.53E-01	1.31E+00
Sr-90	8.4333E-01	17,384.91	34,769.81	0.00E+00	1.47E+04	2.93E+04
Tc-99	4.4825E-04	17,384.91	34,769.81	0.00E+00	7.79E+00	1.56E+01
Th-229	6.0880E-11	17,384.91	34,769.81	0.00E+00	1.06E-06	2.12E-06
Th-230	2.8889E-09	17,384.91	34,769.81	0.00E+00	5.02E-05	1.00E-04
Th-232	2.3708E-11	17,384.91	34,769.81	0.00E+00	4.12E-07	8.24E-07
Tl-208	5.0432E-09	17,384.91	34,769.81	0.00E+00	8.77E-05	1.75E-04
U-232	1.3640E-08	17,384.91	34,769.81	0.00E+00	2.37E-04	4.74E-04
U-233	1.0327E-08	17,384.91	34,769.81	0.00E+00	1.80E-04	3.59E-04
U-234	4.9103E-06	17,384.91	34,769.81	0.00E+00	8.54E-02	1.71E-01
U-235	-2.3191E-06	17,384.91	0.00	7.26E-02	3.22E-02	7.26E-02
U-236	1.2633E-05	17,384.91	34,769.81	0.00E+00	2.20E-01	4.39E-01
U-238	-9.5407E-08	17,384.91	0.00	3.26E-02	3.10E-02	3.26E-02
Y-90	8.4350E-01	17,384.91	34,769.81	0.00E+00	1.47E+04	2.93E+04
Other Radionuclides					1.70E+04	3.41E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.609E+15
0.0250	3.342E+14
0.0375	2.946E+14
0.0575	3.114E+14
0.0850	1.881E+14
0.1250	1.218E+14
0.2250	1.617E+14
0.3750	7.046E+13
0.5750	1.258E+15
0.8500	1.146E+13
1.2500	4.556E+12
1.7500	2.953E+11
2.2500	3.633E+07
2.7500	6.177E+06
3.5000	6.003E+03
5.0000	1.995E+03
7.0000	1.627E+02
11.0000	1.425E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.91E+02	3.82E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	NONE	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	25.69081404	10 to 40

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	209.10	17,384.91
Bounding:	361.35	34,769.81

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:	42.57	83.14
Bounding:	85.13	96.22

Estimated EOL HM/Given EOL HM: 1.04

[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: FERMI CORE I & 2 (SECTIONED)
SNF ID #: 454
Fuel Units & Descr: 980 - ROD
Heavy Metal Mass: BOL=131.222kg; EOL=125.048kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: FERMI (Fast, Zirc, 10 to 40%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4291E-07	5,444.25	10,888.49	0.00E+00	7.78E-04	1.56E-03
Am-241	6.7476E-07	5,444.25	10,888.49	0.00E+00	3.67E-03	7.35E-03
Am-242m	0.0000E+00	5,444.25	10,888.49	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3651E-15	5,444.25	10,888.49	0.00E+00	4.55E-11	9.11E-11
C-14	2.1680E-05	5,444.25	10,888.49	0.00E+00	1.18E-01	2.36E-01
Cl-36	5.5188E-08	5,444.25	10,888.49	0.00E+00	3.00E-04	6.01E-04
Cm-243	1.0760E-14	5,444.25	10,888.49	0.00E+00	5.86E-11	1.17E-10
Cm-244	2.9486E-16	5,444.25	10,888.49	0.00E+00	1.61E-12	3.21E-12
Co-60	2.9128E-04	5,444.25	10,888.49	0.00E+00	1.59E+00	3.17E+00
Cs-134	4.0326E-09	5,444.25	10,888.49	0.00E+00	2.20E-05	4.39E-05
Cs-135	4.4996E-05	5,444.25	10,888.49	0.00E+00	2.45E-01	4.90E-01
Cs-137	9.7388E-01	5,444.25	10,888.49	0.00E+00	5.30E+03	1.06E+04
Eu-154	5.5290E-05	5,444.25	10,888.49	0.00E+00	3.01E-01	6.02E-01
Eu-155	1.7402E-04	5,444.25	10,888.49	0.00E+00	9.47E-01	1.89E+00
Fe-55	2.5992E-07	5,444.25	10,888.49	0.00E+00	1.42E-03	2.83E-03
H-3	1.5242E-03	5,444.25	10,888.49	0.00E+00	8.30E+00	1.66E+01
I-129	1.1426E-06	5,444.25	10,888.49	0.00E+00	6.22E-03	1.24E-02
Kr-85	1.4635E-02	5,444.25	10,888.49	0.00E+00	7.97E+01	1.59E+02
Np-237	3.3099E-06	5,444.25	10,888.49	0.00E+00	1.80E-02	3.60E-02
Pa-231	2.4492E-07	5,444.25	10,888.49	0.00E+00	1.33E-03	2.67E-03
Pb-210	1.7794E-11	5,444.25	10,888.49	0.00E+00	9.69E-08	1.94E-07
Pm-147	2.2021E-05	5,444.25	10,888.49	0.00E+00	1.20E-01	2.40E-01
Pu-238	1.5235E-04	5,444.25	10,888.49	0.00E+00	8.29E-01	1.66E+00
Pu-239	1.9464E-02	5,444.25	10,888.49	0.00E+00	1.06E+02	2.12E+02
Pu-240	6.7817E-05	5,444.25	10,888.49	0.00E+00	3.69E-01	7.38E-01
Pu-241	2.0282E-06	5,444.25	10,888.49	0.00E+00	1.10E-02	2.21E-02
Pu-242	4.3751E-13	5,444.25	10,888.49	0.00E+00	2.38E-09	4.76E-09
Ra-226	4.0632E-11	5,444.25	10,888.49	0.00E+00	2.21E-07	4.42E-07
Ra-228	2.3674E-11	5,444.25	10,888.49	0.00E+00	1.29E-07	2.58E-07
Ru-106	1.0255E-14	5,444.25	10,888.49	0.00E+00	5.58E-11	1.12E-10
Se-79	1.6485E-05	5,444.25	10,888.49	0.00E+00	8.97E-02	1.79E-01
Sn-126	3.7564E-05	5,444.25	10,888.49	0.00E+00	2.05E-01	4.09E-01
Sr-90	8.4333E-01	5,444.25	10,888.49	0.00E+00	4.59E+03	9.18E+03
Tc-99	4.4825E-04	5,444.25	10,888.49	0.00E+00	2.44E+00	4.88E+00
Th-229	6.0880E-11	5,444.25	10,888.49	0.00E+00	3.31E-07	6.63E-07
Th-230	2.8889E-09	5,444.25	10,888.49	0.00E+00	1.57E-05	3.15E-05
Th-232	2.3708E-11	5,444.25	10,888.49	0.00E+00	1.29E-07	2.58E-07
Tl-208	5.0432E-09	5,444.25	10,888.49	0.00E+00	2.75E-05	5.49E-05
U-232	1.3640E-06	5,444.25	10,888.49	0.00E+00	7.43E-05	1.49E-04
U-233	1.0327E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.040E+14
0.0250	1.046E+14
0.0375	9.226E+13
0.0575	9.750E+13
0.0850	5.889E+13
0.1250	3.814E+13
0.2250	5.064E+13
0.3750	2.207E+13
0.5750	3.939E+14
0.8500	3.590E+12
1.2500	1.427E+12
1.7500	9.248E+10
2.2500	1.138E+07
2.7500	1.935E+06
3.5000	2.002E+03
5.0000	6.770E+02
7.0000	5.697E+01
11.0000	5.155E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.98E+01	1.20E+02
Total	Total

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	Basis for burnup used in estimate:
Nominal:	209.96	5,444.25	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	362.83	10,888.49	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	13.28	25.93
Bounding:	26.55	30.01

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: $18^{*}x10^{6}$ 0.11

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4291E-07	740.71	1,481.43	0.00E+00	1.06E-04	2.12E-04
Am-241	6.7476E-07	740.71	1,481.43	0.00E+00	5.00E-04	1.00E-03
Am-242m	0.0000E+00	740.71	1,481.43	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3651E-15	740.71	1,481.43	0.00E+00	6.20E-12	1.24E-11
C-14	2.1680E-05	740.71	1,481.43	0.00E+00	1.61E-02	3.21E-02
Cl-36	5.5188E-08	740.71	1,481.43	0.00E+00	4.09E-05	8.18E-05
Cm-243	1.0760E-14	740.71	1,481.43	0.00E+00	7.97E-12	1.59E-11
Cm-244	2.9486E-16	740.71	1,481.43	0.00E+00	2.18E-13	4.37E-13
Co-60	2.9128E-04	740.71	1,481.43	0.00E+00	2.16E-01	4.32E-01
Cs-134	4.0326E-09	740.71	1,481.43	0.00E+00	2.99E-06	5.97E-06
Cs-135	4.4996E-05	740.71	1,481.43	0.00E+00	3.33E-02	6.67E-02
Cs-137	9.7388E-01	740.71	1,481.43	0.00E+00	7.21E+02	1.44E+03
Eu-154	5.5290E-05	740.71	1,481.43	0.00E+00	4.10E-02	8.19E-02
Eu-155	1.7402E-04	740.71	1,481.43	0.00E+00	1.29E-01	2.58E-01
Fe-55	2.5992E-07	740.71	1,481.43	0.00E+00	1.93E-04	3.85E-04
H-3	1.5242E-03	740.71	1,481.43	0.00E+00	1.13E+00	2.26E+00
I-129	1.1426E-06	740.71	1,481.43	0.00E+00	8.46E-04	1.69E-03
Kr-85	1.4635E-02	740.71	1,481.43	0.00E+00	1.08E+01	2.17E+01
Np-237	3.3099E-06	740.71	1,481.43	0.00E+00	2.45E-03	4.90E-03
Pa-231	2.4492E-07	740.71	1,481.43	0.00E+00	1.81E-04	3.63E-04
Pb-210	1.7794E-11	740.71	1,481.43	0.00E+00	1.32E-08	2.64E-08
Pm-147	2.2021E-05	740.71	1,481.43	0.00E+00	1.63E-02	3.26E-02
Pu-238	1.5235E-04	740.71	1,481.43	0.00E+00	1.13E-01	2.26E-01
Pu-239	1.9464E-02	740.71	1,481.43	0.00E+00	1.44E+01	2.88E+01
Pu-240	6.7817E-05	740.71	1,481.43	0.00E+00	5.02E-02	1.00E-01
Pu-241	2.0282E-06	740.71	1,481.43	0.00E+00	1.50E-03	3.00E-03
Pu-242	4.3751E-13	740.71	1,481.43	0.00E+00	3.24E-10	6.48E-10
Ra-226	4.0632E-11	740.71	1,481.43	0.00E+00	3.01E-08	6.02E-08
Ra-228	2.3674E-11	740.71	1,481.43	0.00E+00	1.75E-08	3.51E-08
Ru-106	1.0255E-14	740.71	1,481.43	0.00E+00	7.60E-12	1.52E-11
Se-79	1.6485E-05	740.71	1,481.43	0.00E+00	1.22E-02	2.44E-02
Sn-126	3.7564E-05	740.71	1,481.43	0.00E+00	2.78E-02	5.56E-02
Sr-90	8.4333E-01	740.71	1,481.43	0.00E+00	6.25E+02	1.25E+03
Tc-99	4.4825E-04	740.71	1,481.43	0.00E+00	3.32E-01	6.64E-01
Th-229	6.0880E-11	740.71	1,481.43	0.00E+00	4.51E-08	9.02E-08
Th-230	2.8889E-09	740.71	1,481.43	0.00E+00	2.14E-06	4.28E-06
Th-232	2.3708E-11	740.71	1,481.43	0.00E+00	1.76E-08	3.51E-08
Tl-208	5.0432E-09	740.71	1,481.43	0.00E+00	3.74E-06	7.47E-06
U-232	1.3640E-08	740.71	1,481.43	0.00E+00	1.01E-05	2.02E-05
U-233	1.0327E-08	740.71	1,481.43	0.00E+00	7.65E-06	1.53E-05
U-234	4.9103E-06	740.71	1,481.43	0.00E+00	3.64E-03	7.27E-03
U-235	-2.3191E-06	740.71	0.00	3.12E-02	2.95E-02	3.12E-02
U-236	1.2633E-05	740.71	1,481.43	0.00E+00	9.36E-03	1.87E-02
U-238	-9.5407E-08	740.71	0.00	1.40E-02	1.40E-02	1.40E-02
Y-90	8.4350E-01	740.71	1,481.43	0.00E+00	6.25E+02	1.25E+03
Other Radionuclides					7.26E+02	1.45E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.857E+13
0.0250	1.424E+13
0.0375	1.255E+13
0.0575	1.327E+13
0.0850	8.013E+12
0.1250	5.189E+12
0.2250	6.890E+12
0.3750	3.002E+12
0.5750	5.359E+13
0.8500	4.884E+11
1.2500	1.941E+11
1.7500	1.258E+10
2.2500	1.548E+06
2.7500	2.633E+05
3.5000	3.241E+02
5.0000	1.144E+02
7.0000	1.031E+01
11.0000	9.957E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.14E+00	1.63E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	25.69061404	10 to 40

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

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

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: FERMI CORE I & 2 (STD FUEL SUBASSEMBLY)
SNF ID #: 456
Fuel Units & Descr: 27160 - ROD
Heavy Metal Mass: BOL=3636.724kg; EOL=3566.108kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 7.07

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4291E-07	62,269.34	124,538.69	0.00E+00	8.90E-03	1.78E-02
Am-241	6.7476E-07	62,269.34	124,538.69	0.00E+00	4.20E-02	8.40E-02
Am-242m	0.0000E+00	62,269.34	124,538.69	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3651E-15	62,269.34	124,538.69	0.00E+00	5.21E-10	1.04E-09
C-14	2.1680E-05	62,269.34	124,538.69	0.00E+00	1.35E+00	2.70E+00
Cl-36	5.5188E-08	62,269.34	124,538.69	0.00E+00	3.44E-03	6.87E-03
Cm-243	1.0760E-14	62,269.34	124,538.69	0.00E+00	6.70E-10	1.34E-09
Cm-244	2.9486E-16	62,269.34	124,538.69	0.00E+00	1.84E-11	3.67E-11
Co-60	2.9128E-04	62,269.34	124,538.69	0.00E+00	1.81E+01	3.63E+01
Cs-134	4.0326E-09	62,269.34	124,538.69	0.00E+00	2.51E-04	5.02E-04
Cs-135	4.4996E-05	62,269.34	124,538.69	0.00E+00	2.80E+00	5.60E+00
Cs-137	9.7388E-01	62,269.34	124,538.69	0.00E+00	6.06E+04	1.21E+05
Eu-154	5.5290E-05	62,269.34	124,538.69	0.00E+00	3.44E+00	6.89E+00
Eu-155	1.7402E-04	62,269.34	124,538.69	0.00E+00	1.08E+01	2.17E+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	3.05E-02
Pb-210	1.7794E-11	62,269.34	124,538.69	0.00E+00	1.11E-06	2.22E-06
Pm-147	2.2021E-05	62,269.34	124,538.69	0.00E+00	1.37E+00	2.74E+00
Pu-238	1.5235E-04	62,269.34	124,538.69	0.00E+00	9.49E+00	1.90E+01
Pu-239	1.9464E-02	62,269.34	124,538.69	0.00E+00	1.21E+03	2.42E+03
Pu-240	6.7817E-05	62,269.34	124,538.69	0.00E+00	4.22E+00	8.45E+00
Pu-241	2.0282E-06	62,269.34	124,538.69	0.00E+00	1.26E-01	2.53E-01
Pu-242	4.3751E-13	62,269.34	124,538.69	0.00E+00	2.72E-08	5.45E-08
Ra-226	4.0632E-11	62,269.34	124,538.69	0.00E+00	2.53E-06	5.06E-06
Ra-228	2.3674E-11	62,269.34	124,538.69	0.00E+00	1.47E-06	2.95E-06
Ru-106	1.0255E-14	62,269.34	124,538.69	0.00E+00	6.39E-10	1.28E-09
Se-79	1.6485E-05	62,269.34	124,538.69	0.00E+00	1.03E+00	2.05E+00
Sn-126	3.7564E-05	62,269.34	124,538.69	0.00E+00	2.34E+00	4.68E+00
Sr-90	8.4333E-01	62,269.34	124,538.69	0.00E+00	5.25E+04	1.05E+05
Tc-99	4.4825E-04	62,269.34	124,538.69	0.00E+00	2.79E+01	5.58E+01
Th-229	6.0880E-11	62,269.34	124,538.69	0.00E+00	3.79E-06	7.58E-06
Th-230	2.8889E-09	62,269.34	124,538.69	0.00E+00	1.80E-04	3.60E-04
Th-232	2.3708E-11	62,269.34	124,538.69	0.00E+00	1.48E-06	2.95E-06
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.764E+15
0.0250	1.197E+15
0.0375	1.055E+15
0.0575	1.115E+15
0.0850	6.736E+14
0.1250	4.363E+14
0.2250	5.792E+14
0.3750	2.524E+14
0.5750	4.506E+15
0.8500	4.106E+13
1.2500	1.632E+13
1.7500	1.058E+12
2.2500	1.301E+08
2.7500	2.213E+07
3.5000	2.578E+04
5.0000	8.981E+03
7.0000	7.940E+02
11.0000	7.534E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.85E+02	1.37E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		62,269.34	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	5,818.76	124,538.69	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF CARBIDE FUEL EXPER.
SNF ID #: 347
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=7.356kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.31

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	525.78	652.69	0.00E+00	3.25E-09	4.04E-09
Am-241	1.1066E-01	525.78	652.69	1.52E+01	7.34E+01	8.74E+01
Am-242m	1.9247E-03	525.78	652.69	0.00E+00	1.01E+00	1.26E+00
Am-243	1.0740E-04	525.78	652.69	0.00E+00	5.65E-02	7.01E-02
C-14	2.6042E-05	525.78	652.69	0.00E+00	1.37E-02	1.70E-02
Cl-36	3.4243E-10	525.78	652.69	0.00E+00	1.80E-07	2.24E-07
Cm-243	4.0629E-04	525.78	652.69	0.00E+00	2.14E-01	2.65E-01
Cm-244	1.6024E-03	525.78	652.69	0.00E+00	8.43E-01	1.05E+00
Co-60	3.4275E-03	525.78	652.69	0.00E+00	1.80E+00	2.24E+00
Cs-134	1.5566E-03	525.78	652.69	0.00E+00	8.18E-01	1.02E+00
Cs-135	4.7693E-05	525.78	652.69	0.00E+00	2.51E-02	3.11E-02
Cs-137	1.4007E+00	525.78	652.69	0.00E+00	7.36E+02	9.14E+02
Eu-154	1.6184E-02	525.78	652.69	0.00E+00	8.51E+00	1.06E+01
Eu-155	1.3774E-02	525.78	652.69	0.00E+00	7.24E+00	8.99E+00
Fe-55	3.8028E-04	525.78	652.69	0.00E+00	2.00E-01	2.48E-01
H-3	3.8454E-03	525.78	652.69	0.00E+00	2.02E+00	2.51E+00
I-129	1.2891E-06	525.78	652.69	0.00E+00	6.78E-04	8.41E-04
Kr-85	2.7848E-02	525.78	652.69	0.00E+00	1.46E+01	1.82E+01
Np-237	3.7516E-06	525.78	652.69	0.00E+00	1.97E-03	2.45E-03
Pa-231	1.2488E-11	525.78	652.69	0.00E+00	6.57E-09	8.15E-09
Pb-210	2.4206E-12	525.78	652.69	0.00E+00	1.27E-09	1.58E-09
Pm-147	1.5671E-02	525.78	652.69	0.00E+00	8.24E+00	1.02E+01
Pu-238	1.4877E-02	525.78	652.69	0.00E+00	7.82E+00	9.71E+00
Pu-239	-3.5520E-02	525.78	0.00	1.25E+02	1.06E+02	1.25E+02
Pu-240	2.0690E-02	525.78	652.69	6.34E+01	7.43E+01	7.69E+01
Pu-241	-1.4799E+00	525.78	0.00	2.85E+03	2.07E+03	2.85E+03
Pu-242	1.1252E-05	525.78	652.69	1.69E-02	2.28E-02	2.43E-02
Ra-226	7.8524E-12	525.78	652.69	0.00E+00	4.13E-09	5.13E-09
Ra-228	2.4086E-16	525.78	652.69	0.00E+00	1.27E-13	1.57E-13
Ru-106	1.5066E-05	525.78	652.69	0.00E+00	7.92E-03	9.83E-03
Se-79	1.0127E-05	525.78	652.69	0.00E+00	5.32E-03	6.61E-03
Sn-126	4.3902E-05	525.78	652.69	0.00E+00	2.31E-02	2.87E-02
Sr-90	5.0088E-01	525.78	652.69	0.00E+00	2.63E+02	3.27E+02
Tc-99	3.9412E-04	525.78	652.69	0.00E+00	2.07E-01	2.57E-01
Th-229	2.7219E-12	525.78	652.69	0.00E+00	1.43E-09	1.78E-09
Th-230	1.0441E-09	525.78	652.69	0.00E+00	5.49E-07	6.81E-07
Th-232	3.1689E-16	525.78	652.69	0.00E+00	1.67E-13	2.07E-13
Tl-208	4.6636E-07	525.78	652.69	0.00E+00	2.45E-04	3.04E-04
U-232	1.2638E-06	525.78	652.69	0.00E+00	6.64E-04	8.25E-04
U-233	5.7451E-10	525.78	652.69	0.00E+00	3.02E-07	3.75E-07
U-234	4.3044E-06	525.78	652.69	0.00E+00	2.26E-03	2.81E-03
U-235	-7.7765E-09	525.78	0.00	2.56E-05	2.15E-05	2.56E-05
U-236	1.8050E-07	525.78	652.69	0.00E+00	9.49E-05	1.18E-04
U-238	-1.7914E-07	525.78	0.00	1.86E-03	1.77E-03	1.86E-03
Y-90	5.0088E-01	525.78	652.69	0.00E+00	2.63E+02	3.27E+02
Other Radionuclides					7.45E+02	9.25E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.179E+13
0.0250	4.253E+12
0.0375	4.933E+12
0.0575	5.026E+12
0.0850	2.362E+12
0.1250	1.663E+12
0.2250	1.906E+12
0.3750	8.265E+11
0.5750	3.348E+13
0.8500	3.498E+11
1.2500	4.187E+11
1.7500	9.471E+09
2.2500	1.932E+08
2.7500	1.084E+07
3.5000	6.964E+04
5.0000	2.524E+04
7.0000	2.878E+03
11.0000	3.291E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+01	1.64E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		525.78
Bounding:		652.69

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.44	
Bounding:	0.54	

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

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

Estimated Canister usage: 18"x10" 0.02

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	33.98	62.29	0.00E+00	2.10E-10	3.85E-10
Am-241	1.1066E-01	33.98	62.29	5.46E-01	4.31E+00	7.44E+00
Am-242m	1.9247E-03	33.98	62.29	0.00E+00	6.54E-02	1.20E-01
Am-243	1.0740E-04	33.98	62.29	0.00E+00	3.65E-03	6.69E-03
C-14	2.6042E-05	33.98	62.29	0.00E+00	8.85E-04	1.62E-03
Cl-36	3.4243E-10	33.98	62.29	0.00E+00	1.16E-08	2.13E-08
Cm-243	4.0629E-04	33.98	62.29	0.00E+00	1.38E-02	2.53E-02
Cm-244	1.6024E-03	33.98	62.29	0.00E+00	5.44E-02	9.98E-02
Co-60	3.4275E-03	33.98	62.29	0.00E+00	1.16E-01	2.14E-01
Cs-134	1.5566E-03	33.98	62.29	0.00E+00	5.29E-02	9.70E-02
Cs-135	4.7693E-05	33.98	62.29	0.00E+00	1.62E-03	2.97E-03
Cs-137	1.4007E+00	33.98	62.29	0.00E+00	4.76E+01	8.72E+01
Eu-154	1.6184E-02	33.98	62.29	0.00E+00	5.50E-01	1.01E+00
Eu-155	1.3774E-02	33.98	62.29	0.00E+00	4.68E-01	8.58E-01
Fe-55	3.8028E-04	33.98	62.29	0.00E+00	1.29E-02	2.37E-02
H-3	3.8454E-03	33.98	62.29	0.00E+00	1.31E-01	2.40E-01
I-129	1.2891E-06	33.98	62.29	0.00E+00	4.38E-05	8.03E-05
Kr-85	2.7848E-02	33.98	62.29	0.00E+00	9.46E-01	1.73E+00
Np-237	3.7516E-06	33.98	62.29	0.00E+00	1.27E-04	2.34E-04
Pa-231	1.2488E-11	33.98	62.29	0.00E+00	4.24E-10	7.78E-10
Pb-210	2.4206E-12	33.98	62.29	0.00E+00	8.22E-11	1.51E-10
Pm-147	1.5671E-02	33.98	62.29	0.00E+00	5.32E-01	9.76E-01
Pu-238	1.4877E-02	33.98	62.29	0.00E+00	5.05E-01	9.27E-01
Pu-239	-3.5520E-02	33.98	0.00	4.48E+00	3.27E+00	4.48E+00
Pu-240	2.0690E-02	33.98	62.29	2.28E+00	2.98E+00	3.57E+00
Pu-241	-1.4799E+00	33.98	0.00	1.02E+02	5.20E+01	1.02E+02
Pu-242	1.1252E-05	33.98	62.29	6.07E-04	9.90E-04	1.31E-03
Ra-226	7.8524E-12	33.98	62.29	0.00E+00	2.67E-10	4.89E-10
Ra-228	2.4066E-16	33.98	62.29	0.00E+00	8.18E-15	1.50E-14
Ru-106	1.5066E-05	33.98	62.29	0.00E+00	5.12E-04	9.38E-04
Se-79	1.0127E-05	33.98	62.29	0.00E+00	3.44E-04	6.31E-04
Sn-126	4.3902E-05	33.98	62.29	0.00E+00	1.49E-03	2.73E-03
Sr-90	5.0088E-01	33.98	62.29	0.00E+00	1.70E+01	3.12E+01
Tc-99	3.9412E-04	33.98	62.29	0.00E+00	1.34E-02	2.45E-02
Th-229	2.7219E-12	33.98	62.29	0.00E+00	9.25E-11	1.70E-10
Th-230	1.0441E-09	33.98	62.29	0.00E+00	3.55E-08	6.50E-08
Th-232	3.1689E-16	33.98	62.29	0.00E+00	1.08E-14	1.97E-14
Tl-208	4.6636E-07	33.98	62.29	0.00E+00	1.58E-05	2.90E-05
U-232	1.2638E-06	33.98	62.29	0.00E+00	4.29E-05	7.87E-05
U-233	5.7451E-10	33.98	62.29	0.00E+00	1.95E-08	3.58E-08
U-234	4.3044E-06	33.98	62.29	0.00E+00	1.46E-04	2.68E-04
U-235	-7.7765E-09	33.98	0.00	9.20E-07	6.56E-07	9.20E-07
U-236	1.8050E-07	33.98	62.29	0.00E+00	6.13E-06	1.12E-05
U-238	-1.7914E-07	33.98	0.00	6.70E-05	6.09E-05	6.70E-05
Y-90	5.0088E-01	33.98	62.29	0.00E+00	1.70E+01	3.12E+01
Other Radionuclides					4.61E+01	8.63E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.031E+12
0.0250	4.051E+11
0.0375	4.707E+11
0.0575	4.671E+11
0.0850	2.255E+11
0.1250	1.586E+11
0.2250	1.819E+11
0.3750	7.886E+10
0.5750	3.195E+12
0.8500	3.338E+10
1.2500	3.996E+10
1.7500	9.039E+08
2.2500	1.803E+05
2.7500	1.032E+06
3.5000	4.536E+03
5.0000	1.513E+03
7.0000	1.727E+02
11.0000	1.975E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.11E-01	1.18E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		33.98
Bounding:		62.29

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=0.283kg
Bounding burnup taken from SFD and converted to MWd using BOL=0.283kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.79	
Bounding:	1.45	

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: FSVR
SNF ID #: 88
Fuel Units & Descr: 1464 - CARBON COATED PART
Heavy Metal Mass: BOL=15366.583kg; EOL=14725.937kg
ROD Storage Site: FSV

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 292.80

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	3.8818E-06	605,875.77	722,229.41	0.00E+00	2.35E+00	2.80E+00
Am-241	3.1387E-03	605,875.77	722,229.41	0.00E+00	1.90E+03	2.27E+03
Am-242m	2.3971E-06	605,875.77	722,229.41	0.00E+00	1.45E+00	1.73E+00
Am-243	4.6069E-05	605,875.77	722,229.41	0.00E+00	2.79E+01	3.33E+01
C-14	2.3121E-05	605,875.77	722,229.41	0.00E+00	1.40E+01	1.67E+01
Cl-36	1.0667E-06	605,875.77	722,229.41	0.00E+00	6.46E-01	7.70E-01
Cm-243	2.5357E-05	605,875.77	722,229.41	0.00E+00	1.54E+01	1.83E+01
Cm-244	6.4458E-03	605,875.77	722,229.41	0.00E+00	3.91E+03	4.66E+03
Co-60	4.5014E-04	605,875.77	722,229.41	0.00E+00	2.73E+02	3.25E+02
Cs-134	3.8086E-05	605,875.77	722,229.41	0.00E+00	2.31E+01	2.75E+01
Cs-135	2.4711E-05	605,875.77	722,229.41	0.00E+00	1.50E+01	1.78E+01
Cs-137	1.3273E+00	605,875.77	722,229.41	0.00E+00	8.04E+05	9.59E+05
Eu-154	1.5705E-02	605,875.77	722,229.41	0.00E+00	9.52E+03	1.13E+04
Eu-155	1.0415E-03	605,875.77	722,229.41	0.00E+00	6.31E+02	7.52E+02
Fe-55	4.4707E-08	605,875.77	722,229.41	0.00E+00	2.71E-02	3.23E-02
H-3	3.9094E-03	605,875.77	722,229.41	0.00E+00	2.37E+03	2.82E+03
I-129	1.0092E-06	605,875.77	722,229.41	0.00E+00	6.11E-01	7.29E-01
Kr-85	3.9519E-02	605,875.77	722,229.41	0.00E+00	2.39E+04	2.85E+04
Np-237	1.2541E-05	605,875.77	722,229.41	0.00E+00	7.60E+00	9.06E+00
Pa-231	4.7376E-06	605,875.77	722,229.41	0.00E+00	2.87E+00	3.42E+00
Pb-210	1.4194E-09	605,875.77	722,229.41	0.00E+00	8.60E-04	1.03E-03
Pm-147	1.5146E-04	605,875.77	722,229.41	0.00E+00	9.18E+01	1.09E+02
Pu-238	1.6248E-01	605,875.77	722,229.41	0.00E+00	9.84E+04	1.17E+05
Pu-239	1.3580E-04	605,875.77	722,229.41	0.00E+00	8.23E+01	9.81E+01
Pu-240	2.7136E-04	605,875.77	722,229.41	0.00E+00	1.64E+02	1.96E+02
Pu-241	1.9342E-02	605,875.77	722,229.41	0.00E+00	1.17E+04	1.40E+04
Pu-242	3.8866E-06	605,875.77	722,229.41	0.00E+00	2.35E+00	2.81E+00
Ra-226	2.7923E-09	605,875.77	722,229.41	0.00E+00	1.69E-03	2.02E-03
Ra-228	9.1791E-07	605,875.77	722,229.41	0.00E+00	5.56E-01	6.63E-01
Ru-106	3.5205E-11	605,875.77	722,229.41	0.00E+00	2.13E-05	2.54E-05
Se-79	2.1082E-05	605,875.77	722,229.41	0.00E+00	1.28E+01	1.52E+01
Sn-126	2.2192E-05	605,875.77	722,229.41	0.00E+00	1.34E+01	1.60E+01
Sr-90	1.2667E+00	605,875.77	722,229.41	0.00E+00	7.67E+05	9.15E+05
Tc-99	3.3331E-04	605,875.77	722,229.41	0.00E+00	2.02E+02	2.41E+02
Th-229	1.0612E-05	605,875.77	722,229.41	0.00E+00	6.43E+00	7.66E+00
Th-230	1.8878E-07	605,875.77	722,229.41	0.00E+00	1.14E-01	1.36E-01
Th-232	-6.9673E-08	605,875.77	0.00	1.52E+00	1.48E+00	1.52E+00
Tl-208	5.9530E-04	605,875.77	722,229.41	0.00E+00	3.61E+02	4.30E+02
U-232	1.6115E-03	605,875.77	722,229.41	0.00E+00	9.76E+02	1.16E+03
U-233	2.0602E-03	605,875.77	722,229.41	0.00E+00	1.25E+03	1.49E+03
U-234	2.8939E-04	605,875.77	722,229.41	0.00E+00	1.75E+02	2.09E+02
U-235	-1.7343E-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.068E+16
0.0250	1.038E+16
0.0375	9.048E+15
0.0575	9.733E+15
0.0850	5.876E+15
0.1250	3.964E+15
0.2250	5.098E+15
0.3750	2.204E+15
0.5750	3.577E+16
0.8500	5.653E+14
1.2500	3.644E+14
1.7500	1.731E+13
2.2500	1.275E+09
2.7500	1.510E+13
3.5000	7.211E+07
5.0000	3.075E+07
7.0000	3.533E+06
11.0000	4.052E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.29E+04	1.54E+04
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 %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	.
Bounding:	0.47	1.68

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: FSVR
SNF ID #: 85
Fuel Units & Descr: 744 - CARBON COATED PART
Heavy Metal Mass: BOL=8780.018kg; EOL=8626.159kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1980
Estimates as of: 2030
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 50 years

Estimated Canister usage: 18"x15' 143.80

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.2062E-06	145,508.60	412,660.86	0.00E+00	6.12E-01	1.74E+00
Am-241	3.2229E-03	145,508.60	412,660.86	0.00E+00	4.69E+02	1.33E+03
Am-242m	2.2381E-06	145,508.60	412,660.86	0.00E+00	3.26E-01	9.24E-01
Am-243	4.6006E-05	145,508.60	412,660.86	0.00E+00	6.69E+00	1.90E+01
C-14	2.3062E-05	145,508.60	412,660.86	0.00E+00	3.36E+00	9.52E+00
Cl-36	1.0667E-06	145,508.60	412,660.86	0.00E+00	1.55E-01	4.40E-01
Cm-243	1.7602E-05	145,508.60	412,660.86	0.00E+00	2.56E+00	7.26E+00
Cm-244	3.6307E-03	145,508.60	412,660.86	0.00E+00	5.28E+02	1.50E+03
Co-60	6.2585E-05	145,508.60	412,660.86	0.00E+00	9.11E+00	2.58E+01
Cs-134	2.4585E-07	145,508.60	412,660.86	0.00E+00	3.58E-02	1.01E-01
Cs-135	2.4711E-05	145,508.60	412,660.86	0.00E+00	3.60E+00	1.02E+01
Cs-137	9.3838E-01	145,508.60	412,660.86	0.00E+00	1.37E+05	3.87E+05
Eu-154	4.6887E-03	145,508.60	412,660.86	0.00E+00	6.62E+02	1.93E+03
Eu-155	1.2793E-04	145,508.60	412,660.86	0.00E+00	1.86E+01	5.28E+01
Fe-55	6.1951E-10	145,508.60	412,660.86	0.00E+00	1.19E-04	3.38E-04
H-3	1.6839E-03	145,508.60	412,660.86	0.00E+00	2.45E+02	6.95E+02
I-129	1.0092E-06	145,508.60	412,660.86	0.00E+00	1.47E-01	4.16E-01
Kr-85	1.4981E-02	145,508.60	412,660.86	0.00E+00	2.18E+03	6.18E+03
Np-237	1.2556E-05	145,508.60	412,660.86	0.00E+00	1.83E+00	5.18E+00
Pa-231	4.7360E-06	145,508.60	412,660.86	0.00E+00	6.89E-01	1.95E+00
Pb-210	2.1901E-09	145,508.60	412,660.86	0.00E+00	3.19E-04	9.04E-04
Pm-147	2.8781E-06	145,508.60	412,660.86	0.00E+00	4.19E-01	1.19E+00
Pu-238	1.4430E-01	145,508.60	412,660.86	0.00E+00	2.10E+04	5.95E+04
Pu-239	1.3572E-04	145,508.60	412,660.86	0.00E+00	1.97E+01	5.60E+01
Pu-240	2.7537E-04	145,508.60	412,660.86	0.00E+00	4.01E+01	1.14E+02
Pu-241	9.3995E-03	145,508.60	412,660.86	0.00E+00	1.37E+03	3.88E+03
Pu-242	3.8866E-06	145,508.60	412,660.86	0.00E+00	5.66E-01	1.60E+00
Ra-226	4.1243E-09	145,508.60	412,660.86	0.00E+00	6.00E-04	1.70E-03
Ra-228	9.1949E-07	145,508.60	412,660.86	0.00E+00	1.34E-01	3.79E-01
Ru-106	1.1667E-15	145,508.60	412,660.86	0.00E+00	1.70E-10	4.81E-10
Se-79	2.1074E-05	145,508.60	412,660.86	0.00E+00	3.07E+00	8.70E+00
Sn-126	2.2192E-05	145,508.60	412,660.86	0.00E+00	3.23E+00	9.16E+00
Sr-90	8.8642E-01	145,508.60	412,660.86	0.00E+00	1.29E+05	3.66E+05
Tc-99	3.3323E-04	145,508.60	412,660.86	0.00E+00	4.85E+01	1.38E+02
Th-229	1.3517E-05	145,508.60	412,660.86	0.00E+00	1.97E+00	5.58E+00
Th-230	2.2822E-07	145,508.60	412,660.86	0.00E+00	3.32E-02	9.42E-02
Th-232	-6.9673E-08	145,508.60	0.00	8.68E-01	8.58E-01	8.68E-01
Tl-208	5.1524E-04	145,508.60	412,660.86	0.00E+00	7.50E+01	2.13E+02
U-232	1.3950E-03	145,508.60	412,660.86	0.00E+00	2.03E+02	5.76E+02
U-233	2.0602E-03	145,508.60	412,660.86	0.00E+00	3.00E+02	8.50E+02
U-234	2.9513E-04	145,508.60	412,660.86	0.00E+00	4.29E+01	1.22E+02
U-235	-1.7343E-06	145,508.60	0.00	1.74E+00	1.48E+00	1.74E+00
U-236	8.6281E-06	145,508.60	412,660.86	0.00E+00	1.26E+00	3.56E+00
U-238	-5.6065E-09	145,508.60	0.00	1.73E-02	1.65E-02	1.73E-02
Y-90	8.8642E-01	145,508.60	412,660.86	0.00E+00	1.29E+05	3.66E+05
Other Radionuclides					1.31E+05	3.73E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.031E+16
0.0250	4.146E+15
0.0375	3.600E+15
0.0575	3.888E+15
0.0850	2.346E+15
0.1250	1.544E+15
0.2250	2.032E+15
0.3750	8.800E+14
0.5750	1.444E+16
0.8500	1.805E+14
1.2500	8.715E+13
1.7500	5.541E+12
2.2500	4.610E+08
2.7500	7.466E+12
3.5000	2.462E+07
5.0000	1.048E+07
7.0000	1.203E+06
11.0000	1.378E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.33E+03	6.89E+03
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 %:	93.13638737	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		145,508.60
Bounding:	412,660.86	291,017.20

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.17	
Bounding:	0.47	0.71

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GA HTGR FUEL
SNF ID #: 89
Fuel Units & Descr: 2 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=2.162kg; EOL=2.081kg
ROD Storage Site: INEEL

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

Estimated Canister usage: HIC 1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.3583E-06	76.23	152.45	0.00E+00	2.56E-04	5.12E-04
Am-241	2.8805E-03	76.23	152.45	0.00E+00	2.20E-01	4.39E-01
Am-242m	2.5089E-06	76.23	152.45	0.00E+00	1.91E-04	3.82E-04
Am-243	4.6116E-05	76.23	152.45	0.00E+00	3.52E-03	7.03E-03
C-14	2.3152E-05	76.23	152.45	0.00E+00	1.76E-03	3.53E-03
Cl-36	1.0667E-06	76.23	152.45	0.00E+00	8.13E-05	1.63E-04
Cm-243	3.2339E-05	76.23	152.45	0.00E+00	2.47E-03	4.93E-03
Cm-244	9.4546E-03	76.23	152.45	0.00E+00	7.21E-01	1.44E+00
Co-60	1.6776E-03	76.23	152.45	0.00E+00	1.28E-01	2.56E-01
Cs-134	1.0974E-03	76.23	152.45	0.00E+00	8.36E-02	1.67E-01
Cs-135	2.4711E-05	76.23	152.45	0.00E+00	1.88E-03	3.77E-03
Cs-137	1.6729E+00	76.23	152.45	0.00E+00	1.28E+02	2.55E+02
Eu-154	3.5166E-02	76.23	152.45	0.00E+00	2.68E+00	5.36E+00
Eu-155	4.2148E-03	76.23	152.45	0.00E+00	3.21E-01	6.43E-01
Fe-55	6.4301E-07	76.23	152.45	0.00E+00	4.90E-05	9.80E-05
H-3	6.8528E-03	76.23	152.45	0.00E+00	5.22E-01	1.04E+00
I-129	1.0092E-06	76.23	152.45	0.00E+00	7.69E-05	1.54E-04
Kr-85	7.5440E-02	76.23	152.45	0.00E+00	5.75E+00	1.15E+01
Np-237	1.2525E-05	76.23	152.45	0.00E+00	9.55E-04	1.91E-03
Pa-231	4.7383E-06	76.23	152.45	0.00E+00	3.61E-04	7.22E-04
Pb-210	9.1476E-10	76.23	152.45	0.00E+00	6.97E-08	1.39E-07
Pm-147	2.1271E-03	76.23	152.45	0.00E+00	1.62E-01	3.24E-01
Pu-238	1.7587E-01	76.23	152.45	0.00E+00	1.34E+01	2.68E+01
Pu-239	1.3580E-04	76.23	152.45	0.00E+00	1.04E-02	2.07E-02
Pu-240	2.6404E-04	76.23	152.45	0.00E+00	2.01E-02	4.03E-02
Pu-241	3.1300E-02	76.23	152.45	0.00E+00	2.39E+00	4.77E+00
Pu-242	3.8866E-06	76.23	152.45	0.00E+00	2.96E-04	5.93E-04
Ra-226	1.7059E-09	76.23	152.45	0.00E+00	1.30E-07	2.60E-07
Ra-228	9.1083E-07	76.23	152.45	0.00E+00	6.94E-05	1.39E-04
Ru-106	3.4126E-08	76.23	152.45	0.00E+00	2.60E-06	5.20E-06
Se-79	2.1082E-05	76.23	152.45	0.00E+00	1.61E-03	3.21E-03
Sn-126	2.2200E-05	76.23	152.45	0.00E+00	1.69E-03	3.38E-03
Sr-90	1.6067E+00	76.23	152.45	0.00E+00	1.22E+02	2.45E+02
Tc-99	3.3331E-04	76.23	152.45	0.00E+00	2.54E-02	5.08E-02
Th-229	7.7062E-06	76.23	152.45	0.00E+00	5.87E-04	1.17E-03
Th-230	1.5020E-07	76.23	152.45	0.00E+00	1.14E-05	2.29E-05
Th-232	-6.9673E-06	76.23	0.00	2.14E-04	2.09E-04	2.14E-04
Tl-208	6.5584E-04	76.23	152.45	0.00E+00	5.00E-02	1.00E-01
U-232	1.7744E-03	76.23	152.45	0.00E+00	1.35E-01	2.71E-01
U-233	2.0602E-03	76.23	152.45	0.00E+00	1.57E-01	3.14E-01
U-234	2.8285E-04	76.23	152.45	0.00E+00	2.16E-02	4.31E-02
U-235	-1.7343E-06	76.23	0.00	4.28E-04	2.95E-04	4.28E-04
U-236	8.6281E-06	76.23	152.45	0.00E+00	6.58E-04	1.32E-03
U-238	-5.6065E-09	76.23	0.00	4.25E-06	3.83E-06	4.25E-06
Y-90	1.6067E+00	76.23	152.45	0.00E+00	1.22E+02	2.45E+02
Other Radionuclides					1.22E+02	2.44E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.357E+13
0.0250	2.787E+12
0.0375	2.446E+12
0.0575	2.613E+12
0.0850	1.580E+12
0.1250	1.100E+12
0.2250	1.372E+12
0.3750	5.920E+11
0.5750	9.534E+12
0.8500	1.973E+11
1.2500	1.558E+11
1.7500	5.940E+09
2.2500	4.126E+05
2.7500	3.511E+09
3.5000	2.175E+04
5.0000	9.278E+03
7.0000	1.067E+03
11.0000	1.224E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.99E+00	3.98E+00
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 %:	92.189	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		76.23
Bounding:		152.45

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

[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: GA RERTR
SNF ID #: 90
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=3.851kg; EOL=3.071kg
ROD Storage Site: INEEL

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

Estimated Canister usage: HIC 0.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	744.21	1,488.42	0.00E+00	6.34E-07	1.27E-06
Am-241	1.8331E-03	744.21	1,488.42	0.00E+00	1.36E+00	2.73E+00
Am-242m	1.4129E-06	744.21	1,488.42	0.00E+00	1.05E-03	2.10E-03
Am-243	1.4774E-07	744.21	1,488.42	0.00E+00	1.10E-04	2.20E-04
C-14	1.2871E-04	744.21	1,488.42	0.00E+00	9.58E-02	1.92E-01
Cl-36	2.8120E-06	744.21	1,488.42	0.00E+00	2.09E-03	4.19E-03
Cm-243	1.7940E-07	744.21	1,488.42	0.00E+00	1.34E-04	2.67E-04
Cm-244	1.6962E-06	744.21	1,488.42	0.00E+00	1.26E-03	2.52E-03
Co-60	1.2839E+00	744.21	1,488.42	0.00E+00	9.56E+02	1.91E+03
Cs-134	9.0541E-02	744.21	1,488.42	0.00E+00	6.74E+01	1.35E+02
Cs-135	3.2195E-05	744.21	1,488.42	0.00E+00	2.40E-02	4.79E-02
Cs-137	2.7564E+00	744.21	1,488.42	0.00E+00	2.05E+03	4.10E+03
Eu-154	1.5368E-02	744.21	1,488.42	0.00E+00	1.14E+01	2.29E+01
Eu-155	2.9293E-02	744.21	1,488.42	0.00E+00	2.18E+01	4.36E+01
Fe-55	7.7158E-01	744.21	1,488.42	0.00E+00	5.74E+02	1.15E+03
H-3	1.1111E-02	744.21	1,488.42	0.00E+00	8.27E+00	1.65E+01
I-129	7.3684E-07	744.21	1,488.42	0.00E+00	5.48E-04	1.10E-03
Kr-85	2.5263E-01	744.21	1,488.42	0.00E+00	1.88E+02	3.76E+02
Np-237	1.2427E-06	744.21	1,488.42	0.00E+00	9.25E-04	1.85E-03
Pa-231	3.8511E-09	744.21	1,488.42	0.00E+00	2.87E-06	5.73E-06
Pb-210	7.3880E-15	744.21	1,488.42	0.00E+00	5.50E-12	1.10E-11
Pm-147	2.1023E+00	744.21	1,488.42	0.00E+00	1.56E+03	3.13E+03
Pu-238	1.0383E-03	744.21	1,488.42	0.00E+00	7.73E-01	1.55E+00
Pu-239	5.5293E-03	744.21	1,488.42	0.00E+00	4.11E+00	8.23E+00
Pu-240	2.1278E-03	744.21	1,488.42	0.00E+00	1.58E+00	3.17E+00
Pu-241	1.0195E-01	744.21	1,488.42	0.00E+00	7.59E+01	1.52E+02
Pu-242	2.3128E-07	744.21	1,488.42	0.00E+00	1.72E-04	3.44E-04
Ra-226	5.2782E-14	744.21	1,488.42	0.00E+00	3.93E-11	7.86E-11
Ra-228	1.9338E-10	744.21	1,488.42	0.00E+00	1.44E-07	2.88E-07
Ru-106	9.1684E-02	744.21	1,488.42	0.00E+00	6.82E+01	1.36E+02
Se-79	1.3018E-05	744.21	1,488.42	0.00E+00	9.69E-03	1.94E-02
Sn-126	1.2167E-05	744.21	1,488.42	0.00E+00	9.05E-03	1.81E-02
Sr-90	2.6045E+00	744.21	1,488.42	0.00E+00	1.94E+03	3.88E+03
Tc-99	4.4241E-04	744.21	1,488.42	0.00E+00	3.29E-01	6.58E-01
Th-229	1.3713E-10	744.21	1,488.42	0.00E+00	1.02E-07	2.04E-07
Th-230	1.8090E-11	744.21	1,488.42	0.00E+00	1.35E-08	2.69E-08
Th-232	2.5278E-10	744.21	1,488.42	0.00E+00	1.88E-07	3.76E-07
Tl-208	1.6947E-08	744.21	1,488.42	0.00E+00	1.26E-05	2.52E-05
U-232	4.8737E-08	744.21	1,488.42	0.00E+00	3.63E-05	7.25E-05
U-233	1.2203E-07	744.21	1,488.42	0.00E+00	9.08E-05	1.82E-04
U-234	1.5925E-07	744.21	1,488.42	0.00E+00	1.19E-04	2.37E-04
U-235	-2.6194E-06	744.21	0.00	1.65E-03	0.00E+00	1.65E-03
U-236	1.2693E-05	744.21	1,488.42	0.00E+00	9.45E-03	1.89E-02
U-238	-3.6331E-08	744.21	0.00	1.04E-03	1.01E-03	1.04E-03
Y-90	2.6060E+00	744.21	1,488.42	0.00E+00	1.94E+03	3.88E+03
Other Radionuclides					2.68E+03	5.37E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.406E+14
0.0250	5.293E+13
0.0375	4.508E+13
0.0575	4.627E+13
0.0850	2.867E+13
0.1250	2.082E+13
0.2250	2.432E+13
0.3750	1.234E+13
0.5750	1.841E+14
0.8500	7.041E+12
1.2500	1.430E+14
1.7500	9.531E+10
2.2500	1.536E+11
2.7500	1.219E+09
3.5000	1.419E+08
5.0000	7.824E+02
7.0000	8.856E+01
11.0000	1.009E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.33E+01	8.86E+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:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.787	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		744.21
Bounding:		1,488.42

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:	5.67	
Bounding:	11.33	

Estimated EOL HM/Given EOL HM: 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GCRE CAN (1B-8T 1&2)
SNF ID #: 94
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.908kg; EOL=0.908kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-06	17.15	34.31	0.00E+00	7.88E-07	1.58E-06
Am-241	1.1471E-04	17.15	34.31	0.00E+00	1.97E-03	3.94E-03
Am-242m	7.4210E-09	17.15	34.31	0.00E+00	1.27E-07	2.55E-07
Am-243	9.8236E-10	17.15	34.31	0.00E+00	1.69E-08	3.37E-08
C-14	2.2928E-04	17.15	34.31	0.00E+00	3.93E-03	7.87E-03
Cl-36	1.2260E-06	17.15	34.31	0.00E+00	2.10E-05	4.21E-05
Cm-243	1.2000E-10	17.15	34.31	0.00E+00	2.06E-09	4.12E-09
Cm-244	7.3577E-10	17.15	34.31	0.00E+00	1.26E-08	2.52E-08
Co-60	1.3732E-03	17.15	34.31	0.00E+00	2.36E-02	4.71E-02
Cs-134	1.2709E-10	17.15	34.31	0.00E+00	2.18E-09	4.36E-09
Cs-135	3.0316E-05	17.15	34.31	0.00E+00	5.20E-04	1.04E-03
Cs-137	7.2579E-01	17.15	34.31	0.00E+00	1.25E+01	2.49E+01
Eu-154	5.9750E-05	17.15	34.31	0.00E+00	1.03E-03	2.05E-03
Eu-155	1.0577E-05	17.15	34.31	0.00E+00	1.81E-04	3.63E-04
Fe-55	4.1631E-07	17.15	34.31	0.00E+00	7.14E-08	1.43E-05
H-3	4.6722E-04	17.15	34.31	0.00E+00	8.02E-03	1.60E-02
I-129	7.3195E-07	17.15	34.31	0.00E+00	1.26E-05	2.51E-05
Kr-85	5.9418E-03	17.15	34.31	0.00E+00	1.02E-01	2.04E-01
Np-237	1.1499E-06	17.15	34.31	0.00E+00	1.97E-05	3.95E-05
Pa-231	7.0899E-08	17.15	34.31	0.00E+00	1.22E-06	2.43E-06
Pb-210	2.2363E-12	17.15	34.31	0.00E+00	3.84E-11	7.67E-11
Pm-147	4.2296E-07	17.15	34.31	0.00E+00	7.26E-06	1.45E-05
Pu-238	2.3295E-04	17.15	34.31	0.00E+00	4.00E-03	7.99E-03
Pu-239	6.6722E-04	17.15	34.31	0.00E+00	1.14E-02	2.29E-02
Pu-240	8.6556E-05	17.15	34.31	0.00E+00	1.48E-03	2.97E-03
Pu-241	1.6889E-04	17.15	34.31	0.00E+00	2.90E-03	5.79E-03
Pu-242	1.9717E-09	17.15	34.31	0.00E+00	3.38E-08	6.76E-08
Ra-226	4.5740E-12	17.15	34.31	0.00E+00	7.85E-11	1.57E-10
Ra-228	8.3511E-12	17.15	34.31	0.00E+00	1.43E-10	2.87E-10
Ru-106	2.0516E-19	17.15	34.31	0.00E+00	3.52E-18	7.04E-18
Se-79	1.3220E-05	17.15	34.31	0.00E+00	2.27E-04	4.54E-04
Sn-126	1.1489E-05	17.15	34.31	0.00E+00	1.97E-04	3.94E-04
Sr-90	6.6872E-01	17.15	34.31	0.00E+00	1.15E+01	2.29E+01
Tc-99	4.6639E-04	17.15	34.31	0.00E+00	8.00E-03	1.60E-02
Th-229	2.3727E-11	17.15	34.31	0.00E+00	4.07E-10	8.14E-10
Th-230	2.7354E-10	17.15	34.31	0.00E+00	4.69E-09	9.39E-09
Th-232	8.3594E-12	17.15	34.31	0.00E+00	1.43E-10	2.87E-10
Tl-208	1.6228E-08	17.15	34.31	0.00E+00	2.78E-07	5.57E-07
U-232	4.3960E-08	17.15	34.31	0.00E+00	7.54E-07	1.51E-06
U-233	3.3344E-09	17.15	34.31	0.00E+00	5.72E-08	1.14E-07
U-234	4.0749E-07	17.15	34.31	0.00E+00	6.99E-06	1.40E-05
U-235	-2.7761E-06	17.15	0.00	1.83E-03	1.78E-03	1.83E-03
U-236	1.6190E-05	17.15	34.31	0.00E+00	2.78E-04	5.55E-04
U-238	-2.8547E-09	17.15	0.00	2.05E-05	2.05E-05	2.05E-05
Y-90	6.6889E-01	17.15	34.31	0.00E+00	1.15E+01	2.29E+01
Other Radionuclides					1.56E+01	3.12E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.252E+12
0.0250	2.602E+11
0.0375	2.261E+11
0.0575	2.426E+11
0.0850	1.466E+11
0.1250	9.503E+10
0.2250	1.263E+11
0.3750	5.509E+10
0.5750	9.267E+11
0.8500	9.000E+09
1.2500	6.514E+09
1.7500	2.315E+08
2.2500	4.379E+04
2.7500	1.961E+04
3.5000	2.139E+00
5.0000	8.847E-01
7.0000	9.792E-02
11.0000	1.100E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.40E-01	2.79E-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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.282	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:

This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		17.15
Bounding:		34.31

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

[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: GCRE PELLETS (1B-7T-1)
SNF ID #: 95
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.074kg; EOL=0.074kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.08

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	4.5940E-08	1.40	2.79	0.00E+00	6.41E-08	1.28E-07
Am-241	1.1471E-04	1.40	2.79	0.00E+00	1.60E-04	3.20E-04
Am-242m	7.4210E-09	1.40	2.79	0.00E+00	1.04E-08	2.07E-08
Am-243	9.8236E-10	1.40	2.79	0.00E+00	1.37E-09	2.74E-09
C-14	2.2928E-04	1.40	2.79	0.00E+00	3.20E-04	6.40E-04
Cl-36	1.2260E-06	1.40	2.79	0.00E+00	1.71E-06	3.42E-06
Cm-243	1.2000E-10	1.40	2.79	0.00E+00	1.68E-10	3.35E-10
Cm-244	7.3577E-10	1.40	2.79	0.00E+00	1.03E-09	2.05E-09
Co-60	1.3732E-03	1.40	2.79	0.00E+00	1.92E-03	3.83E-03
Cs-134	1.2709E-10	1.40	2.79	0.00E+00	1.77E-10	3.55E-10
Cs-135	3.0316E-05	1.40	2.79	0.00E+00	4.23E-05	8.47E-05
Cs-137	7.2579E-01	1.40	2.79	0.00E+00	1.01E+00	2.03E+00
Eu-154	5.9750E-05	1.40	2.79	0.00E+00	8.34E-05	1.67E-04
Eu-155	1.0577E-05	1.40	2.79	0.00E+00	1.48E-05	2.95E-05
Fe-55	4.1631E-07	1.40	2.79	0.00E+00	5.81E-07	1.16E-06
H-3	4.6722E-04	1.40	2.79	0.00E+00	6.52E-04	1.30E-03
I-129	7.3195E-07	1.40	2.79	0.00E+00	1.02E-06	2.04E-06
Kr-85	5.9418E-03	1.40	2.79	0.00E+00	8.30E-03	1.66E-02
Np-237	1.1499E-06	1.40	2.79	0.00E+00	1.61E-06	3.21E-06
Pa-231	7.0899E-08	1.40	2.79	0.00E+00	9.90E-08	1.98E-07
Pb-210	2.2363E-12	1.40	2.79	0.00E+00	3.12E-12	6.24E-12
Pm-147	4.2296E-07	1.40	2.79	0.00E+00	5.91E-07	1.18E-06
Pu-238	2.3295E-04	1.40	2.79	0.00E+00	3.25E-04	6.50E-04
Pu-239	6.6722E-04	1.40	2.79	0.00E+00	9.32E-04	1.86E-03
Pu-240	8.6556E-05	1.40	2.79	0.00E+00	1.21E-04	2.42E-04
Pu-241	1.6889E-04	1.40	2.79	0.00E+00	2.36E-04	4.72E-04
Pu-242	1.9717E-09	1.40	2.79	0.00E+00	2.75E-09	5.51E-09
Ra-226	4.5740E-12	1.40	2.79	0.00E+00	6.39E-12	1.28E-11
Ra-228	8.3511E-12	1.40	2.79	0.00E+00	1.17E-11	2.33E-11
Ru-106	2.0516E-19	1.40	2.79	0.00E+00	2.86E-19	5.73E-19
Se-79	1.3220E-05	1.40	2.79	0.00E+00	1.85E-05	3.69E-05
Sn-126	1.1489E-05	1.40	2.79	0.00E+00	1.60E-05	3.21E-05
Sr-90	6.6872E-01	1.40	2.79	0.00E+00	9.34E-01	1.87E+00
Tc-99	4.6639E-04	1.40	2.79	0.00E+00	6.51E-04	1.30E-03
Th-229	2.3727E-11	1.40	2.79	0.00E+00	3.31E-11	6.63E-11
Th-230	2.7364E-10	1.40	2.79	0.00E+00	3.82E-10	7.64E-10
Th-232	8.3594E-12	1.40	2.79	0.00E+00	1.17E-11	2.33E-11
Tl-208	1.6228E-08	1.40	2.79	0.00E+00	2.27E-08	4.53E-08
U-232	4.3960E-08	1.40	2.79	0.00E+00	6.14E-08	1.23E-07
U-233	3.3344E-09	1.40	2.79	0.00E+00	4.66E-09	9.31E-09
U-234	4.0749E-07	1.40	2.79	0.00E+00	5.69E-07	1.14E-06
U-235	-2.7761E-06	1.40	0.00	1.49E-04	1.45E-04	1.49E-04
U-236	1.6190E-05	1.40	2.79	0.00E+00	2.26E-05	4.52E-05
U-238	-2.8547E-09	1.40	0.00	1.71E-06	1.71E-06	1.71E-06
Y-90	6.6889E-01	1.40	2.79	0.00E+00	9.34E-01	1.87E+00
Other Radionuclides					1.27E+00	2.54E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.019E+11
0.0250	2.116E+10
0.0375	1.840E+10
0.0575	1.975E+10
0.0850	1.193E+10
0.1250	7.734E+09
0.2250	1.028E+10
0.3750	4.484E+09
0.5750	7.842E+10
0.8500	7.325E+08
1.2500	5.302E+08
1.7500	1.884E+07
2.2500	3.564E+03
2.7500	1.596E+03
3.5000	1.743E-01
5.0000	7.210E-02
7.0000	7.981E-03
11.0000	8.968E-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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1.40
Bounding:		2.79

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

[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: GETR FILTERS
SNF ID #: 98
Fuel Units & Descr: 70 - FILTERS
Heavy Metal Mass: BOL=4.543kg; EOL=4.417kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1977
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated Canister usage:

HIC
1.56

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	3.4276E-08	119.03	238.05	0.00E+00	4.08E-06	8.16E-06
Am-241	1.1458E-04	119.03	238.05	0.00E+00	1.36E-02	2.73E-02
Am-242m	7.9468E-09	119.03	238.05	0.00E+00	9.46E-07	1.89E-06
Am-243	9.8386E-10	119.03	238.05	0.00E+00	1.17E-07	2.34E-07
C-14	2.2978E-04	119.03	238.05	0.00E+00	2.74E-02	5.47E-02
Cl-36	1.2261E-06	119.03	238.05	0.00E+00	1.46E-04	2.92E-04
Cm-243	1.7271E-10	119.03	238.05	0.00E+00	2.06E-08	4.11E-08
Cm-244	1.3058E-09	119.03	238.05	0.00E+00	1.55E-07	3.11E-07
Co-60	9.8636E-03	119.03	238.05	0.00E+00	1.17E+00	2.35E+00
Cs-134	1.9617E-08	119.03	238.05	0.00E+00	2.33E-06	4.67E-06
Cs-135	3.0316E-05	119.03	238.05	0.00E+00	3.61E-03	7.22E-03
Cs-137	1.0263E+00	119.03	238.05	0.00E+00	1.22E+02	2.44E+02
Eu-154	2.0017E-04	119.03	238.05	0.00E+00	2.38E-02	4.76E-02
Eu-155	8.5957E-05	119.03	238.05	0.00E+00	1.02E-02	2.05E-02
Fe-55	2.2646E-05	119.03	238.05	0.00E+00	2.70E-03	5.39E-03
H-3	1.0835E-03	119.03	238.05	0.00E+00	1.29E-01	2.58E-01
I-129	7.3195E-07	119.03	238.05	0.00E+00	8.71E-05	1.74E-04
Kr-85	1.5661E-02	119.03	238.05	0.00E+00	1.86E+00	3.73E+00
Np-237	1.1494E-06	119.03	238.05	0.00E+00	1.37E-04	2.74E-04
Pa-231	5.8070E-06	119.03	238.05	0.00E+00	6.91E-06	1.38E-05
Pb-210	1.2985E-12	119.03	238.05	0.00E+00	1.55E-10	3.09E-10
Pm-147	2.2196E-05	119.03	238.05	0.00E+00	2.64E-03	5.28E-03
Pu-238	2.6223E-04	119.03	238.05	0.00E+00	3.12E-02	6.24E-02
Pu-239	6.6739E-04	119.03	238.05	0.00E+00	7.94E-02	1.59E-01
Pu-240	8.6705E-05	119.03	238.05	0.00E+00	1.03E-02	2.06E-02
Pu-241	3.4759E-04	119.03	238.05	0.00E+00	4.14E-02	8.27E-02
Pu-242	1.9717E-09	119.03	238.05	0.00E+00	2.35E-07	4.69E-07
Ra-226	3.0000E-12	119.03	238.05	0.00E+00	3.57E-10	7.14E-10
Ra-228	8.3328E-12	119.03	238.05	0.00E+00	9.92E-10	1.98E-09
Ru-106	6.1464E-15	119.03	238.05	0.00E+00	7.32E-13	1.46E-12
Se-79	1.3221E-05	119.03	238.05	0.00E+00	1.57E-03	3.15E-03
Sn-126	1.1491E-05	119.03	238.05	0.00E+00	1.37E-03	2.74E-03
Sr-90	9.5541E-01	119.03	238.05	0.00E+00	1.14E+02	2.27E+02
Tc-99	4.6656E-04	119.03	238.05	0.00E+00	5.55E-02	1.11E-01
Th-229	1.9085E-11	119.03	238.05	0.00E+00	2.27E-09	4.54E-09
Th-230	2.1913E-10	119.03	238.05	0.00E+00	2.61E-08	5.22E-08
Th-232	8.3478E-12	119.03	238.05	0.00E+00	9.94E-10	1.99E-09
Tl-208	1.8752E-08	119.03	238.05	0.00E+00	2.23E-06	4.46E-06
U-232	5.0782E-08	119.03	238.05	0.00E+00	6.04E-06	1.21E-05
U-233	3.2596E-09	119.03	238.05	0.00E+00	3.88E-07	7.76E-07
U-234	3.9817E-07	119.03	238.05	0.00E+00	4.74E-05	9.48E-05
U-235	-2.7761E-06	119.03	0.00	9.14E-03	8.81E-03	9.14E-03
U-236	1.6190E-05	119.03	238.05	0.00E+00	1.93E-03	3.85E-03
U-238	-2.8547E-09	119.03	0.00	1.05E-04	1.04E-04	1.05E-04
Y-90	9.5557E-01	119.03	238.05	0.00E+00	1.14E+02	2.27E+02
Other Radionuclides					1.45E+02	2.90E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.241E+13
0.0250	2.580E+12
0.0375	2.236E+12
0.0575	2.406E+12
0.0850	1.453E+12
0.1250	9.427E+11
0.2250	1.252E+12
0.3750	5.462E+11
0.5750	9.094E+12
0.8500	8.979E+10
1.2500	2.045E+11
1.7500	2.312E+09
2.2500	1.172E+08
2.7500	1.596E+05
3.5000	1.472E+01
5.0000	6.084E+00
7.0000	6.728E-01
11.0000	7.556E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+08	2.78E+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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14635987	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		119.03
Bounding:		238.05

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:	0.56	
Bounding:	1.12	

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: H. B. ROBINSON (ASSEMBLY)
SNF ID #: 383
Fuel Units & Descr: 1 - ASSEMBLY
Heavy Metal Mass: BOL=236.248kg; EOL=229.168kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: PWR (Light Water, Zirc. 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	6,732.94	13,465.87	0.00E+00	7.23E-06	1.45E-05
Am-241	1.4751E-01	6,732.94	13,465.87	0.00E+00	9.93E+02	1.99E+03
Am-242m	2.6809E-04	6,732.94	13,465.87	0.00E+00	1.81E+00	3.61E+00
Am-243	6.2484E-04	6,732.94	13,465.87	0.00E+00	4.21E+00	8.41E+00
C-14	4.7820E-05	6,732.94	13,465.87	0.00E+00	3.22E-01	6.44E-01
Cl-36	8.0297E-07	6,732.94	13,465.87	0.00E+00	5.41E-03	1.08E-02
Cm-243	1.7426E-04	6,732.94	13,465.87	0.00E+00	1.17E+00	2.35E+00
Cm-244	2.7616E-02	6,732.94	13,465.87	0.00E+00	1.86E+02	3.72E+02
Co-60	3.5610E-04	6,732.94	13,465.87	0.00E+00	2.40E+00	4.80E+00
Cs-134	2.6260E-07	6,732.94	13,465.87	0.00E+00	1.77E-03	3.54E-03
Cs-135	1.4433E-05	6,732.94	13,465.87	0.00E+00	9.72E-02	1.94E-01
Cs-137	9.8870E-01	6,732.94	13,465.87	0.00E+00	6.66E+03	1.33E+04
Eu-154	6.0320E-03	6,732.94	13,465.87	0.00E+00	4.06E+01	8.12E+01
Eu-155	2.1770E-04	6,732.94	13,465.87	0.00E+00	1.47E+00	2.93E+00
Fe-55	7.9296E-07	6,732.94	13,465.87	0.00E+00	5.34E-03	1.07E-02
H-3	8.9486E-03	6,732.94	13,465.87	0.00E+00	6.03E+01	1.21E+02
I-129	9.8288E-07	6,732.94	13,465.87	0.00E+00	6.62E-03	1.32E-02
Kr-85	1.0707E-02	6,732.94	13,465.87	0.00E+00	7.21E+01	1.44E+02
Np-237	1.1927E-05	6,732.94	13,465.87	0.00E+00	8.03E-02	1.61E-01
Pa-231	1.4703E-09	6,732.94	13,465.87	0.00E+00	9.90E-06	1.98E-05
Pb-210	1.6828E-10	6,732.94	13,465.87	0.00E+00	1.13E-06	2.27E-06
Pm-147	6.9606E-06	6,732.94	13,465.87	0.00E+00	4.69E-02	9.37E-02
Pu-238	6.6263E-02	6,732.94	13,465.87	0.00E+00	4.46E+02	8.92E+02
Pu-239	1.1618E-02	6,732.94	13,465.87	0.00E+00	7.82E+01	1.56E+02
Pu-240	1.5142E-02	6,732.94	13,465.87	0.00E+00	1.02E+02	2.04E+02
Pu-241	4.3766E-01	6,732.94	13,465.87	0.00E+00	2.95E+03	5.89E+03
Pu-242	6.4260E-05	6,732.94	13,465.87	0.00E+00	4.33E-01	8.65E-01
Ra-226	3.8501E-10	6,732.94	13,465.87	0.00E+00	2.59E-06	5.18E-06
Ra-228	5.2955E-12	6,732.94	13,465.87	0.00E+00	3.57E-08	7.13E-08
Ru-106	2.0413E-14	6,732.94	13,465.87	0.00E+00	1.37E-10	2.75E-10
Se-79	1.2376E-05	6,732.94	13,465.87	0.00E+00	8.33E-02	1.67E-01
Sn-126	2.5210E-05	6,732.94	13,465.87	0.00E+00	1.70E-01	3.39E-01
Sr-90	6.4163E-01	6,732.94	13,465.87	0.00E+00	4.32E+03	8.64E+03
Tc-99	3.9357E-04	6,732.94	13,465.87	0.00E+00	2.65E+00	5.30E+00
Th-229	1.5644E-10	6,732.94	13,465.87	0.00E+00	1.05E-06	2.11E-06
Th-230	2.7972E-08	6,732.94	13,465.87	0.00E+00	1.88E-04	3.77E-04
Th-232	5.3036E-12	6,732.94	13,465.87	0.00E+00	3.57E-08	7.14E-08
Tl-208	1.5136E-07	6,732.94	13,465.87	0.00E+00	1.02E-03	2.04E-03
U-232	4.1005E-07	6,732.94	13,465.87	0.00E+00	2.76E-03	5.52E-03
U-233	2.5856E-08	6,732.94	13,465.87	0.00E+00	1.74E-04	3.48E-04
U-234	5.2665E-05	6,732.94	13,465.87	0.00E+00	3.55E-01	7.09E-01
U-235	-1.4487E-06	6,732.94	0.00	1.48E-02	5.05E-03	1.48E-02
U-236	7.5888E-06	6,732.94	13,465.87	0.00E+00	5.11E-02	1.02E-01
U-238	-2.6129E-07	6,732.94	0.00	7.71E-02	7.53E-02	7.71E-02
Y-90	6.4180E-01	6,732.94	13,465.87	0.00E+00	4.32E+03	8.64E+03
Other Radionuclides					6.42E+03	1.28E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.124E+14
0.0250	1.027E+14
0.0375	9.676E+13
0.0575	1.211E+14
0.0850	5.657E+13
0.1250	3.764E+13
0.2250	4.830E+13
0.3750	2.086E+13
0.5750	4.912E+14
0.8500	4.796E+12
1.2500	3.052E+12
1.7500	1.342E+11
2.2500	2.205E+07
2.7500	7.774E+07
3.5000	5.546E+06
5.0000	2.370E+06
7.0000	2.731E+05
11.0000	3.135E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E+02	2.44E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	6,617.31	6,732.94	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		13,465.87	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.81	1.02
Bounding:	1.63	

Estimated EOL HM/Given EOL HM: 1.00

[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: H. B. ROBINSON RODS
SNF ID #: 364
Fuel Units & Descr: 12 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=25.068kg; EOL=20.86kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: HIC 12.00

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	4,021.39	8,042.78	0.00E+00	4.32E-06	8.63E-06
Am-241	1.4751E-01	4,021.39	8,042.78	0.00E+00	5.93E+02	1.19E+03
Am-242m	2.6809E-04	4,021.39	8,042.78	0.00E+00	1.08E+00	2.16E+00
Am-243	6.2484E-04	4,021.39	8,042.78	0.00E+00	2.51E+00	5.03E+00
C-14	4.7820E-05	4,021.39	8,042.78	0.00E+00	1.92E-01	3.85E-01
Cl-36	8.0297E-07	4,021.39	8,042.78	0.00E+00	3.23E-03	6.46E-03
Cm-243	1.7426E-04	4,021.39	8,042.78	0.00E+00	7.01E-01	1.40E+00
Cm-244	2.7616E-02	4,021.39	8,042.78	0.00E+00	1.11E+02	2.22E+02
Co-60	3.5610E-04	4,021.39	8,042.78	0.00E+00	1.43E+00	2.86E+00
Cs-134	2.6260E-07	4,021.39	8,042.78	0.00E+00	1.06E-03	2.11E-03
Cs-135	1.4433E-05	4,021.39	8,042.78	0.00E+00	5.80E-02	1.16E-01
Cs-137	9.8870E-01	4,021.39	8,042.78	0.00E+00	3.98E+03	7.95E+03
Eu-154	6.0320E-03	4,021.39	8,042.78	0.00E+00	2.43E+01	4.85E+01
Eu-155	2.1770E-04	4,021.39	8,042.78	0.00E+00	8.75E-01	1.75E+00
Fe-55	7.9296E-07	4,021.39	8,042.78	0.00E+00	3.19E-03	6.38E-03
H-3	8.9486E-03	4,021.39	8,042.78	0.00E+00	3.60E+01	7.20E+01
I-129	9.8288E-07	4,021.39	8,042.78	0.00E+00	3.95E-03	7.91E-03
Kr-85	1.0707E-02	4,021.39	8,042.78	0.00E+00	4.31E+01	8.61E+01
Np-237	1.1927E-05	4,021.39	8,042.78	0.00E+00	4.80E-02	9.59E-02
Pa-231	1.4703E-09	4,021.39	8,042.78	0.00E+00	5.91E-06	1.18E-05
Pb-210	1.6828E-10	4,021.39	8,042.78	0.00E+00	6.77E-07	1.35E-06
Pm-147	6.9606E-06	4,021.39	8,042.78	0.00E+00	2.80E-02	5.60E-02
Pu-238	6.6263E-02	4,021.39	8,042.78	0.00E+00	2.66E+02	5.33E+02
Pu-239	1.1618E-02	4,021.39	8,042.78	0.00E+00	4.67E+01	9.34E+01
Pu-240	1.5142E-02	4,021.39	8,042.78	0.00E+00	6.09E+01	1.22E+02
Pu-241	4.3766E-01	4,021.39	8,042.78	0.00E+00	1.76E+03	3.52E+03
Pu-242	6.4260E-05	4,021.39	8,042.78	0.00E+00	2.58E-01	5.17E-01
Ra-226	3.8501E-10	4,021.39	8,042.78	0.00E+00	1.55E-06	3.10E-06
Ra-228	5.2955E-12	4,021.39	8,042.78	0.00E+00	2.13E-08	4.26E-08
Ru-106	2.0413E-14	4,021.39	8,042.78	0.00E+00	8.21E-11	1.64E-10
Se-79	1.2376E-05	4,021.39	8,042.78	0.00E+00	4.98E-02	9.95E-02
Sn-126	2.5210E-05	4,021.39	8,042.78	0.00E+00	1.01E-01	2.03E-01
Sr-90	6.4163E-01	4,021.39	8,042.78	0.00E+00	2.58E+03	5.16E+03
Tc-99	3.9357E-04	4,021.39	8,042.78	0.00E+00	1.58E+00	3.17E+00
Th-229	1.5644E-10	4,021.39	8,042.78	0.00E+00	6.29E-07	1.26E-06
Th-230	2.7972E-08	4,021.39	8,042.78	0.00E+00	1.12E-04	2.25E-04
Th-232	5.3036E-12	4,021.39	8,042.78	0.00E+00	2.13E-08	4.27E-08
Tl-208	1.5136E-07	4,021.39	8,042.78	0.00E+00	6.09E-04	1.22E-03
U-232	4.1005E-07	4,021.39	8,042.78	0.00E+00	1.65E-03	3.30E-03
U-233	2.5856E-08	4,021.39	8,042.78	0.00E+00	1.04E-04	2.08E-04
U-234	5.2665E-05	4,021.39	8,042.78	0.00E+00	2.12E-01	4.24E-01
U-235	-1.4487E-06	4,021.39	0.00	1.57E-03	0.00E+00	1.57E-03
U-236	7.5888E-08	4,021.39	8,042.78	0.00E+00	3.05E-02	6.10E-02
U-238	-2.6129E-07	4,021.39	0.00	8.19E-03	7.14E-03	8.19E-03
Y-90	6.4180E-01	4,021.39	8,042.78	0.00E+00	2.58E+03	5.16E+03
Other Radionuclides					3.83E+03	7.66E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.060E+14
0.0250	6.133E+13
0.0375	5.779E+13
0.0575	7.231E+13
0.0850	3.379E+13
0.1250	2.248E+13
0.2250	2.885E+13
0.3750	1.246E+13
0.5750	2.934E+14
0.8500	2.865E+12
1.2500	1.823E+12
1.7500	8.015E+10
2.2500	1.317E+07
2.7500	4.643E+07
3.5000	3.312E+06
5.0000	1.416E+06
7.0000	1.631E+05
11.0000	1.873E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.27E+01	1.45E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.9	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.58	5.72
Bounding:	9.16	

Estimated EOL HM/Given EOL HM: 1.10

[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: HFBR
SNF ID #: 102
Fuel Units & Descr: 220 - 18 CURVED PLATES
Heavy Metal Mass: BOL=82.72kg; EOL=58.102kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1977
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4241E-09	22,675.71	45,351.43	0.00E+00	3.23E-05	6.46E-05
Am-241	1.0407E-02	22,675.71	45,351.43	0.00E+00	2.36E+02	4.72E+02
Am-242m	1.1944E-06	22,675.71	45,351.43	0.00E+00	2.71E-02	5.42E-02
Am-243	3.6993E-05	22,675.71	45,351.43	0.00E+00	8.39E-01	1.68E+00
C-14	2.6367E-08	22,675.71	45,351.43	0.00E+00	5.98E-04	1.20E-03
Cl-36	4.4435E-31	22,675.71	45,351.43	0.00E+00	1.01E-26	2.02E-26
Cm-243	2.7503E-06	22,675.71	45,351.43	0.00E+00	6.24E-02	1.25E-01
Cm-244	1.4775E-03	22,675.71	45,351.43	0.00E+00	3.35E+01	6.70E+01
Co-60	9.4350E-07	22,675.71	45,351.43	0.00E+00	2.14E-02	4.28E-02
Cs-134	4.4666E-07	22,675.71	45,351.43	0.00E+00	1.01E-02	2.03E-02
Cs-135	4.2564E-06	22,675.71	45,351.43	0.00E+00	9.65E-02	1.93E-01
Cs-137	1.0182E+00	22,675.71	45,351.43	0.00E+00	2.31E+04	4.62E+04
Eu-154	4.6373E-03	22,675.71	45,351.43	0.00E+00	1.05E+02	2.10E+02
Eu-155	2.1646E-04	22,675.71	45,351.43	0.00E+00	4.91E+00	9.82E+00
Fe-55	4.5838E-07	22,675.71	45,351.43	0.00E+00	1.04E-02	2.08E-02
H-3	8.5966E-04	22,675.71	45,351.43	0.00E+00	1.95E+01	3.90E+01
I-129	6.6403E-07	22,675.71	45,351.43	0.00E+00	1.51E-02	3.01E-02
Kr-85	1.5553E-02	22,675.71	45,351.43	0.00E+00	3.53E+02	7.05E+02
Np-237	3.1665E-05	22,675.71	45,351.43	0.00E+00	7.18E-01	1.44E+00
Pa-231	2.4380E-09	22,675.71	45,351.43	0.00E+00	5.53E-05	1.11E-04
Pb-210	1.7394E-10	22,675.71	45,351.43	0.00E+00	3.94E-06	7.89E-06
Pm-147	8.8578E-06	22,675.71	45,351.43	0.00E+00	2.01E-01	4.02E-01
Pu-238	1.2120E-01	22,675.71	45,351.43	0.00E+00	2.75E+03	5.50E+03
Pu-239	6.9441E-04	22,675.71	45,351.43	0.00E+00	1.57E+01	3.15E+01
Pu-240	3.8299E-04	22,675.71	45,351.43	0.00E+00	8.68E+00	1.74E+01
Pu-241	3.1731E-02	22,675.71	45,351.43	0.00E+00	7.20E+02	1.44E+03
Pu-242	3.0911E-06	22,675.71	45,351.43	0.00E+00	7.01E-02	1.40E-01
Ra-226	4.1239E-10	22,675.71	45,351.43	0.00E+00	9.35E-06	1.87E-05
Ra-228	4.5680E-14	22,675.71	45,351.43	0.00E+00	1.04E-09	2.07E-09
Ru-106	8.1713E-15	22,675.71	45,351.43	0.00E+00	1.85E-10	3.71E-10
Se-79	1.2333E-05	22,675.71	45,351.43	0.00E+00	2.80E-01	5.59E-01
Sn-126	1.0194E-05	22,675.71	45,351.43	0.00E+00	2.31E-01	4.62E-01
Sr-90	9.3378E-01	22,675.71	45,351.43	0.00E+00	2.12E+04	4.23E+04
Tc-99	3.8050E-04	22,675.71	45,351.43	0.00E+00	8.63E+00	1.73E+01
Th-229	2.9532E-11	22,675.71	45,351.43	0.00E+00	6.70E-07	1.34E-06
Th-230	3.1981E-08	22,675.71	45,351.43	0.00E+00	7.25E-04	1.45E-03
Th-232	5.3633E-14	22,675.71	45,351.43	0.00E+00	1.22E-09	2.43E-09
Tl-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	1.86E-01	1.01E-01	1.66E-01
U-236	1.6701E-05	22,675.71	45,351.43	0.00E+00	3.79E-01	7.57E-01
U-238	-9.4194E-09	22,675.71	0.00	1.92E-03	1.71E-03	1.92E-03
Y-90	9.3439E-01	22,675.71	45,351.43	0.00E+00	2.12E+04	4.24E+04
Other Radionuclides					2.22E+04	4.44E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.349E+15
0.0250	4.813E+14
0.0375	4.202E+14
0.0575	4.553E+14
0.0850	2.711E+14
0.1250	1.787E+14
0.2250	2.340E+14
0.3750	1.018E+14
0.5750	1.719E+15
0.8500	2.018E+13
1.2500	9.545E+12
1.7500	5.479E+11
2.2500	4.895E+07
2.7500	6.084E+07
3.5000	1.134E+06
5.0000	4.805E+05
7.0000	5.481E+04
11.0000	6.259E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.86E+02	7.12E+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 HM Constituents:	U	U
BOL Enrichment %:	93.08510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		22,675.71	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		45,351.43	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

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

[1]Fuel decay start date: 1977
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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:

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	1.4241E-09	2,061.43	4,122.86	0.00E+00	2.94E-06	5.87E-06
Am-241	1.0407E-02	2,061.43	4,122.86	0.00E+00	2.15E+01	4.29E+01
Am-242m	1.1944E-06	2,061.43	4,122.86	0.00E+00	2.46E-03	4.92E-03
Am-243	3.6993E-05	2,061.43	4,122.86	0.00E+00	7.63E-02	1.53E-01
C-14	2.6367E-08	2,061.43	4,122.86	0.00E+00	5.44E-05	1.09E-04
Cl-36	4.4435E-31	2,061.43	4,122.86	0.00E+00	9.16E-28	1.83E-27
Cm-243	2.7503E-06	2,061.43	4,122.86	0.00E+00	5.67E-03	1.13E-02
Cm-244	1.4775E-03	2,061.43	4,122.86	0.00E+00	3.05E+00	6.09E+00
Co-60	9.4350E-07	2,061.43	4,122.86	0.00E+00	1.94E-03	3.89E-03
Cs-134	4.4666E-07	2,061.43	4,122.86	0.00E+00	9.21E-04	1.84E-03
Cs-135	4.2564E-06	2,061.43	4,122.86	0.00E+00	8.77E-03	1.75E-02
Cs-137	1.0182E+00	2,061.43	4,122.86	0.00E+00	2.10E+03	4.20E+03
Eu-154	4.6373E-03	2,061.43	4,122.86	0.00E+00	9.56E+00	1.91E+01
Eu-155	2.1646E-04	2,061.43	4,122.86	0.00E+00	4.46E-01	8.92E-01
Fe-55	4.5838E-07	2,061.43	4,122.86	0.00E+00	9.45E-04	1.89E-03
H-3	8.5966E-04	2,061.43	4,122.86	0.00E+00	1.77E+00	3.54E+00
I-129	6.6403E-07	2,061.43	4,122.86	0.00E+00	1.37E-03	2.74E-03
Kr-85	1.5553E-02	2,061.43	4,122.86	0.00E+00	3.21E+01	6.41E+01
Np-237	3.1665E-05	2,061.43	4,122.86	0.00E+00	6.53E-02	1.31E-01
Pa-231	2.4380E-09	2,061.43	4,122.86	0.00E+00	5.03E-06	1.01E-05
Pb-210	1.7394E-10	2,061.43	4,122.86	0.00E+00	3.59E-07	7.17E-07
Pm-147	8.8578E-06	2,061.43	4,122.86	0.00E+00	1.83E-02	3.65E-02
Pu-238	1.2120E-01	2,061.43	4,122.86	0.00E+00	2.50E+02	5.00E+02
Pu-239	6.9441E-04	2,061.43	4,122.86	0.00E+00	1.43E+00	2.86E+00
Pu-240	3.8299E-04	2,061.43	4,122.86	0.00E+00	7.90E-01	1.58E+00
Pu-241	3.1731E-02	2,061.43	4,122.86	0.00E+00	6.54E+01	1.31E+02
Pu-242	3.0911E-06	2,061.43	4,122.86	0.00E+00	6.37E-03	1.27E-02
Ra-226	4.1239E-10	2,061.43	4,122.86	0.00E+00	8.50E-07	1.70E-06
Ra-228	4.5680E-14	2,061.43	4,122.86	0.00E+00	9.42E-11	1.88E-10
Ru-106	8.1713E-15	2,061.43	4,122.86	0.00E+00	1.68E-11	3.37E-11
Se-79	1.2333E-05	2,061.43	4,122.86	0.00E+00	2.54E-02	5.08E-02
Sn-126	1.0194E-05	2,061.43	4,122.86	0.00E+00	2.10E-02	4.20E-02
Sr-90	9.3378E-01	2,061.43	4,122.86	0.00E+00	1.92E+03	3.85E+03
Tc-99	3.8050E-04	2,061.43	4,122.86	0.00E+00	7.84E-01	1.57E+00
Th-229	2.9532E-11	2,061.43	4,122.86	0.00E+00	6.09E-08	1.22E-07
Th-230	3.1961E-08	2,061.43	4,122.86	0.00E+00	6.59E-05	1.32E-04
Th-232	5.3633E-14	2,061.43	4,122.86	0.00E+00	1.11E-10	2.21E-10
Tl-208	3.7406E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.136E+14
0.0250	4.376E+13
0.0375	3.820E+13
0.0575	4.139E+13
0.0850	2.464E+13
0.1250	1.625E+13
0.2250	2.127E+13
0.3750	9.255E+12
0.5750	1.563E+14
0.8500	1.835E+12
1.2500	8.678E+11
1.7500	4.981E+10
2.2500	4.450E+06
2.7500	5.531E+06
3.5000	1.031E+05
5.0000	4.368E+04
7.0000	4.983E+03
11.0000	5.690E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.24E+01	6.47E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		2,061.43	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,122.86	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

[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: HFEF FISSION CHAMBERS (U METAL)
SNF ID #: 894
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=24.345kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	23,240.11	23,240.11	0.00E+00	1.56E-04	1.56E-04
Am-241	3.9068E-03	23,240.11	23,240.11	0.00E+00	9.08E+01	9.08E+01
Am-242m	1.2325E-06	23,240.11	23,240.11	0.00E+00	2.86E-02	2.86E-02
Am-243	1.4732E-07	23,240.11	23,240.11	0.00E+00	3.42E-03	3.42E-03
C-14	1.2824E-04	23,240.11	23,240.11	0.00E+00	2.98E+00	2.98E+00
Cl-36	2.8120E-06	23,240.11	23,240.11	0.00E+00	6.54E-02	6.54E-02
Cm-243	8.6556E-06	23,240.11	23,240.11	0.00E+00	2.01E-03	2.01E-03
Cm-244	5.3835E-07	23,240.11	23,240.11	0.00E+00	1.25E-02	1.25E-02
Co-60	2.4887E-02	23,240.11	23,240.11	0.00E+00	5.78E+02	5.78E+02
Cs-134	3.8030E-06	23,240.11	23,240.11	0.00E+00	8.84E-02	8.84E-02
Cs-135	3.2195E-05	23,240.11	23,240.11	0.00E+00	7.48E-01	7.48E-01
Cs-137	1.3788E+00	23,240.11	23,240.11	0.00E+00	3.20E+04	3.20E+04
Eu-154	1.3711E-03	23,240.11	23,240.11	0.00E+00	3.19E+01	3.19E+01
Eu-155	4.4361E-04	23,240.11	23,240.11	0.00E+00	1.03E+01	1.03E+01
Fe-55	2.6075E-04	23,240.11	23,240.11	0.00E+00	6.06E+00	6.06E+00
H-3	2.0647E-03	23,240.11	23,240.11	0.00E+00	4.80E+01	4.80E+01
I-129	7.3684E-07	23,240.11	23,240.11	0.00E+00	1.71E-02	1.71E-02
Kr-85	3.6346E-02	23,240.11	23,240.11	0.00E+00	8.45E+02	8.45E+02
Np-237	1.2844E-06	23,240.11	23,240.11	0.00E+00	2.98E-02	2.98E-02
Pa-231	1.2352E-08	23,240.11	23,240.11	0.00E+00	2.87E-04	2.87E-04
Pb-210	3.5338E-13	23,240.11	23,240.11	0.00E+00	8.21E-09	8.21E-09
Pm-147	7.6346E-04	23,240.11	23,240.11	0.00E+00	1.77E+01	1.77E+01
Pu-238	8.1970E-04	23,240.11	23,240.11	0.00E+00	1.90E+01	1.90E+01
Pu-239	5.5248E-03	23,240.11	23,240.11	0.00E+00	1.28E+02	1.28E+02
Pu-240	2.1203E-03	23,240.11	23,240.11	0.00E+00	4.93E+01	4.93E+01
Pu-241	2.4075E-02	23,240.11	23,240.11	0.00E+00	5.60E+02	5.60E+02
Pu-242	2.3128E-07	23,240.11	23,240.11	0.00E+00	5.37E-03	5.37E-03
Ra-226	9.6481E-13	23,240.11	23,240.11	0.00E+00	2.24E-08	2.24E-08
Ra-228	2.5188E-10	23,240.11	23,240.11	0.00E+00	5.85E-06	5.85E-06
Ru-106	1.0214E-10	23,240.11	23,240.11	0.00E+00	2.37E-06	2.37E-06
Se-79	1.3014E-05	23,240.11	23,240.11	0.00E+00	3.02E-01	3.02E-01
Sn-126	1.2164E-05	23,240.11	23,240.11	0.00E+00	2.83E-01	2.83E-01
Sr-90	1.2762E+00	23,240.11	23,240.11	0.00E+00	2.97E+04	2.97E+04
Tc-99	4.4241E-04	23,240.11	23,240.11	0.00E+00	1.03E+01	1.03E+01
Th-229	5.9684E-10	23,240.11	23,240.11	0.00E+00	1.39E-05	1.39E-05
Th-230	9.3880E-11	23,240.11	23,240.11	0.00E+00	2.18E-06	2.18E-06
Th-232	2.5278E-10	23,240.11	23,240.11	0.00E+00	5.87E-06	5.87E-06
Tl-208	1.3723E-08	23,240.11	23,240.11	0.00E+00	3.19E-04	3.19E-04
U-232	3.6932E-08	23,240.11	23,240.11	0.00E+00	8.58E-04	8.58E-04
U-233	1.2224E-07	23,240.11	23,240.11	0.00E+00	2.84E-03	2.84E-03
U-234	2.5714E-07	23,240.11	23,240.11	0.00E+00	5.98E-03	5.98E-03
U-235	-2.6194E-06	23,240.11	0.00	2.10E-02	0.00E+00	2.10E-02
U-236	1.2695E-05	23,240.11	23,240.11	0.00E+00	2.95E-01	2.95E-01
U-238	-3.6331E-08	23,240.11	0.00	1.31E-02	1.22E-02	1.31E-02
Y-90	1.2765E+00	23,240.11	23,240.11	0.00E+00	2.97E+04	2.97E+04
Other Radionuclides					3.20E+04	3.20E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.622E+15
0.0250	3.371E+14
0.0375	2.928E+14
0.0575	3.155E+14
0.0850	1.898E+14
0.1250	1.235E+14
0.2250	1.635E+14
0.3750	7.132E+13
0.5750	1.193E+15
0.8500	1.221E+13
1.2500	4.737E+13
1.7500	3.168E+11
2.2500	2.596E+08
2.7500	1.193E+07
3.5000	2.858E+04
5.0000	1.203E+04
7.0000	1.357E+03
11.0000	1.543E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.74E+02	3.74E+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:	UNKNOWN	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		10 to 20.1

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		23,240.11
Bounding:		23,240.11

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:	14.00	
Bounding:	14.00	

Estimated EOL HM/Given EOL HM: 1.78

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HTGR (PEACH BOTTOM SCRAP)
SNF ID #: 935
Fuel Units & Descr: 21 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=18.722kg; EOL=16.34kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1967
Estimates as of: 2030
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 50 years

Estimated Canister usage:
18"x15'
1.62

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.2062E-06	2,252.15	4,504.30	0.00E+00	9.47E-03	1.89E-02
Am-241	3.2229E-03	2,252.15	4,504.30	0.00E+00	7.26E+00	1.45E+01
Am-242m	2.2381E-06	2,252.15	4,504.30	0.00E+00	5.04E-03	1.01E-02
Am-243	4.6006E-05	2,252.15	4,504.30	0.00E+00	1.04E-01	2.07E-01
C-14	2.3082E-05	2,252.15	4,504.30	0.00E+00	5.20E-02	1.04E-01
Cl-36	1.0667E-06	2,252.15	4,504.30	0.00E+00	2.40E-03	4.80E-03
Cm-243	1.7602E-05	2,252.15	4,504.30	0.00E+00	3.96E-02	7.93E-02
Cm-244	3.6307E-03	2,252.15	4,504.30	0.00E+00	8.18E+00	1.64E+01
Co-60	6.2585E-05	2,252.15	4,504.30	0.00E+00	1.41E-01	2.82E-01
Cs-134	2.4585E-07	2,252.15	4,504.30	0.00E+00	5.54E-04	1.11E-03
Cs-135	2.4711E-05	2,252.15	4,504.30	0.00E+00	5.57E-02	1.11E-01
Cs-137	9.3838E-01	2,252.15	4,504.30	0.00E+00	2.11E+03	4.23E+03
Eu-154	4.6887E-03	2,252.15	4,504.30	0.00E+00	1.06E+01	2.11E+01
Eu-155	1.2793E-04	2,252.15	4,504.30	0.00E+00	2.88E+01	5.76E-01
Fe-55	8.1951E-10	2,252.15	4,504.30	0.00E+00	1.85E-06	3.69E-06
H-3	1.6839E-03	2,252.15	4,504.30	0.00E+00	3.79E+00	7.58E+00
I-129	1.0092E-06	2,252.15	4,504.30	0.00E+00	2.27E-03	4.55E-03
Kr-85	1.4981E-02	2,252.15	4,504.30	0.00E+00	3.37E+01	6.75E+01
Np-237	1.2556E-05	2,252.15	4,504.30	0.00E+00	2.83E-02	5.66E-02
Pa-231	4.7360E-06	2,252.15	4,504.30	0.00E+00	1.07E-02	2.13E-02
Pb-210	2.1901E-09	2,252.15	4,504.30	0.00E+00	4.93E-06	9.86E-06
Pm-147	2.8781E-06	2,252.15	4,504.30	0.00E+00	6.48E-03	1.30E-02
Pu-238	1.4430E-01	2,252.15	4,504.30	0.00E+00	3.25E+02	6.50E+02
Pu-239	1.3572E-04	2,252.15	4,504.30	0.00E+00	3.06E-01	6.11E-01
Pu-240	2.7537E-04	2,252.15	4,504.30	0.00E+00	6.20E-01	1.24E+00
Pu-241	9.3995E-03	2,252.15	4,504.30	0.00E+00	2.12E+01	4.23E+01
Pu-242	3.8866E-06	2,252.15	4,504.30	0.00E+00	8.75E-03	1.75E-02
Ra-226	4.1243E-09	2,252.15	4,504.30	0.00E+00	9.29E-06	1.86E-05
Ra-228	9.1949E-07	2,252.15	4,504.30	0.00E+00	2.07E-03	4.14E-03
Ru-106	1.1667E-15	2,252.15	4,504.30	0.00E+00	2.63E-12	5.26E-12
Se-79	2.1074E-05	2,252.15	4,504.30	0.00E+00	4.75E-02	9.49E-02
Sn-126	2.2192E-05	2,252.15	4,504.30	0.00E+00	5.00E-02	1.00E-01
Sr-90	8.8642E-01	2,252.15	4,504.30	0.00E+00	2.00E+03	3.99E+03
Tc-99	3.3323E-04	2,252.15	4,504.30	0.00E+00	7.50E-01	1.50E+00
Th-229	1.3517E-05	2,252.15	4,504.30	0.00E+00	3.04E-02	6.09E-02
Th-230	2.2822E-07	2,252.15	4,504.30	0.00E+00	5.14E-04	1.03E-03
Th-232	-6.9673E-08	2,252.15	0.00	1.85E-03	1.69E-03	1.85E-03
Tl-208	5.1524E-04	2,252.15	4,504.30	0.00E+00	1.16E+00	2.32E+00
U-232	1.3950E-03	2,252.15	4,504.30	0.00E+00	3.14E+00	6.28E+00
U-233	2.0602E-03	2,252.15	4,504.30	0.00E+00	4.64E+00	9.28E+00
U-234	2.9513E-04	2,252.15	4,504.30	0.00E+00	6.65E-01	1.33E+00
U-235	-1.7343E-06	2,252.15	0.00	3.70E-03	0.00E+00	3.70E-03
U-236	8.6281E-06	2,252.15	4,504.30	0.00E+00	1.94E-02	3.89E-02
U-238	-5.6065E-09	2,252.15	0.00	3.68E-05	2.42E-05	3.68E-05
Y-90	8.8642E-01	2,252.15	4,504.30	0.00E+00	2.00E+03	3.99E+03
Other Radionuclides					2.04E+03	4.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.217E+14
0.0250	4.526E+13
0.0375	3.929E+13
0.0575	4.244E+13
0.0850	2.561E+13
0.1250	1.685E+13
0.2250	2.218E+13
0.3750	9.605E+12
0.5750	1.576E+14
0.8500	1.971E+12
1.2500	9.513E+11
1.7500	6.048E+10
2.2500	5.032E+08
2.7500	8.149E+10
3.5000	2.688E+05
5.0000	1.144E+05
7.0000	1.313E+04
11.0000	1.504E+03

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,239.49	2,252.15	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1,361.22	4,504.30	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.20	1.82
Bounding:	2.41	3.31

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: KEMA
SNF ID #: 861
Fuel Units & Descr: 14 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=243.783kg; EOL=243.755kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1979
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]Template Burnup(MWd): 10269.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0595E-04	27.25	54.50	0.00E+00	2.89E-03	5.77E-03
Am-241	2.4968E-04	27.25	54.50	0.00E+00	6.80E-03	1.36E-02
Am-242m	1.3847E-06	27.25	54.50	0.00E+00	3.77E-05	7.55E-05
Am-243	3.1103E-07	27.25	54.50	0.00E+00	8.48E-06	1.70E-05
C-14	9.2267E-05	27.25	54.50	0.00E+00	2.51E-03	5.03E-03
Cl-36	1.8103E-06	27.25	54.50	0.00E+00	4.93E-05	9.87E-05
Cm-243	2.1248E-07	27.25	54.50	0.00E+00	5.79E-06	1.16E-05
Cm-244	7.9666E-06	27.25	54.50	0.00E+00	2.17E-04	4.34E-04
Co-60	1.2143E-04	27.25	54.50	0.00E+00	3.31E-03	6.62E-03
Cs-134	1.6535E-07	27.25	54.50	0.00E+00	4.51E-06	9.01E-06
Cs-135	2.8639E-05	27.25	54.50	0.00E+00	7.80E-04	1.56E-03
Cs-137	1.0449E+00	27.25	54.50	0.00E+00	2.85E+01	5.69E+01
Eu-154	2.5679E-03	27.25	54.50	0.00E+00	7.00E-02	1.40E-01
Eu-155	8.1175E-05	27.25	54.50	0.00E+00	2.21E-03	4.42E-03
Fe-55	4.2194E-08	27.25	54.50	0.00E+00	1.15E-06	2.30E-06
H-3	9.1673E-04	27.25	54.50	0.00E+00	2.50E-02	5.00E-02
I-129	1.5853E-06	27.25	54.50	0.00E+00	4.32E-05	8.64E-05
Kr-85	2.3741E-02	27.25	54.50	0.00E+00	6.47E-01	1.29E+00
Np-237	1.2747E-07	27.25	54.50	0.00E+00	3.47E-06	6.95E-06
Pa-231	1.2007E-04	27.25	54.50	0.00E+00	3.27E-03	6.54E-03
Pb-210	1.8424E-08	27.25	54.50	0.00E+00	5.02E-07	1.00E-06
Pm-147	4.9829E-06	27.25	54.50	0.00E+00	1.36E-04	2.72E-04
Pu-238	3.7744E-04	27.25	54.50	0.00E+00	1.03E-02	2.06E-02
Pu-239	2.7510E-05	27.25	54.50	0.00E+00	7.50E-04	1.50E-03
Pu-240	1.6175E-05	27.25	54.50	0.00E+00	4.41E-04	8.81E-04
Pu-241	7.1379E-04	27.25	54.50	0.00E+00	1.94E-02	3.89E-02
Pu-242	4.0831E-08	27.25	54.50	0.00E+00	1.11E-06	2.23E-06
Ra-226	2.9038E-08	27.25	54.50	0.00E+00	7.91E-07	1.58E-06
Ra-228	4.6352E-06	27.25	54.50	0.00E+00	1.26E-04	2.53E-04
Ru-106	1.3321E-15	27.25	54.50	0.00E+00	3.63E-14	7.26E-14
Se-79	3.5407E-05	27.25	54.50	0.00E+00	9.65E-04	1.93E-03
Sn-126	3.9838E-05	27.25	54.50	0.00E+00	1.09E-03	2.17E-03
Sr-90	1.0449E+00	27.25	54.50	0.00E+00	2.85E+01	5.69E+01
Tc-99	3.2525E-04	27.25	54.50	0.00E+00	8.86E-03	1.77E-02
Th-229	8.2305E-05	27.25	54.50	0.00E+00	2.24E-03	4.49E-03
Th-230	1.2533E-06	27.25	54.50	0.00E+00	3.41E-05	6.83E-05
Th-232	-9.0328E-08	27.25	0.00	2.57E-02	2.57E-02	2.57E-02
Tl-208	1.2085E-02	27.25	54.50	0.00E+00	3.29E-01	6.59E-01
U-232	3.2729E-02	27.25	54.50	0.00E+00	8.92E-01	1.78E+00
U-233	-3.3244E-03	27.25	0.00	8.66E+01	8.65E+01	8.66E+01
U-234	8.1769E-04	27.25	54.50	0.00E+00	2.23E-02	4.46E-02
U-235	5.7813E-08	27.25	54.50	1.77E-05	1.93E-05	2.09E-05
U-236	1.3273E-07	27.25	54.50	0.00E+00	3.62E-06	7.23E-06
U-238	-3.1121E-10	27.25	0.00	1.13E-05	1.13E-05	1.13E-05
Y-90	1.0449E+00	27.25	54.50	0.00E+00	2.85E+01	5.69E+01
Other Radionuclides					3.33E+01	6.67E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.414E+12
0.0250	6.486E+11
0.0375	5.567E+11
0.0575	6.058E+11
0.0850	3.929E+11
0.1250	2.406E+11
0.2250	3.550E+11
0.3750	1.402E+11
0.5750	2.152E+12
0.8500	3.701E+10
1.2500	1.126E+10
1.7500	2.946E+09
2.2500	6.713E+04
2.7500	2.312E+10
3.5000	6.434E+02
5.0000	1.931E+02
7.0000	1.271E+01
11.0000	8.248E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.67E+00	3.62E+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:	NONE	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	89.895	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		27.25	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		54.50	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CENTER FUEL MODULE (A1,A2,A3,F1)
SNF ID #: 127
Fuel Units & Descr: 4 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=814.001kg; EOL=813.286kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	803.42	1,108.67	0.00E+00	8.62E-07	1.19E-06
Am-241	1.4751E-01	803.42	1,108.67	0.00E+00	1.19E+02	1.64E+02
Am-242m	2.6809E-04	803.42	1,108.67	0.00E+00	2.15E-01	2.97E-01
Am-243	6.2484E-04	803.42	1,108.67	0.00E+00	5.02E-01	6.93E-01
C-14	4.7820E-05	803.42	1,108.67	0.00E+00	3.84E-02	5.30E-02
Cl-36	8.0297E-07	803.42	1,108.67	0.00E+00	6.45E-04	8.90E-04
Cm-243	1.7426E-04	803.42	1,108.67	0.00E+00	1.40E-01	1.93E-01
Cm-244	2.7616E-02	803.42	1,108.67	0.00E+00	2.22E+01	3.06E+01
Co-60	3.5610E-04	803.42	1,108.67	0.00E+00	2.86E-01	3.95E-01
Cs-134	2.6260E-07	803.42	1,108.67	0.00E+00	2.11E-04	2.91E-04
Cs-135	1.4433E-05	803.42	1,108.67	0.00E+00	1.16E-02	1.60E-02
Cs-137	9.8870E-01	803.42	1,108.67	0.00E+00	7.94E+02	1.10E+03
Eu-154	6.0320E-03	803.42	1,108.67	0.00E+00	4.85E+00	6.69E+00
Eu-155	2.1770E-04	803.42	1,108.67	0.00E+00	1.75E-01	2.41E-01
Fe-55	7.9296E-07	803.42	1,108.67	0.00E+00	6.37E-04	8.79E-04
H-3	8.9486E-03	803.42	1,108.67	0.00E+00	7.19E+00	9.92E+00
I-129	9.8288E-07	803.42	1,108.67	0.00E+00	7.90E-04	1.09E-03
Kr-85	1.0707E-02	803.42	1,108.67	0.00E+00	8.60E+00	1.19E+01
Np-237	1.1927E-05	803.42	1,108.67	0.00E+00	9.58E-03	1.32E-02
Pa-231	1.4703E-09	803.42	1,108.67	0.00E+00	1.18E-06	1.63E-06
Pb-210	1.6828E-10	803.42	1,108.67	0.00E+00	1.35E-07	1.87E-07
Pm-147	6.9606E-06	803.42	1,108.67	0.00E+00	5.59E-03	7.72E-03
Pu-238	6.6263E-02	803.42	1,108.67	0.00E+00	5.32E+01	7.35E+01
Pu-239	1.1618E-02	803.42	1,108.67	0.00E+00	9.33E+00	1.29E+01
Pu-240	1.5142E-02	803.42	1,108.67	0.00E+00	1.22E+01	1.68E+01
Pu-241	4.3766E-01	803.42	1,108.67	0.00E+00	3.52E+02	4.85E+02
Pu-242	6.4260E-05	803.42	1,108.67	0.00E+00	5.16E-02	7.12E-02
Ra-226	3.8501E-10	803.42	1,108.67	0.00E+00	3.09E-07	4.27E-07
Ra-228	5.2955E-12	803.42	1,108.67	0.00E+00	4.25E-09	5.87E-09
Ru-106	2.0413E-14	803.42	1,108.67	0.00E+00	1.64E-11	2.26E-11
Se-79	1.2376E-05	803.42	1,108.67	0.00E+00	9.94E-03	1.37E-02
Sn-126	2.5210E-05	803.42	1,108.67	0.00E+00	2.03E-02	2.79E-02
Sr-90	6.4163E-01	803.42	1,108.67	0.00E+00	5.16E+02	7.11E+02
Tc-99	3.9357E-04	803.42	1,108.67	0.00E+00	3.16E-01	4.36E-01
Th-229	1.5644E-10	803.42	1,108.67	0.00E+00	1.26E-07	1.73E-07
Th-230	2.7972E-08	803.42	1,108.67	0.00E+00	2.25E-05	3.10E-05
Th-232	5.3036E-12	803.42	1,108.67	0.00E+00	4.26E-09	5.88E-09
Tl-208	1.5136E-07	803.42	1,108.67	0.00E+00	1.22E-04	1.68E-04
U-232	4.1005E-07	803.42	1,108.67	0.00E+00	3.29E-04	4.55E-04
U-233	2.5856E-08	803.42	1,108.67	0.00E+00	2.08E-05	2.87E-05
U-234	5.2665E-05	803.42	1,108.67	0.00E+00	4.23E-02	5.84E-02
U-235	-1.4487E-06	803.42	0.00	7.12E-02	7.00E-02	7.12E-02
U-236	7.5888E-06	803.42	1,108.67	0.00E+00	6.10E-03	8.41E-03
U-238	-2.6129E-07	803.42	0.00	2.63E-01	2.62E-01	2.63E-01
Y-90	6.4180E-01	803.42	1,108.67	0.00E+00	5.16E+02	7.12E+02
Other Radionuclides					7.66E+02	1.06E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.219E+13
0.0250	8.454E+12
0.0375	7.966E+12
0.0575	9.968E+12
0.0850	4.658E+12
0.1250	3.099E+12
0.2250	3.978E+12
0.3750	1.717E+12
0.5750	4.044E+13
0.8500	3.949E+11
1.2500	2.513E+11
1.7500	1.105E+10
2.2500	1.818E+08
2.7500	6.402E+06
3.5000	4.580E+05
5.0000	1.957E+05
7.0000	2.255E+04
11.0000	2.589E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.45E+01	2.01E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	4.046614577	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	803.42	679.36	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	1,108.67	1,358.72	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CENTER FUEL MODULE (FP-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

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	200.85	277.17	0.00E+00	2.16E-07	2.97E-07
Am-241	1.4751E-01	200.85	277.17	0.00E+00	2.96E+01	4.09E+01
Am-242m	2.6809E-04	200.85	277.17	0.00E+00	5.38E-02	7.43E-02
Am-243	6.2484E-04	200.85	277.17	0.00E+00	1.26E-01	1.73E-01
C-14	4.7820E-05	200.85	277.17	0.00E+00	9.60E-03	1.33E-02
Cl-36	8.0297E-07	200.85	277.17	0.00E+00	1.61E-04	2.23E-04
Cm-243	1.7426E-04	200.85	277.17	0.00E+00	3.50E-02	4.83E-02
Cm-244	2.7616E-02	200.85	277.17	0.00E+00	5.55E+00	7.65E+00
Co-60	3.5610E-04	200.85	277.17	0.00E+00	7.15E-02	9.87E-02
Cs-134	2.6260E-07	200.85	277.17	0.00E+00	5.27E-05	7.28E-05
Cs-135	1.4433E-05	200.85	277.17	0.00E+00	2.90E-03	4.00E-03
Cs-137	9.8870E-01	200.85	277.17	0.00E+00	1.99E+02	2.74E+02
Eu-154	6.0320E-03	200.85	277.17	0.00E+00	1.21E+00	1.67E+00
Eu-155	2.1770E-04	200.85	277.17	0.00E+00	4.37E-02	6.03E-02
Fe-55	7.9296E-07	200.85	277.17	0.00E+00	1.59E-04	2.20E-04
H-3	8.9486E-03	200.85	277.17	0.00E+00	1.80E+00	2.48E+00
I-129	9.8288E-07	200.85	277.17	0.00E+00	1.97E-04	2.72E-04
Kr-85	1.0707E-02	200.85	277.17	0.00E+00	2.15E+00	2.97E+00
Np-237	1.1927E-05	200.85	277.17	0.00E+00	2.40E-03	3.31E-03
Pa-231	1.4703E-09	200.85	277.17	0.00E+00	2.95E-07	4.08E-07
Pb-210	1.6828E-10	200.85	277.17	0.00E+00	3.38E-08	4.66E-08
Pm-147	6.9606E-06	200.85	277.17	0.00E+00	1.40E-03	1.93E-03
Pu-238	6.6263E-02	200.85	277.17	0.00E+00	1.33E+01	1.84E+01
Pu-239	1.1618E-02	200.85	277.17	0.00E+00	2.33E+00	3.22E+00
Pu-240	1.5142E-02	200.85	277.17	0.00E+00	3.04E+00	4.20E+00
Pu-241	4.3766E-01	200.85	277.17	0.00E+00	8.79E+01	1.21E+02
Pu-242	6.4260E-05	200.85	277.17	0.00E+00	1.29E-02	1.78E-02
Ra-226	3.8501E-10	200.85	277.17	0.00E+00	7.73E-08	1.07E-07
Ra-228	5.2955E-12	200.85	277.17	0.00E+00	1.06E-09	1.47E-09
Ru-106	2.0413E-14	200.85	277.17	0.00E+00	4.10E-12	5.66E-12
Se-79	1.2376E-05	200.85	277.17	0.00E+00	2.49E-03	3.43E-03
Sn-126	2.5210E-05	200.85	277.17	0.00E+00	5.06E-03	6.99E-03
Sr-90	6.4163E-01	200.85	277.17	0.00E+00	1.29E+02	1.78E+02
Tc-99	3.9357E-04	200.85	277.17	0.00E+00	7.91E-02	1.09E-01
Th-229	1.5644E-10	200.85	277.17	0.00E+00	3.14E-08	4.34E-08
Th-230	2.7972E-08	200.85	277.17	0.00E+00	5.62E-06	7.75E-06
Th-232	5.3036E-12	200.85	277.17	0.00E+00	1.07E-09	1.47E-09
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.055E+13
0.0250	2.114E+12
0.0375	1.992E+12
0.0575	2.492E+12
0.0850	1.164E+12
0.1250	7.748E+11
0.2250	9.945E+11
0.3750	4.294E+11
0.5750	1.011E+13
0.8500	9.873E+10
1.2500	6.282E+10
1.7500	2.762E+09
2.2500	4.546E+05
2.7500	1.600E+06
3.5000	1.145E+05
5.0000	4.893E+04
7.0000	5.637E+03
11.0000	6.473E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.63E+00	6.02E+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:	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	339.68

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CENTER FUEL MODULE FP-2 REMAINS
SNF ID #: 923
Fuel Units & Descr: 10 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=99.951kg; EOL=99.899kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	49.45	98.90	0.00E+00	5.31E-08	1.06E-07
Am-241	1.4751E-01	49.45	98.90	0.00E+00	7.29E+00	1.46E+01
Am-242m	2.6809E-04	49.45	98.90	0.00E+00	1.33E-02	2.65E-02
Am-243	6.2484E-04	49.45	98.90	0.00E+00	3.09E-02	6.18E-02
C-14	4.7820E-05	49.45	98.90	0.00E+00	2.36E-03	4.73E-03
Cl-36	8.0297E-07	49.45	98.90	0.00E+00	3.97E-05	7.94E-05
Cm-243	1.7426E-04	49.45	98.90	0.00E+00	8.62E-03	1.72E-02
Cm-244	2.7616E-02	49.45	98.90	0.00E+00	1.37E+00	2.73E+00
Co-60	3.5610E-04	49.45	98.90	0.00E+00	1.76E-02	3.52E-02
Cs-134	2.6260E-07	49.45	98.90	0.00E+00	1.30E-05	2.60E-05
Cs-135	1.4433E-05	49.45	98.90	0.00E+00	7.14E-04	1.43E-03
Cs-137	9.8870E-01	49.45	98.90	0.00E+00	4.89E+01	9.78E+01
Eu-154	6.0320E-03	49.45	98.90	0.00E+00	2.98E-01	5.97E-01
Eu-155	2.1770E-04	49.45	98.90	0.00E+00	1.08E-02	2.15E-02
Fe-55	7.9296E-07	49.45	98.90	0.00E+00	3.92E-05	7.84E-05
H-3	8.9486E-03	49.45	98.90	0.00E+00	4.43E-01	8.85E-01
I-129	9.8288E-07	49.45	98.90	0.00E+00	4.86E-05	9.72E-05
Kr-85	1.0707E-02	49.45	98.90	0.00E+00	5.29E-01	1.06E+00
Np-237	1.1927E-05	49.45	98.90	0.00E+00	5.90E-04	1.18E-03
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
Tl-208	1.5136E-07	49.45	98.90	0.00E+00	7.48E-06	1.50E-05
U-232	4.1005E-07	49.45	98.90	0.00E+00	2.03E-05	4.06E-05
U-233	2.5856E-08	49.45	98.90	0.00E+00	1.28E-06	2.56E-06
U-234	5.2665E-05	49.45	98.90	0.00E+00	2.60E-03	5.21E-03
U-235	-1.4487E-06	49.45	0.00	2.10E-02	2.10E-02	2.10E-02
U-236	7.5888E-06	49.45	98.90	0.00E+00	3.75E-04	7.51E-04
U-238	-2.6129E-07	49.45	0.00	3.03E-02	3.03E-02	3.03E-02
Y-90	6.4180E-01	49.45	98.90	0.00E+00	3.17E+01	6.35E+01
Other Radionuclides					4.71E+01	9.42E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.764E+12
0.0250	7.542E+11
0.0375	7.106E+11
0.0575	8.892E+11
0.0850	4.156E+11
0.1250	2.765E+11
0.2250	3.551E+11
0.3750	1.532E+11
0.5750	3.608E+12
0.8500	3.523E+10
1.2500	2.242E+10
1.7500	9.855E+08
2.2500	1.623E+05
2.7500	5.711E+05
3.5000	4.089E+04
5.0000	1.748E+04
7.0000	2.013E+03
11.0000	2.312E+02

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
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	9.74	0 to 5

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	47.48	49.45
Bounding:		98.90

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:	0.01	1.04
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CORNER FUEL MODULE
SNF ID #: 128
Fuel Units & Descr: 4 - 11 X 11 ROD ARRAY
Heavy Metal Mass: BOL=279.864kg; EOL=279.053kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 16"x10' 2.00

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	780.26	1,560.52	0.00E+00	8.37E-07	1.67E-06
Am-241	1.4751E-01	780.26	1,560.52	0.00E+00	1.15E+02	2.30E+02
Am-242m	2.6809E-04	780.26	1,560.52	0.00E+00	2.09E-01	4.18E-01
Am-243	6.2484E-04	780.26	1,560.52	0.00E+00	4.88E-01	9.75E-01
C-14	4.7820E-05	780.26	1,560.52	0.00E+00	3.73E-02	7.46E-02
Cl-36	8.0297E-07	780.26	1,560.52	0.00E+00	6.27E-04	1.25E-03
Cm-243	1.7426E-04	780.26	1,560.52	0.00E+00	1.36E-01	2.72E-01
Cm-244	2.7616E-02	780.26	1,560.52	0.00E+00	2.15E+01	4.31E+01
Co-60	3.5610E-04	780.26	1,560.52	0.00E+00	2.78E-01	5.56E-01
Cs-134	2.6260E-07	780.26	1,560.52	0.00E+00	2.05E-04	4.10E-04
Cs-135	1.4433E-05	780.26	1,560.52	0.00E+00	1.13E-02	2.25E-02
Cs-137	9.8870E-01	780.26	1,560.52	0.00E+00	7.71E+02	1.54E+03
Eu-154	6.0320E-03	780.26	1,560.52	0.00E+00	4.71E+00	9.41E+00
Eu-155	2.1770E-04	780.26	1,560.52	0.00E+00	1.70E-01	3.40E-01
Fe-55	7.9296E-07	780.26	1,560.52	0.00E+00	6.19E-04	1.24E-03
H-3	8.9486E-03	780.26	1,560.52	0.00E+00	6.98E+00	1.40E+01
I-129	9.8288E-07	780.26	1,560.52	0.00E+00	7.67E-04	1.53E-03
Kr-85	1.0707E-02	780.26	1,560.52	0.00E+00	8.35E+00	1.67E+01
Np-237	1.1927E-05	780.26	1,560.52	0.00E+00	9.31E-03	1.86E-02
Pa-231	1.4703E-09	780.26	1,560.52	0.00E+00	1.15E-06	2.29E-06
Pb-210	1.6828E-10	780.26	1,560.52	0.00E+00	1.31E-07	2.63E-07
Pm-147	6.9606E-06	780.26	1,560.52	0.00E+00	5.43E-03	1.09E-02
Pu-238	6.6263E-02	780.26	1,560.52	0.00E+00	5.17E+01	1.03E+02
Pu-239	1.1618E-02	780.26	1,560.52	0.00E+00	9.07E+00	1.81E+01
Pu-240	1.5142E-02	780.26	1,560.52	0.00E+00	1.18E+01	2.36E+01
Pu-241	4.3766E-01	780.26	1,560.52	0.00E+00	3.41E+02	6.83E+02
Pu-242	6.4260E-05	780.26	1,560.52	0.00E+00	5.01E-02	1.00E-01
Ra-226	3.8501E-10	780.26	1,560.52	0.00E+00	3.00E-07	6.01E-07
Ra-228	5.2955E-12	780.26	1,560.52	0.00E+00	4.13E-09	8.26E-09
Ru-106	2.0413E-14	780.26	1,560.52	0.00E+00	1.59E-11	3.19E-11
Se-79	1.2376E-05	780.26	1,560.52	0.00E+00	9.66E-03	1.93E-02
Sn-126	2.5210E-05	780.26	1,560.52	0.00E+00	1.97E-02	3.93E-02
Sr-90	6.4163E-01	780.26	1,560.52	0.00E+00	5.01E+02	1.00E+03
Tc-99	3.9357E-04	780.26	1,560.52	0.00E+00	3.07E-01	6.14E-01
Th-229	1.5644E-10	780.26	1,560.52	0.00E+00	1.22E-07	2.44E-07
Th-230	2.7972E-08	780.26	1,560.52	0.00E+00	2.18E-05	4.37E-05
Th-232	5.3036E-12	780.26	1,560.52	0.00E+00	4.14E-09	8.28E-09
Tl-208	1.5136E-07	780.26	1,560.52	0.00E+00	1.18E-04	2.36E-04
U-232	4.1005E-07	780.26	1,560.52	0.00E+00	3.20E-04	6.40E-04
U-233	2.5856E-08	780.26	1,560.52	0.00E+00	2.02E-05	4.03E-05
U-234	5.2665E-05	780.26	1,560.52	0.00E+00	4.11E-02	8.22E-02
U-235	-1.4487E-06	780.26	0.00	2.42E-02	2.31E-02	2.42E-02
U-236	7.5888E-06	780.26	1,560.52	0.00E+00	5.92E-03	1.18E-02
U-238	-2.6129E-07	780.26	0.00	9.03E-02	9.01E-02	9.03E-02
Y-90	6.4180E-01	780.26	1,560.52	0.00E+00	5.01E+02	1.00E+03
Other Radionuclides					7.44E+02	1.49E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.938E+13
0.0250	1.190E+13
0.0375	1.121E+13
0.0575	1.403E+13
0.0850	6.556E+12
0.1250	4.362E+12
0.2250	5.598E+12
0.3750	2.417E+12
0.5750	5.693E+13
0.8500	5.558E+11
1.2500	3.537E+11
1.7500	1.555E+10
2.2500	2.557E+06
2.7500	9.009E+06
3.5000	6.432E+05
5.0000	2.749E+05
7.0000	3.167E+04
11.0000	3.636E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+01	2.82E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	4.000514536	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.08	0.99
Bounding:	0.16	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT FUEL RODS
SNF ID #: 924
Fuel Units & Descr: 2 - ROD
Heavy Metal Mass: BOL= ; EOL=1.895kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 0.67

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	11.83	23.65	0.00E+00	1.27E-08	2.54E-08
Am-241	1.4751E-01	11.83	23.65	0.00E+00	1.74E+00	3.49E+00
Am-242m	2.6809E-04	11.83	23.65	0.00E+00	3.17E-03	6.34E-03
Am-243	6.2484E-04	11.83	23.65	0.00E+00	7.39E-03	1.48E-02
C-14	4.7820E-05	11.83	23.65	0.00E+00	5.66E-04	1.13E-03
Cl-36	8.0297E-07	11.83	23.65	0.00E+00	9.50E-06	1.90E-05
Cm-243	1.7426E-04	11.83	23.65	0.00E+00	2.06E-03	4.12E-03
Cm-244	2.7616E-02	11.83	23.65	0.00E+00	3.27E-01	6.53E-01
Co-60	3.5610E-04	11.83	23.65	0.00E+00	4.21E-03	8.42E-03
Cs-134	2.6260E-07	11.83	23.65	0.00E+00	3.11E-06	6.21E-06
Cs-135	1.4433E-05	11.83	23.65	0.00E+00	1.71E-04	3.41E-04
Cs-137	9.8870E-01	11.83	23.65	0.00E+00	1.17E+01	2.34E+01
Eu-154	6.0320E-03	11.83	23.65	0.00E+00	7.13E-02	1.43E-01
Eu-155	2.1770E-04	11.83	23.65	0.00E+00	2.57E-03	5.15E-03
Fe-55	7.9296E-07	11.83	23.65	0.00E+00	9.38E-06	1.88E-05
H-3	8.9486E-03	11.83	23.65	0.00E+00	1.06E-01	2.12E-01
I-129	9.8288E-07	11.83	23.65	0.00E+00	1.16E-05	2.32E-05
Kr-85	1.0707E-02	11.83	23.65	0.00E+00	1.27E-01	2.53E-01
Np-237	1.1927E-05	11.83	23.65	0.00E+00	1.41E-04	2.82E-04
Pa-231	1.4703E-09	11.83	23.65	0.00E+00	1.74E-08	3.48E-08
Pb-210	1.6828E-10	11.83	23.65	0.00E+00	1.99E-09	3.98E-09
Pm-147	6.9606E-06	11.83	23.65	0.00E+00	8.23E-05	1.65E-04
Pu-238	6.6263E-02	11.83	23.65	0.00E+00	7.84E-01	1.57E+00
Pu-239	1.1618E-02	11.83	23.65	0.00E+00	1.37E-01	2.75E-01
Pu-240	1.5142E-02	11.83	23.65	0.00E+00	1.79E-01	3.58E-01
Pu-241	4.3766E-01	11.83	23.65	0.00E+00	5.18E+00	1.04E+01
Pu-242	6.4260E-05	11.83	23.65	0.00E+00	7.60E-04	1.52E-03
Ra-226	3.8501E-10	11.83	23.65	0.00E+00	4.55E-09	9.11E-09
Ra-228	5.2955E-12	11.83	23.65	0.00E+00	6.26E-11	1.25E-10
Ru-106	2.0413E-14	11.83	23.65	0.00E+00	2.41E-13	4.83E-13
Se-79	1.2376E-05	11.83	23.65	0.00E+00	1.46E-04	2.93E-04
Sn-126	2.5210E-05	11.83	23.65	0.00E+00	2.98E-04	5.96E-04
Sr-90	6.4163E-01	11.83	23.65	0.00E+00	7.59E+00	1.52E+01
Tc-99	3.9357E-04	11.83	23.65	0.00E+00	4.65E-03	9.31E-03
Th-229	1.5644E-10	11.83	23.65	0.00E+00	1.85E-09	3.70E-09
Th-230	2.7972E-06	11.83	23.65	0.00E+00	3.31E-07	6.62E-07
Th-232	5.3036E-12	11.83	23.65	0.00E+00	6.27E-11	1.25E-10
Tl-208	1.5136E-07	11.83	23.65	0.00E+00	1.79E-06	3.58E-06
U-232	4.1005E-07	11.83	23.65	0.00E+00	4.85E-06	9.70E-06
U-233	2.5856E-06	11.83	23.65	0.00E+00	3.06E-07	6.12E-07
U-234	5.2665E-05	11.83	23.65	0.00E+00	6.23E-04	1.25E-03
U-235	-1.4487E-06	11.83	0.00	1.32E-04	1.15E-04	1.32E-04
U-236	7.5888E-06	11.83	23.65	0.00E+00	8.97E-05	1.79E-04
U-238	-2.6129E-07	11.83	0.00	6.20E-04	6.17E-04	6.20E-04
Y-90	6.4180E-01	11.83	23.65	0.00E+00	7.59E+00	1.52E+01
Other Radionuclides					1.13E+01	2.25E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.000E+11
0.0250	1.804E+11
0.0375	1.700E+11
0.0575	2.127E+11
0.0850	9.937E+10
0.1250	6.611E+10
0.2250	8.484E+10
0.3750	3.664E+10
0.5750	8.628E+11
0.8500	8.425E+09
1.2500	5.361E+09
1.7500	2.357E+08
2.2500	3.874E+04
2.7500	1.385E+05
3.5000	9.744E+03
5.0000	4.164E+03
7.0000	4.797E+02
11.0000	5.509E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E-01	4.28E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		11.83
Bounding:		23.65

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=1.907kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	
Bounding:	0.35	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT SQUARE FUEL MODULE
SNF ID #: 129
Fuel Units & Descr: 4 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=815.6kg; EOL=813.026kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	2,447.37	4,894.74	0.00E+00	2.63E-06	5.25E-06
Am-241	1.4751E-01	2,447.37	4,894.74	0.00E+00	3.61E+02	7.22E+02
Am-242m	2.6809E-04	2,447.37	4,894.74	0.00E+00	6.56E-01	1.31E+00
Am-243	6.2484E-04	2,447.37	4,894.74	0.00E+00	1.53E+00	3.06E+00
C-14	4.7820E-05	2,447.37	4,894.74	0.00E+00	1.17E-01	2.34E-01
Cl-36	8.0297E-07	2,447.37	4,894.74	0.00E+00	1.97E-03	3.93E-03
Cm-243	1.7426E-04	2,447.37	4,894.74	0.00E+00	4.26E-01	8.53E-01
Cm-244	2.7616E-02	2,447.37	4,894.74	0.00E+00	6.76E+01	1.35E+02
Co-60	3.5610E-04	2,447.37	4,894.74	0.00E+00	8.72E-01	1.74E+00
Cs-134	2.6260E-07	2,447.37	4,894.74	0.00E+00	6.43E-04	1.29E-03
Cs-135	1.4433E-05	2,447.37	4,894.74	0.00E+00	3.53E-02	7.06E-02
Cs-137	9.8870E-01	2,447.37	4,894.74	0.00E+00	2.42E+03	4.84E+03
Eu-154	6.0320E-03	2,447.37	4,894.74	0.00E+00	1.48E+01	2.95E+01
Eu-155	2.1770E-04	2,447.37	4,894.74	0.00E+00	5.33E-01	1.07E+00
Fe-55	7.9296E-07	2,447.37	4,894.74	0.00E+00	1.94E-03	3.88E-03
H-3	8.9486E-03	2,447.37	4,894.74	0.00E+00	2.19E+01	4.38E+01
I-129	9.8288E-07	2,447.37	4,894.74	0.00E+00	2.41E-03	4.81E-03
Kr-85	1.0707E-02	2,447.37	4,894.74	0.00E+00	2.62E+01	5.24E+01
Np-237	1.1927E-05	2,447.37	4,894.74	0.00E+00	2.92E-02	5.84E-02
Pa-231	1.4703E-09	2,447.37	4,894.74	0.00E+00	3.60E-06	7.20E-06
Pb-210	1.6828E-10	2,447.37	4,894.74	0.00E+00	4.12E-07	8.24E-07
Pm-147	6.9606E-06	2,447.37	4,894.74	0.00E+00	1.70E-02	3.41E-02
Pu-238	6.6263E-02	2,447.37	4,894.74	0.00E+00	1.62E+02	3.24E+02
Pu-239	1.1618E-02	2,447.37	4,894.74	0.00E+00	2.84E+01	5.69E+01
Pu-240	1.5142E-02	2,447.37	4,894.74	0.00E+00	3.71E+01	7.41E+01
Pu-241	4.3766E-01	2,447.37	4,894.74	0.00E+00	1.07E+03	2.14E+03
Pu-242	6.4260E-05	2,447.37	4,894.74	0.00E+00	1.57E-01	3.15E-01
Ra-226	3.8501E-10	2,447.37	4,894.74	0.00E+00	9.42E-07	1.88E-06
Ra-228	5.2955E-12	2,447.37	4,894.74	0.00E+00	1.30E-08	2.59E-08
Ru-106	2.0413E-14	2,447.37	4,894.74	0.00E+00	5.00E-11	9.99E-11
Se-79	1.2376E-05	2,447.37	4,894.74	0.00E+00	3.03E-02	6.06E-02
Sn-126	2.5210E-05	2,447.37	4,894.74	0.00E+00	6.17E-02	1.23E-01
Sr-90	6.4163E-01	2,447.37	4,894.74	0.00E+00	1.57E+03	3.14E+03
Tc-99	3.9357E-04	2,447.37	4,894.74	0.00E+00	9.63E-01	1.93E+00
Th-229	1.5644E-10	2,447.37	4,894.74	0.00E+00	3.83E-07	7.66E-07
Th-230	2.7972E-08	2,447.37	4,894.74	0.00E+00	6.85E-05	1.37E-04
Th-232	5.3036E-12	2,447.37	4,894.74	0.00E+00	1.30E-08	2.60E-08
Tl-208	1.5136E-07	2,447.37	4,894.74	0.00E+00	3.70E-04	7.41E-04
U-232	4.1005E-07	2,447.37	4,894.74	0.00E+00	1.00E-03	2.01E-03
U-233	2.5856E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.863E+14
0.0250	3.732E+13
0.0375	3.517E+13
0.0575	4.401E+13
0.0850	2.056E+13
0.1250	1.368E+13
0.2250	1.756E+13
0.3750	7.582E+12
0.5750	1.786E+14
0.8500	1.743E+12
1.2500	1.109E+12
1.7500	4.878E+10
2.2500	8.019E+06
2.7500	2.826E+07
3.5000	2.017E+06
5.0000	8.621E+05
7.0000	9.932E+04
11.0000	1.140E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.43E+01	8.85E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	2,418.25	2,447.37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,894.74	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	1.01
Bounding:	0.17	

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: LOOSE FUEL ROD STORAGE BASKET (LFRSB)
SNF ID #: 126
Fuel Units & Descr: 1 - SCRAP
Heavy Metal Mass: BOL= ; EOL=311.112kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x15' 1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	293,891.20	293,891.20	0.00E+00	6.86E-03	6.86E-03
Am-241	1.1135E-04	293,891.20	293,891.20	0.00E+00	3.27E+01	3.27E+01
Am-242m	8.5075E-09	293,891.20	293,891.20	0.00E+00	2.50E-03	2.50E-03
Am-243	9.8519E-10	293,891.20	293,891.20	0.00E+00	2.90E-04	2.90E-04
C-14	2.3012E-04	293,891.20	293,891.20	0.00E+00	6.76E+01	6.76E+01
Cl-36	1.2261E-06	293,891.20	293,891.20	0.00E+00	3.60E-01	3.60E-01
Cm-243	2.4875E-10	293,891.20	293,891.20	0.00E+00	7.31E-05	7.31E-05
Cm-244	2.3178E-09	293,891.20	293,891.20	0.00E+00	6.81E-04	6.81E-04
Co-60	7.0849E-02	293,891.20	293,891.20	0.00E+00	2.08E+04	2.08E+04
Cs-134	3.0266E-06	293,891.20	293,891.20	0.00E+00	8.89E-01	8.89E-01
Cs-135	3.0316E-05	293,891.20	293,891.20	0.00E+00	8.91E+00	8.91E+00
Cs-137	1.4511E+00	293,891.20	293,891.20	0.00E+00	4.26E+05	4.26E+05
Eu-154	6.6955E-04	293,891.20	293,891.20	0.00E+00	1.97E+02	1.97E+02
Eu-155	6.9850E-04	293,891.20	293,891.20	0.00E+00	2.05E+02	2.05E+02
Fe-55	1.2318E-03	293,891.20	293,891.20	0.00E+00	3.62E+02	3.62E+02
H-3	2.5141E-03	293,891.20	293,891.20	0.00E+00	7.39E+02	7.39E+02
I-129	7.3195E-07	293,891.20	293,891.20	0.00E+00	2.15E-01	2.15E-01
Kr-85	4.1281E-02	293,891.20	293,891.20	0.00E+00	1.21E+04	1.21E+04
Np-237	1.1489E-08	293,891.20	293,891.20	0.00E+00	3.38E-01	3.38E-01
Pa-231	4.5241E-08	293,891.20	293,891.20	0.00E+00	1.33E-02	1.33E-02
Pb-210	6.4476E-13	293,891.20	293,891.20	0.00E+00	1.89E-07	1.89E-07
Pm-147	1.1651E-03	293,891.20	293,891.20	0.00E+00	3.42E+02	3.42E+02
Pu-238	2.9517E-04	293,891.20	293,891.20	0.00E+00	8.67E+01	8.67E+01
Pu-239	6.6772E-04	293,891.20	293,891.20	0.00E+00	1.96E+02	1.96E+02
Pu-240	8.6839E-05	293,891.20	293,891.20	0.00E+00	2.55E+01	2.55E+01
Pu-241	7.1514E-04	293,891.20	293,891.20	0.00E+00	2.10E+02	2.10E+02
Pu-242	1.9717E-09	293,891.20	293,891.20	0.00E+00	5.79E-04	5.79E-04
Ra-226	1.7654E-12	293,891.20	293,891.20	0.00E+00	5.19E-07	5.19E-07
Ra-228	8.2928E-12	293,891.20	293,891.20	0.00E+00	2.44E-06	2.44E-06
Ru-106	1.8419E-10	293,891.20	293,891.20	0.00E+00	5.41E-05	5.41E-05
Se-79	1.3223E-05	293,891.20	293,891.20	0.00E+00	3.89E+00	3.89E+00
Sn-126	1.1493E-05	293,891.20	293,891.20	0.00E+00	3.38E+00	3.38E+00
Sr-90	1.3649E+00	293,891.20	293,891.20	0.00E+00	4.01E+05	4.01E+05
Tc-99	4.6656E-04	293,891.20	293,891.20	0.00E+00	1.37E+02	1.37E+02
Th-229	1.4547E-11	293,891.20	293,891.20	0.00E+00	4.28E-06	4.28E-06
Th-230	1.6617E-10	293,891.20	293,891.20	0.00E+00	4.88E-05	4.88E-05
Th-232	8.3361E-12	293,891.20	293,891.20	0.00E+00	2.45E-06	2.45E-06
Tl-208	2.1664E-08	293,891.20	293,891.20	0.00E+00	6.37E-03	6.37E-03
U-232	5.8669E-08	293,891.20	293,891.20	0.00E+00	1.72E-02	1.72E-02
U-233	3.1847E-09	293,891.20	293,891.20	0.00E+00	9.36E-04	9.36E-04
U-234	3.8769E-07	293,891.20	293,891.20	0.00E+00	1.14E-01	1.14E-01
U-235	-2.7761E-06	293,891.20	0.00	1.26E+00	4.41E-01	1.26E+00
U-236	1.6190E-05	293,891.20	293,891.20	0.00E+00	4.76E+00	4.76E+00
U-238	-2.8547E-09	293,891.20	0.00	1.36E-02	1.27E-02	1.36E-02
Y-90	1.3652E+00	293,891.20	293,891.20	0.00E+00	4.01E+05	4.01E+05
Other Radionuclides					4.85E+05	4.85E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.194E+16
0.0250	4.558E+15
0.0375	3.943E+15
0.0575	4.250E+15
0.0850	2.568E+15
0.1250	1.667E+15
0.2250	2.210E+15
0.3750	9.641E+14
0.5750	1.588E+16
0.8500	1.606E+14
1.2500	1.596E+15
1.7500	4.146E+12
2.2500	8.609E+09
2.7500	2.488E+08
3.5000	1.755E+04
5.0000	7.217E+03
7.0000	7.969E+02
11.0000	8.942E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.13E+03	5.13E+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:	UNKNOWN	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		293,891.20
Bounding:		293,891.20

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1983
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.7758E-10	7,263.66	14,527.32	0.00E+00	6.37E-06	1.27E-05
Am-241	1.4352E-01	7,263.66	14,527.32	0.00E+00	1.04E+03	2.09E+03
Am-242m	2.8698E-04	7,263.66	14,527.32	0.00E+00	2.08E+00	4.17E+00
Am-243	6.2565E-04	7,263.66	14,527.32	0.00E+00	4.54E+00	9.09E+00
C-14	4.7901E-05	7,263.66	14,527.32	0.00E+00	3.48E-01	6.96E-01
Cl-36	8.0297E-07	7,263.66	14,527.32	0.00E+00	5.83E-03	1.17E-02
Cm-243	2.5081E-04	7,263.66	14,527.32	0.00E+00	1.82E+00	3.64E+00
Cm-244	4.9015E-02	7,263.66	14,527.32	0.00E+00	3.56E+02	7.12E+02
Co-60	2.5581E-03	7,263.66	14,527.32	0.00E+00	1.86E+01	3.72E+01
Cs-134	4.0536E-05	7,263.66	14,527.32	0.00E+00	2.94E-01	5.89E-01
Cs-135	1.4433E-05	7,263.66	14,527.32	0.00E+00	1.05E-01	2.10E-01
Cs-137	1.3979E+00	7,263.66	14,527.32	0.00E+00	1.02E+04	2.03E+04
Eu-154	2.0203E-02	7,263.66	14,527.32	0.00E+00	1.47E+02	2.94E+02
Eu-155	1.7884E-03	7,263.66	14,527.32	0.00E+00	1.28E+01	2.57E+01
Fe-55	4.3136E-05	7,263.66	14,527.32	0.00E+00	3.13E-01	6.27E-01
H-3	2.0769E-02	7,263.66	14,527.32	0.00E+00	1.51E+02	3.02E+02
I-129	9.8288E-07	7,263.66	14,527.32	0.00E+00	7.14E-03	1.43E-02
Kr-85	2.8214E-02	7,263.66	14,527.32	0.00E+00	2.05E+02	4.10E+02
Np-237	1.1218E-05	7,263.66	14,527.32	0.00E+00	8.15E-02	1.63E-01
Pa-231	1.3036E-09	7,263.66	14,527.32	0.00E+00	9.47E-06	1.89E-05
Pb-210	8.5078E-11	7,263.66	14,527.32	0.00E+00	6.18E-07	1.24E-06
Pm-147	3.6531E-04	7,263.66	14,527.32	0.00E+00	2.65E+00	5.31E+00
Pu-238	7.4564E-02	7,263.66	14,527.32	0.00E+00	5.42E+02	1.08E+03
Pu-239	1.1623E-02	7,263.66	14,527.32	0.00E+00	8.44E+01	1.69E+02
Pu-240	1.5132E-02	7,263.66	14,527.32	0.00E+00	1.10E+02	2.20E+02
Pu-241	9.0036E-01	7,263.66	14,527.32	0.00E+00	6.54E+03	1.31E+04
Pu-242	6.4260E-05	7,263.66	14,527.32	0.00E+00	4.67E-01	9.34E-01
Ra-226	2.2804E-10	7,263.66	14,527.32	0.00E+00	1.66E-06	3.31E-06
Ra-228	5.2713E-12	7,263.66	14,527.32	0.00E+00	3.83E-08	7.66E-08
Ru-106	6.1160E-10	7,263.66	14,527.32	0.00E+00	4.44E-06	8.88E-06
Se-79	1.2377E-05	7,263.66	14,527.32	0.00E+00	8.99E-02	1.80E-01
Sn-126	2.5210E-05	7,263.66	14,527.32	0.00E+00	1.83E-01	3.66E-01
Sr-90	9.1667E-01	7,263.66	14,527.32	0.00E+00	6.66E+03	1.33E+04
Tc-99	3.9357E-04	7,263.66	14,527.32	0.00E+00	2.86E+00	5.72E+00
Th-229	1.2057E-10	7,263.66	14,527.32	0.00E+00	8.76E-07	1.75E-06
Th-230	2.1043E-08	7,263.66	14,527.32	0.00E+00	1.53E-04	3.06E-04
Th-232	5.2972E-12	7,263.66	14,527.32	0.00E+00	3.85E-08	7.70E-08
Tl-208	1.7474E-07	7,263.66	14,527.32	0.00E+00	1.27E-03	2.54E-03
U-232	4.7368E-07	7,263.66	14,527.32	0.00E+00	3.44E-03	6.88E-03
U-233	2.5097E-08	7,263.66	14,527.32	0.00E+00	1.82E-04	3.65E-04
U-234	5.0000E-05	7,263.66	14,527.32	0.00E+00	3.63E-01	7.26E-01
U-235	-1.4489E-06	7,263.66	0.00	1.37E-02	3.20E-03	1.37E-02
U-236	7.5824E-06	7,263.66	14,527.32	0.00E+00	5.51E-02	1.10E-01
U-238	-2.6129E-07	7,263.66	0.00	5.23E-02	5.04E-02	5.23E-02
Y-90	9.1699E-01	7,263.66	14,527.32	0.00E+00	6.66E+03	1.33E+04
Other Radionuclides					9.75E+03	1.95E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.817E+14
0.0250	1.576E+14
0.0375	1.503E+14
0.0575	1.737E+14
0.0850	8.746E+13
0.1250	6.069E+13
0.2250	7.500E+13
0.3750	3.225E+13
0.5750	7.501E+14
0.8500	1.038E+13
1.2500	1.019E+13
1.7500	3.052E+11
2.2500	4.915E+07
2.7500	1.007E+08
3.5000	1.037E+07
5.0000	4.433E+06
7.0000	5.110E+05
11.0000	5.868E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.87E+02	3.34E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC OR SST	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3.923	0 to 5

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,263.66
Bounding:		14,527.32

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:	1.28	
Bounding:	2.56	

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: MISCELLANEOUS RSWF FUEL
SNF ID #: 366
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=4161.515kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
2.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	12,522.18	28,967.98	0.00E+00	7.74E-08	1.79E-07
Am-241	1.1066E-01	12,522.18	28,967.98	8.05E+03	9.43E+03	1.13E+04
Am-242m	1.9247E-03	12,522.18	28,967.98	0.00E+00	2.41E+01	5.58E+01
Am-243	1.0740E-04	12,522.18	28,967.98	0.00E+00	1.34E+00	3.11E+00
C-14	2.6042E-05	12,522.18	28,967.98	0.00E+00	3.26E-01	7.54E-01
Cl-36	3.4243E-10	12,522.18	28,967.98	0.00E+00	4.29E-06	9.92E-06
Cm-243	4.0629E-04	12,522.18	28,967.98	0.00E+00	5.09E+00	1.18E+01
Cm-244	1.6024E-03	12,522.18	28,967.98	0.00E+00	2.01E+01	4.64E+01
Co-60	3.4275E-03	12,522.18	28,967.98	0.00E+00	4.29E+01	9.93E+01
Cs-134	1.5566E-03	12,522.18	28,967.98	0.00E+00	1.95E+01	4.51E+01
Cs-135	4.7693E-05	12,522.18	28,967.98	0.00E+00	5.97E-01	1.38E+00
Cs-137	1.4007E+00	12,522.18	28,967.98	0.00E+00	1.75E+04	4.06E+04
Eu-154	1.6184E-02	12,522.18	28,967.98	0.00E+00	2.03E+02	4.69E+02
Eu-155	1.3774E-02	12,522.18	28,967.98	0.00E+00	1.72E+02	3.99E+02
Fe-55	3.8028E-04	12,522.18	28,967.98	0.00E+00	4.76E+00	1.10E+01
H-3	3.8454E-03	12,522.18	28,967.98	0.00E+00	4.82E+01	1.11E+02
I-129	1.2891E-06	12,522.18	28,967.98	0.00E+00	1.61E-02	3.73E-02
Kr-85	2.7848E-02	12,522.18	28,967.98	0.00E+00	3.49E+02	8.07E+02
Np-237	3.7516E-06	12,522.18	28,967.98	0.00E+00	4.70E-02	1.09E-01
Pa-231	1.2488E-11	12,522.18	28,967.98	0.00E+00	1.56E-07	3.62E-07
Pb-210	2.4206E-12	12,522.18	28,967.98	0.00E+00	3.03E-08	7.01E-08
Pm-147	1.5671E-02	12,522.18	28,967.98	0.00E+00	1.96E+02	4.54E+02
Pu-238	1.4877E-02	12,522.18	28,967.98	0.00E+00	1.86E+02	4.31E+02
Pu-239	-3.5520E-02	12,522.18	0.00	6.61E+04	6.56E+04	6.61E+04
Pu-240	2.0690E-02	12,522.18	28,967.98	3.36E+04	3.38E+04	3.42E+04
Pu-241	-1.4799E+00	12,522.18	0.00	1.51E+06	1.49E+06	1.51E+06
Pu-242	1.1252E-05	12,522.18	28,967.98	8.95E+00	9.09E+00	9.28E+00
Ra-226	7.8524E-12	12,522.18	28,967.98	0.00E+00	9.83E-08	2.27E-07
Ra-228	2.4086E-16	12,522.18	28,967.98	0.00E+00	3.02E-12	6.98E-12
Ru-106	1.5066E-05	12,522.18	28,967.98	0.00E+00	1.89E-01	4.36E-01
Se-79	1.0127E-05	12,522.18	28,967.98	0.00E+00	1.27E-01	2.93E-01
Sn-126	4.3902E-05	12,522.18	28,967.98	0.00E+00	5.50E-01	1.27E+00
Sr-90	5.0088E-01	12,522.18	28,967.98	0.00E+00	6.27E+03	1.45E+04
Tc-99	3.9412E-04	12,522.18	28,967.98	0.00E+00	4.94E+00	1.14E+01
Th-229	2.7219E-12	12,522.18	28,967.98	0.00E+00	3.41E-08	7.88E-08
Th-230	1.0441E-09	12,522.18	28,967.98	0.00E+00	1.31E-05	3.02E-05
Th-232	3.1689E-16	12,522.18	28,967.98	0.00E+00	3.97E-12	9.18E-12
Tl-208	4.6636E-07	12,522.18	28,967.98	0.00E+00	5.84E-03	1.35E-02
U-232	1.2638E-06	12,522.18	28,967.98	0.00E+00	1.58E-02	3.66E-02
U-233	5.7451E-10	12,522.18	28,967.98	0.00E+00	7.19E-06	1.66E-05
U-234	4.3044E-06	12,522.18	28,967.98	0.00E+00	5.39E-02	1.25E-01
U-235	-7.7765E-09	12,522.18	0.00	1.36E-02	1.35E-02	1.36E-02
U-236	1.8050E-07	12,522.18	28,967.98	0.00E+00	2.26E-03	5.23E-03
U-238	-1.7914E-07	12,522.18	0.00	9.87E-01	9.85E-01	9.87E-01
Y-90	5.0088E-01	12,522.18	28,967.98	0.00E+00	6.27E+03	1.45E+04
Other Radionuclides					1.77E+04	4.10E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.365E+15
0.0250	1.957E+14
0.0375	2.196E+14
0.0575	3.254E+14
0.0850	1.050E+14
0.1250	7.411E+13
0.2250	8.464E+13
0.3750	3.683E+13
0.5750	1.486E+15
0.8500	1.563E+13
1.2500	1.858E+13
1.7500	4.204E+11
2.2500	1.193E+08
2.7500	5.003E+08
3.5000	2.029E+07
5.0000	8.426E+08
7.0000	9.583E+05
11.0000	1.096E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.57E+03	3.84E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	SST	SST
BOL HM Constituents:	UNKNOWN	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) and BOL heavy metal (it is mostly U with a little Pu).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12,522.18
Bounding:		28,967.98

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=4174.061kg
Bounding burnup taken from SFD and converted to MWd using BOL=4174.061kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.02	
Bounding:	0.05	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MISCELLANEOUS TREAT FUEL (MOX)
SNF ID #: 369
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=0.12kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	114.14	114.14	0.00E+00	2.63E-04	2.63E-04
Am-241	8.4448E+00	114.14	114.14	0.00E+00	9.64E+02	9.64E+02
Am-242m	1.6848E-02	114.14	114.14	0.00E+00	1.92E+00	1.92E+00
Am-243	1.6320E-02	114.14	114.14	0.00E+00	1.86E+00	1.86E+00
C-14	1.2090E-01	114.14	114.14	0.00E+00	1.38E+01	1.38E+01
Cl-36	2.2849E-03	114.14	114.14	0.00E+00	2.61E-01	2.61E-01
Cm-243	8.6624E-04	114.14	114.14	0.00E+00	9.89E-02	9.89E-02
Cm-244	1.6848E-01	114.14	114.14	0.00E+00	1.92E+01	1.92E+01
Co-60	2.8086E+01	114.14	114.14	0.00E+00	3.21E+03	3.21E+03
Cs-134	3.4148E-04	114.14	114.14	0.00E+00	3.90E-02	3.90E-02
Cs-135	4.3976E-04	114.14	114.14	0.00E+00	5.02E-02	5.02E-02
Cs-137	2.1049E+01	114.14	114.14	0.00E+00	2.40E+03	2.40E+03
Eu-154	1.2500E+00	114.14	114.14	0.00E+00	1.43E+02	1.43E+02
Eu-155	6.8986E-02	114.14	114.14	0.00E+00	7.87E+00	7.87E+00
Fe-55	2.9308E-01	114.14	114.14	0.00E+00	3.35E+01	3.35E+01
H-3	2.4311E-01	114.14	114.14	0.00E+00	2.77E+01	2.77E+01
I-129	1.0618E-05	114.14	114.14	0.00E+00	1.21E-03	1.21E-03
Kr-85	5.9882E-01	114.14	114.14	0.00E+00	6.83E+01	6.83E+01
Np-237	1.5668E-04	114.14	114.14	0.00E+00	1.79E-02	1.79E-02
Pa-231	2.8656E-06	114.14	114.14	0.00E+00	3.27E-04	3.27E-04
Pb-210	2.3918E-08	114.14	114.14	0.00E+00	2.73E-06	2.73E-06
Pm-147	1.6900E-02	114.14	114.14	0.00E+00	1.93E+00	1.93E+00
Pu-238	-8.6120E-01	114.14	0.00	3.09E+01	0.00E+00	3.09E+01
Pu-239	-4.8440E-02	114.14	0.00	3.74E+00	0.00E+00	3.74E+00
Pu-240	-3.0095E-01	114.14	0.00	4.77E+00	0.00E+00	4.77E+00
Pu-241	-1.0411E+02	114.14	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-242	-1.1381E-04	114.14	0.00	2.06E-02	7.66E-03	2.06E-02
Ra-226	6.4400E-08	114.14	114.14	0.00E+00	7.35E-06	7.35E-06
Ra-228	5.9952E-07	114.14	114.14	0.00E+00	6.84E-05	6.84E-05
Ru-106	8.5526E-07	114.14	114.14	0.00E+00	9.76E-05	9.76E-05
Se-79	1.9181E-04	114.14	114.14	0.00E+00	2.19E-02	2.19E-02
Sn-126	1.6671E-04	114.14	114.14	0.00E+00	1.90E-02	1.90E-02
Sr-90	1.9799E+01	114.14	114.14	0.00E+00	2.26E+03	2.26E+03
Tc-99	6.7678E-03	114.14	114.14	0.00E+00	7.72E-01	7.72E-01
Th-229	1.7488E-06	114.14	114.14	0.00E+00	2.00E-04	2.00E-04
Th-230	5.8704E-06	114.14	114.14	0.00E+00	6.70E-04	6.70E-04
Th-232	6.0206E-07	114.14	114.14	0.00E+00	6.87E-05	6.87E-05
Tl-208	8.7573E-05	114.14	114.14	0.00E+00	1.00E-02	1.00E-02
U-232	2.3706E-04	114.14	114.14	0.00E+00	2.71E-02	2.71E-02
U-233	3.6128E-04	114.14	114.14	0.00E+00	4.12E-02	4.12E-02
U-234	1.2788E-02	114.14	114.14	0.00E+00	1.46E+00	1.46E+00
U-235	5.7486E-04	114.14	114.14	1.03E-04	6.57E-02	6.57E-02
U-236	2.3485E-04	114.14	114.14	0.00E+00	2.68E-02	2.68E-02
U-238	1.1581E-04	114.14	114.14	1.29E-05	1.32E-02	1.32E-02
Y-90	1.9804E+01	114.14	114.14	0.00E+00	2.26E+03	2.26E+03
Other Radionuclides					7.04E+03	7.04E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.399E+14
0.0250	2.783E+13
0.0375	2.431E+13
0.0575	3.826E+13
0.0850	1.493E+13
0.1250	1.170E+13
0.2250	1.294E+13
0.3750	5.533E+12
0.5750	8.997E+13
0.8500	3.438E+12
1.2500	2.403E+14
1.7500	1.063E+11
2.2500	1.260E+09
2.7500	3.552E+08
3.5000	2.842E+05
5.0000	1.207E+05
7.0000	1.382E+04
11.0000	1.582E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+02	1.14E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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:		114.14
Bounding:		114.14

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

[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: MISCELLANEOUS TREAT FUEL (U-METAL)
SNF ID #: 905
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=0.12kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 69600
Template BOL Heavy Metal Mass (MT): 11.8
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
0.01

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.2184E-10	126.70	126.70	0.00E+00	5.34E-08	5.34E-08
Am-241	9.6379E-02	126.70	126.70	0.00E+00	1.22E+01	1.22E+01
Am-242m	5.8463E-05	126.70	126.70	0.00E+00	7.41E-03	7.41E-03
Am-243	4.6279E-05	126.70	126.70	0.00E+00	5.86E-03	5.86E-03
C-14	9.2026E-05	126.70	126.70	0.00E+00	1.17E-02	1.17E-02
Cl-36	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Cm-244	4.5445E-04	126.70	126.70	0.00E+00	5.76E-02	5.76E-02
Co-60	6.3707E-05	126.70	126.70	0.00E+00	8.07E-03	8.07E-03
Cs-134	1.4042E-05	126.70	126.70	0.00E+00	1.78E-03	1.78E-03
Cs-135	1.0066E-05	126.70	126.70	0.00E+00	1.28E-03	1.28E-03
Cs-137	1.1945E+00	126.70	126.70	0.00E+00	1.51E+02	1.51E+02
Eu-154	6.6451E-03	126.70	126.70	0.00E+00	8.42E-01	8.42E-01
Eu-155	2.9052E-04	126.70	126.70	0.00E+00	3.68E-02	3.68E-02
Fe-55	2.8807E-06	126.70	126.70	0.00E+00	3.65E-04	3.65E-04
H-3	2.1063E-03	126.70	126.70	0.00E+00	2.67E-01	2.67E-01
I-129	8.6006E-07	126.70	126.70	0.00E+00	1.09E-04	1.09E-04
Kr-85	2.6739E-02	126.70	126.70	0.00E+00	3.39E+00	3.39E+00
Np-237	8.5589E-06	126.70	126.70	0.00E+00	1.08E-03	1.08E-03
Pa-231	1.2500E-09	126.70	126.70	0.00E+00	1.58E-07	1.58E-07
Pb-210	2.3017E-11	126.70	126.70	0.00E+00	2.92E-09	2.92E-09
Pm-147	5.9856E-04	126.70	126.70	0.00E+00	7.58E-02	7.58E-02
Pu-238	2.0029E-02	126.70	126.70	0.00E+00	2.54E+00	2.54E+00
Pu-239	2.8836E-02	126.70	126.70	0.00E+00	3.65E+00	3.65E+00
Pu-240	2.2802E-02	126.70	126.70	0.00E+00	2.89E+00	2.89E+00
Pu-241	6.1020E-01	126.70	126.70	0.00E+00	7.73E+01	7.73E+01
Pu-242	1.4526E-05	126.70	126.70	0.00E+00	1.84E-03	1.84E-03
Ra-226	9.7701E-11	126.70	126.70	0.00E+00	1.24E-08	1.24E-08
Ra-228	1.1068E-14	126.70	126.70	0.00E+00	1.40E-12	1.40E-12
Ru-106	5.9224E-10	126.70	126.70	0.00E+00	7.50E-08	7.50E-08
Se-79	1.0899E-05	126.70	126.70	0.00E+00	1.38E-03	1.38E-03
Sn-126	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Sr-90	8.4899E-01	126.70	126.70	0.00E+00	1.08E+02	1.08E+02
Tc-99	3.6494E-04	126.70	126.70	0.00E+00	4.62E-02	4.62E-02
Th-229	1.2928E-12	126.70	126.70	0.00E+00	1.64E-10	1.64E-10
Th-230	1.6293E-08	126.70	126.70	0.00E+00	2.06E-06	2.06E-06
Th-232	1.6451E-14	126.70	126.70	0.00E+00	2.08E-12	2.08E-12
Tl-208	3.4382E-15	126.70	126.70	0.00E+00	4.36E-13	4.36E-13
U-232	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
U-233	9.9425E-10	126.70	126.70	0.00E+00	1.26E-07	1.26E-07
U-234	6.5575E-05	126.70	126.70	0.00E+00	8.31E-03	8.31E-03
U-235	-1.2944E-06	126.70	0.00	4.92E-06	0.00E+00	4.92E-06
U-236	1.1951E-05	126.70	126.70	0.00E+00	1.51E-03	1.51E-03
U-238	-3.0619E-07	126.70	0.00	7.99E-05	4.11E-05	7.99E-05
Y-90	8.4928E-01	126.70	126.70	0.00E+00	1.08E+02	1.08E+02
Other Radionuclides					1.45E+02	1.45E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.156E+12
0.0250	1.258E+12
0.0375	1.164E+12
0.0575	1.328E+12
0.0850	6.986E+11
0.1250	4.639E+11
0.2250	5.993E+11
0.3750	2.594E+11
0.5750	5.595E+12
0.8500	5.684E+10
1.2500	3.101E+10
1.7500	1.572E+09
2.2500	1.270E+06
2.7500	2.965E+03
3.5000	2.621E+03
5.0000	1.106E+03
7.0000	1.254E+02
11.0000	1.428E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.16E+00	2.16E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	UNKNOWN	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 cladding (unknown) and enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		126.70
Bounding:		126.70

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:	87.91	
Bounding:	87.91	

Estimated EOL HM/Given EOL HM: 1.83

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1979
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	266.26	532.51	0.00E+00	2.86E-07	5.72E-07
Am-241	1.4751E-01	266.26	532.51	0.00E+00	3.93E+01	7.86E+01
Am-242m	2.6809E-04	266.26	532.51	0.00E+00	7.14E-02	1.43E-01
Am-243	6.2484E-04	266.26	532.51	0.00E+00	1.66E-01	3.33E-01
C-14	4.7820E-05	266.26	532.51	0.00E+00	1.27E-02	2.55E-02
Cl-36	8.0297E-07	266.26	532.51	0.00E+00	2.14E-04	4.28E-04
Cm-243	1.7426E-04	266.26	532.51	0.00E+00	4.64E-02	9.28E-02
Cm-244	2.7616E-02	266.26	532.51	0.00E+00	7.35E+00	1.47E+01
Co-60	3.5610E-04	266.26	532.51	0.00E+00	9.48E-02	1.90E-01
Cs-134	2.6260E-07	266.26	532.51	0.00E+00	6.99E-05	1.40E-04
Cs-135	1.4433E-05	266.26	532.51	0.00E+00	3.84E-03	7.69E-03
Cs-137	9.8870E-01	266.26	532.51	0.00E+00	2.63E+02	5.26E+02
Eu-154	6.0320E-03	266.26	532.51	0.00E+00	1.61E+00	3.21E+00
Eu-155	2.1770E-04	266.26	532.51	0.00E+00	5.80E-02	1.16E-01
Fe-55	7.9296E-07	266.26	532.51	0.00E+00	2.11E-04	4.22E-04
H-3	8.9486E-03	266.26	532.51	0.00E+00	2.38E+00	4.77E+00
I-129	9.8288E-07	266.26	532.51	0.00E+00	2.62E-04	5.23E-04
Kr-85	1.0707E-02	266.26	532.51	0.00E+00	2.85E+00	5.70E+00
Np-237	1.1927E-05	266.26	532.51	0.00E+00	3.18E-03	6.35E-03
Pa-231	1.4703E-09	266.26	532.51	0.00E+00	3.91E-07	7.83E-07
Pb-210	1.6828E-10	266.26	532.51	0.00E+00	4.48E-08	8.96E-08
Pm-147	6.9606E-06	266.26	532.51	0.00E+00	1.85E-03	3.71E-03
Pu-238	6.6263E-02	266.26	532.51	0.00E+00	1.76E+01	3.53E+01
Pu-239	1.1618E-02	266.26	532.51	0.00E+00	3.09E+00	6.19E+00
Pu-240	1.5142E-02	266.26	532.51	0.00E+00	4.03E+00	8.06E+00
Pu-241	4.3766E-01	266.26	532.51	0.00E+00	1.17E+02	2.33E+02
Pu-242	6.4260E-05	266.26	532.51	0.00E+00	1.71E-02	3.42E-02
Ra-226	3.8501E-10	266.26	532.51	0.00E+00	1.03E-07	2.05E-07
Ra-228	5.2955E-12	266.26	532.51	0.00E+00	1.41E-09	2.82E-09
Ru-106	2.0413E-14	266.26	532.51	0.00E+00	5.44E-12	1.09E-11
Se-79	1.2376E-05	266.26	532.51	0.00E+00	3.30E-03	6.59E-03
Sn-126	2.5210E-05	266.26	532.51	0.00E+00	6.71E-03	1.34E-02
Sr-90	6.4163E-01	266.26	532.51	0.00E+00	1.71E+02	3.42E+02
Tc-99	3.9357E-04	266.26	532.51	0.00E+00	1.05E-01	2.10E-01
Th-229	1.5644E-10	266.26	532.51	0.00E+00	4.17E-08	8.33E-08
Th-230	2.7972E-08	266.26	532.51	0.00E+00	7.45E-06	1.49E-05
Th-232	5.3036E-12	266.26	532.51	0.00E+00	1.41E-09	2.82E-09
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.026E+13
0.0250	4.061E+12
0.0375	3.826E+12
0.0575	4.788E+12
0.0850	2.237E+12
0.1250	1.488E+12
0.2250	1.910E+12
0.3750	8.249E+11
0.5750	1.943E+13
0.8500	1.897E+11
1.2500	1.207E+11
1.7500	5.307E+09
2.2500	8.730E+05
2.7500	3.075E+06
3.5000	2.198E+05
5.0000	9.393E+04
7.0000	1.082E+04
11.0000	1.242E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.82E+00	9.63E+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:	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MURR (UALX) COLUMBIA
SNF ID #: 142
Fuel Units & Descr: 32 - 24 CURVED PLATES
Heavy Metal Mass: BOL=25.12kg; EOL=21.725kg
ROD Storage Site: SRS

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

Estimated Canister usage: 18"x10' 1.33

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	4,521.60	9,043.20	0.00E+00	9.07E-06	1.81E-05
Am-241	2.5251E-03	4,521.60	9,043.20	0.00E+00	1.14E+01	2.28E+01
Am-242m	3.9624E-07	4,521.60	9,043.20	0.00E+00	1.79E-03	3.58E-03
Am-243	1.4880E-06	4,521.60	9,043.20	0.00E+00	6.73E-03	1.35E-02
C-14	5.7053E-09	4,521.60	9,043.20	0.00E+00	2.58E-05	5.16E-05
Cl-36	1.3124E-32	4,521.60	9,043.20	0.00E+00	5.93E-29	1.19E-28
Cm-243	1.1419E-07	4,521.60	9,043.20	0.00E+00	5.16E-04	1.03E-03
Cm-244	1.6522E-05	4,521.60	9,043.20	0.00E+00	7.47E-02	1.49E-01
Co-60	7.4047E-07	4,521.60	9,043.20	0.00E+00	3.35E-03	6.70E-03
Cs-134	2.0455E-05	4,521.60	9,043.20	0.00E+00	9.25E-02	1.85E-01
Cs-135	3.4477E-06	4,521.60	9,043.20	0.00E+00	1.56E-02	3.12E-02
Cs-137	1.4365E+00	4,521.60	9,043.20	0.00E+00	6.50E+03	1.30E+04
Eu-154	7.3230E-03	4,521.60	9,043.20	0.00E+00	3.31E+01	6.62E+01
Eu-155	5.9259E-04	4,521.60	9,043.20	0.00E+00	2.68E+00	5.36E+00
Fe-55	2.2791E-06	4,521.60	9,043.20	0.00E+00	1.03E-02	2.06E-02
H-3	1.9698E-03	4,521.60	9,043.20	0.00E+00	8.91E+00	1.78E+01
I-129	7.5300E-07	4,521.60	9,043.20	0.00E+00	3.40E-03	6.81E-03
Kr-85	4.1176E-02	4,521.60	9,043.20	0.00E+00	1.86E+02	3.72E+02
Np-237	9.5752E-06	4,521.60	9,043.20	0.00E+00	4.33E-02	8.66E-02
Pa-231	3.9379E-09	4,521.60	9,043.20	0.00E+00	1.78E-05	3.56E-05
Pb-210	3.3115E-10	4,521.60	9,043.20	0.00E+00	1.50E-06	2.99E-06
Pm-147	9.2402E-04	4,521.60	9,043.20	0.00E+00	4.18E+00	8.36E+00
Pu-238	1.6217E-02	4,521.60	9,043.20	0.00E+00	7.33E+01	1.47E+02
Pu-239	4.2810E-04	4,521.60	9,043.20	0.00E+00	1.94E+00	3.87E+00
Pu-240	2.4333E-04	4,521.60	9,043.20	0.00E+00	1.10E+00	2.20E+00
Pu-241	1.6242E-02	4,521.60	9,043.20	0.00E+00	7.34E+01	1.47E+02
Pu-242	3.6329E-07	4,521.60	9,043.20	0.00E+00	1.64E-03	3.29E-03
Ra-226	9.0114E-10	4,521.60	9,043.20	0.00E+00	4.07E-06	8.15E-06
Ra-228	3.1019E-14	4,521.60	9,043.20	0.00E+00	1.40E-10	2.81E-10
Ru-106	2.1225E-10	4,521.60	9,043.20	0.00E+00	9.60E-07	1.92E-06
Se-79	1.2930E-05	4,521.60	9,043.20	0.00E+00	5.85E-02	1.17E-01
Sn-126	1.1571E-05	4,521.60	9,043.20	0.00E+00	5.23E-02	1.05E-01
Sr-90	1.3472E+00	4,521.60	9,043.20	0.00E+00	6.09E+03	1.22E+04
Tc-99	4.2239E-04	4,521.60	9,043.20	0.00E+00	1.91E+00	3.82E+00
Th-229	1.2407E-11	4,521.60	9,043.20	0.00E+00	5.61E-08	1.12E-07
Th-230	8.3497E-06	4,521.60	9,043.20	0.00E+00	3.78E-04	7.55E-04
Th-232	3.8371E-14	4,521.60	9,043.20	0.00E+00	1.74E-10	3.47E-10
Tl-208	4.0414E-08	4,521.60	9,043.20	0.00E+00	1.83E-04	3.65E-04
U-232	1.0948E-07	4,521.60	9,043.20	0.00E+00	4.95E-04	9.90E-04
U-233	3.6275E-09	4,521.60	9,043.20	0.00E+00	1.64E-05	3.28E-05
U-234	1.8562E-04	4,521.60	9,043.20	0.00E+00	8.39E-01	1.68E+00
U-235	-2.7235E-06	4,521.60	0.00	5.08E-02	3.84E-02	5.08E-02
U-236	1.5493E-05	4,521.60	9,043.20	0.00E+00	7.01E-02	1.40E-01
U-238	-4.2851E-09	4,521.60	0.00	5.49E-04	5.29E-04	5.49E-04
Y-90	1.3475E+00	4,521.60	9,043.20	0.00E+00	6.09E+03	1.22E+04
Other Radionuclides					6.19E+03	1.24E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.660E+14
0.0250	1.383E+14
0.0375	1.202E+14
0.0575	1.294E+14
0.0850	7.796E+13
0.1250	5.150E+13
0.2250	6.731E+13
0.3750	2.928E+13
0.5750	4.839E+14
0.8500	5.911E+12
1.2500	2.859E+12
1.7500	1.609E+11
2.2500	1.345E+07
2.7500	1.284E+07
3.5000	7.441E+03
5.0000	3.041E+03
7.0000	3.327E+02
11.0000	3.710E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.57E+01	1.51E+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 %:	93.5	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	4,521.60	3,215.32	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		9,043.20	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MURR (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

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	3,391.20	6,782.40	0.00E+00	6.81E-06	1.36E-05
Am-241	2.5251E-03	3,391.20	6,782.40	0.00E+00	8.56E+00	1.71E+01
Am-242m	3.9624E-07	3,391.20	6,782.40	0.00E+00	1.34E-03	2.69E-03
Am-243	1.4880E-06	3,391.20	6,782.40	0.00E+00	5.05E-03	1.01E-02
C-14	5.7053E-09	3,391.20	6,782.40	0.00E+00	1.93E-05	3.87E-05
Cl-36	1.3124E-32	3,391.20	6,782.40	0.00E+00	4.45E-29	8.90E-29
Cm-243	1.1419E-07	3,391.20	6,782.40	0.00E+00	3.87E-04	7.74E-04
Cm-244	1.6522E-05	3,391.20	6,782.40	0.00E+00	5.60E-02	1.12E-01
Co-60	7.4047E-07	3,391.20	6,782.40	0.00E+00	2.51E-03	5.02E-03
Cs-134	2.0455E-05	3,391.20	6,782.40	0.00E+00	6.94E-02	1.39E-01
Cs-135	3.4477E-06	3,391.20	6,782.40	0.00E+00	1.17E-02	2.34E-02
Cs-137	1.4365E+00	3,391.20	6,782.40	0.00E+00	4.87E+03	9.74E+03
Eu-154	7.3230E-03	3,391.20	6,782.40	0.00E+00	2.48E+01	4.97E+01
Eu-155	5.9259E-04	3,391.20	6,782.40	0.00E+00	2.01E+00	4.02E+00
Fe-55	2.2791E-06	3,391.20	6,782.40	0.00E+00	7.73E-03	1.55E-02
H-3	1.9698E-03	3,391.20	6,782.40	0.00E+00	6.68E+00	1.34E+01
I-129	7.5300E-07	3,391.20	6,782.40	0.00E+00	2.55E-03	5.11E-03
Kr-85	4.1176E-02	3,391.20	6,782.40	0.00E+00	1.40E+02	2.79E+02
Np-237	9.5752E-06	3,391.20	6,782.40	0.00E+00	3.25E-02	6.49E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.995E+14
0.0250	1.037E+14
0.0375	9.016E+13
0.0575	9.705E+13
0.0850	5.847E+13
0.1250	3.862E+13
0.2250	5.048E+13
0.3750	2.196E+13
0.5750	3.629E+14
0.8500	4.433E+12
1.2500	2.144E+12
1.7500	1.207E+11
2.2500	1.009E+07
2.7500	9.631E+06
3.5000	5.561E+03
5.0000	2.261E+03
7.0000	2.496E+02
11.0000	2.783E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.68E+01	1.14E+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 %:	93.5	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3,391.20	2,411.49	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		6,782.40	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

[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: OCONEE
SNF ID #: 156
Fuel Units & Descr: 14 - ROD
Heavy Metal Mass: BOL=39.2kg; EOL=31.983kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1986
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.78

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	6,863.03	13,726.05	0.00E+00	6.02E-06	1.20E-05
Am-241	1.4352E-01	6,863.03	13,726.05	0.00E+00	9.85E+02	1.97E+03
Am-242m	2.8698E-04	6,863.03	13,726.05	0.00E+00	1.97E+00	3.94E+00
Am-243	6.2565E-04	6,863.03	13,726.05	0.00E+00	4.29E+00	8.59E+00
C-14	4.7901E-05	6,863.03	13,726.05	0.00E+00	3.29E-01	6.57E-01
Cl-36	8.0297E-07	6,863.03	13,726.05	0.00E+00	5.51E-03	1.10E-02
Cm-243	2.5081E-04	6,863.03	13,726.05	0.00E+00	1.72E+00	3.44E+00
Cm-244	4.9015E-02	6,863.03	13,726.05	0.00E+00	3.36E+02	6.73E+02
Co-60	2.5581E-03	6,863.03	13,726.05	0.00E+00	1.76E+01	3.51E+01
Cs-134	4.0536E-05	6,863.03	13,726.05	0.00E+00	2.78E-01	5.56E-01
Cs-135	1.4433E-05	6,863.03	13,726.05	0.00E+00	9.91E-02	1.98E-01
Cs-137	1.3979E+00	6,863.03	13,726.05	0.00E+00	9.59E+03	1.92E+04
Eu-154	2.0203E-02	6,863.03	13,726.05	0.00E+00	1.39E+02	2.77E+02
Eu-155	1.7684E-03	6,863.03	13,726.05	0.00E+00	1.21E+01	2.43E+01
Fe-55	4.3136E-05	6,863.03	13,726.05	0.00E+00	2.96E-01	5.92E-01
H-3	2.0769E-02	6,863.03	13,726.05	0.00E+00	1.43E+02	2.85E+02
I-129	9.8288E-07	6,863.03	13,726.05	0.00E+00	6.75E-03	1.35E-02
Kr-85	2.8214E-02	6,863.03	13,726.05	0.00E+00	1.94E+02	3.87E+02
Np-237	1.1218E-05	6,863.03	13,726.05	0.00E+00	7.70E-02	1.54E-01
Pa-231	1.3036E-09	6,863.03	13,726.05	0.00E+00	8.95E-06	1.79E-05
Pb-210	8.5078E-11	6,863.03	13,726.05	0.00E+00	5.84E-07	1.17E-06
Pm-147	3.6531E-04	6,863.03	13,726.05	0.00E+00	2.51E+00	5.01E+00
Pu-238	7.4564E-02	6,863.03	13,726.05	0.00E+00	5.12E+02	1.02E+03
Pu-239	1.1623E-02	6,863.03	13,726.05	0.00E+00	7.98E+01	1.60E+02
Pu-240	1.5132E-02	6,863.03	13,726.05	0.00E+00	1.04E+02	2.08E+02
Pu-241	9.0036E-01	6,863.03	13,726.05	0.00E+00	6.18E+03	1.24E+04
Pu-242	6.4260E-05	6,863.03	13,726.05	0.00E+00	4.41E-01	8.82E-01
Ra-226	2.2804E-10	6,863.03	13,726.05	0.00E+00	1.57E-06	3.13E-06
Ra-228	5.2713E-12	6,863.03	13,726.05	0.00E+00	3.62E-08	7.24E-08
Ru-106	6.1160E-10	6,863.03	13,726.05	0.00E+00	4.20E-06	8.39E-06
Se-79	1.2377E-05	6,863.03	13,726.05	0.00E+00	8.49E-02	1.70E-01
Sn-126	2.5210E-05	6,863.03	13,726.05	0.00E+00	1.73E-01	3.46E-01
Sr-90	9.1667E-01	6,863.03	13,726.05	0.00E+00	6.29E+03	1.26E+04
Tc-99	3.9357E-04	6,863.03	13,726.05	0.00E+00	2.70E+00	5.40E+00
Th-229	1.2057E-10	6,863.03	13,726.05	0.00E+00	8.28E-07	1.66E-06
Th-230	2.1043E-08	6,863.03	13,726.05	0.00E+00	1.44E-04	2.89E-04
Th-232	5.2972E-12	6,863.03	13,726.05	0.00E+00	3.64E-08	7.27E-08
Tl-208	1.7474E-07	6,863.03	13,726.05	0.00E+00	1.20E-03	2.40E-03
U-232	4.7368E-07	6,863.03	13,726.05	0.00E+00	3.25E-03	6.50E-03
U-233	2.5097E-08	6,863.03	13,726.05	0.00E+00	1.72E-04	3.44E-04
U-234	5.0000E-05	6,863.03	13,726.05	0.00E+00	3.43E-01	6.86E-01
U-235	-1.4489E-06	6,863.03	0.00	1.75E-03	0.00E+00	1.75E-03
U-236	7.5824E-06	6,863.03	13,726.05	0.00E+00	5.20E-02	1.04E-01
U-238	-2.6129E-07	6,863.03	0.00	1.29E-02	1.11E-02	1.29E-02
Y-90	9.1699E-01	6,863.03	13,726.05	0.00E+00	6.29E+03	1.26E+04
Other Radionuclides					9.21E+03	1.84E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.385E+14
0.0250	1.489E+14
0.0375	1.420E+14
0.0575	1.641E+14
0.0850	8.264E+13
0.1250	5.734E+13
0.2250	7.086E+13
0.3750	3.047E+13
0.5750	7.087E+14
0.8500	9.805E+12
1.2500	9.631E+12
1.7500	2.884E+11
2.2500	4.644E+07
2.7500	9.514E+07
3.5000	9.796E+06
5.0000	4.189E+06
7.0000	4.829E+05
11.0000	5.545E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.58E+02	3.16E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.0625	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,326.33	6,863.03	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1,960.00	13,726.05	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.12

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR
SNF ID #: 461
Fuel Units & Descr: 17 - 19 CURVED PLATES
Heavy Metal Mass: BOL=4.981kg; EOL=3.252kg
ROD Storage Site: SRS

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

Estimated Canister usage: 16"x10' 0.47

II. Estimates

Radionuclide	m: CI/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_a: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	1,637.30	3,274.60	0.00E+00	3.29E-06	6.57E-06
Am-241	2.5251E-03	1,637.30	3,274.60	0.00E+00	4.13E+00	8.27E+00
Am-242m	3.9624E-07	1,637.30	3,274.60	0.00E+00	6.49E-04	1.30E-03
Am-243	1.4880E-06	1,637.30	3,274.60	0.00E+00	2.44E-03	4.87E-03
C-14	5.7053E-09	1,637.30	3,274.60	0.00E+00	9.34E-06	1.87E-05
Cl-36	1.3124E-32	1,637.30	3,274.60	0.00E+00	2.15E-29	4.30E-29
Cm-243	1.1419E-07	1,637.30	3,274.60	0.00E+00	1.87E-04	3.74E-04
Cm-244	1.6522E-05	1,637.30	3,274.60	0.00E+00	2.71E-02	5.41E-02
Co-60	7.4047E-07	1,637.30	3,274.60	0.00E+00	1.21E-03	2.42E-03
Cs-134	2.0455E-05	1,637.30	3,274.60	0.00E+00	3.35E-02	6.70E-02
Cs-135	3.4477E-06	1,637.30	3,274.60	0.00E+00	5.64E-03	1.13E-02
Cs-137	1.4365E+00	1,637.30	3,274.60	0.00E+00	2.35E+03	4.70E+03
Eu-154	7.3230E-03	1,637.30	3,274.60	0.00E+00	1.20E+01	2.40E+01
Eu-155	5.9259E-04	1,637.30	3,274.60	0.00E+00	9.70E-01	1.94E+00
Fe-55	2.2791E-06	1,637.30	3,274.60	0.00E+00	3.73E-03	7.46E-03
H-3	1.9698E-03	1,637.30	3,274.60	0.00E+00	3.23E+00	6.45E+00
I-129	7.5300E-07	1,637.30	3,274.60	0.00E+00	1.23E-03	2.47E-03
Kr-85	4.1176E-02	1,637.30	3,274.60	0.00E+00	6.74E+01	1.36E+02
Np-237	9.5752E-06	1,637.30	3,274.60	0.00E+00	1.57E-02	3.14E-02
Pa-231	3.9379E-09	1,637.30	3,274.60	0.00E+00	6.45E-06	1.29E-05
Pb-210	3.3115E-10	1,637.30	3,274.60	0.00E+00	5.42E-07	1.08E-06
Pm-147	9.2402E-04	1,637.30	3,274.60	0.00E+00	1.51E+00	3.03E+00
Pu-238	1.6217E-02	1,637.30	3,274.60	0.00E+00	2.66E+01	5.31E+01
Pu-239	4.2810E-04	1,637.30	3,274.60	0.00E+00	7.01E-01	1.40E+00
Pu-240	2.4333E-04	1,637.30	3,274.60	0.00E+00	3.98E-01	7.97E-01
Pu-241	1.6242E-02	1,637.30	3,274.60	0.00E+00	2.66E+01	5.32E+01
Pu-242	3.6329E-07	1,637.30	3,274.60	0.00E+00	5.95E-04	1.19E-03
Ra-226	9.0114E-10	1,637.30	3,274.60	0.00E+00	1.48E-06	2.95E-06
Ra-228	3.1019E-14	1,637.30	3,274.60	0.00E+00	5.08E-11	1.02E-10
Ru-106	2.1225E-10	1,637.30	3,274.60	0.00E+00	3.48E-07	6.95E-07
Se-79	1.2930E-05	1,637.30	3,274.60	0.00E+00	2.12E-02	4.23E-02
Sn-126	1.1571E-05	1,637.30	3,274.60	0.00E+00	1.89E-02	3.79E-02
Sr-90	1.3472E+00	1,637.30	3,274.60	0.00E+00	2.21E+03	4.41E+03
Tc-99	4.2239E-04	1,637.30	3,274.60	0.00E+00	6.92E-01	1.38E+00
Th-229	1.2407E-11	1,637.30	3,274.60	0.00E+00	2.03E-08	4.06E-08
Th-230	8.3497E-08	1,637.30	3,274.60	0.00E+00	1.37E-04	2.73E-04
Th-232	3.8371E-14	1,637.30	3,274.60	0.00E+00	6.28E-11	1.26E-10
Tl-208	4.0414E-08	1,637.30	3,274.60	0.00E+00	6.62E-05	1.32E-04
U-232	1.0948E-07	1,637.30	3,274.60	0.00E+00	1.79E-04	3.58E-04
U-233	3.6275E-09	1,637.30	3,274.60	0.00E+00	5.94E-06	1.19E-05
U-234	1.8562E-04	1,637.30	3,274.60	0.00E+00	3.04E-01	6.08E-01
U-235	-2.7235E-06	1,637.30	0.00	1.00E-02	5.57E-03	1.00E-02
U-236	1.5493E-05	1,637.30	3,274.60	0.00E+00	2.54E-02	5.07E-02
U-238	-4.2851E-09	1,637.30	0.00	1.14E-04	1.07E-04	1.14E-04
Y-90	1.3475E+00	1,637.30	3,274.60	0.00E+00	2.21E+03	4.41E+03
Other Radionuclides					2.24E+03	4.48E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.412E+14
0.0250	5.008E+13
0.0375	4.353E+13
0.0575	4.685E+13
0.0850	2.823E+13
0.1250	1.865E+13
0.2250	2.437E+13
0.3750	1.060E+13
0.5750	1.752E+14
0.8500	2.140E+12
1.2500	1.035E+12
1.7500	5.827E+10
2.2500	4.872E+06
2.7500	4.650E+06
3.5000	2.694E+03
5.0000	1.101E+03
7.0000	1.205E+02
11.0000	1.343E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.74E+01	5.48E+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 %:	93.19412969	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	0.47	1,637.30	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,274.60	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.04	3,460.10
Bounding:	2.09	

Estimated EOL HM/Given EOL HM: 1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PATHFINDER (SUPERHEATER)
SNF ID #: 166
Fuel Units & Descr: 411 - ROD
Heavy Metal Mass: BOL=54.54kg; EOL=52.608kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1967
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
3.57

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	1,824.78	3,649.55	0.00E+00	6.25E-05	1.25E-04
Am-241	1.1458E-04	1,824.78	3,649.55	0.00E+00	2.09E-01	4.18E-01
Am-242m	7.9468E-09	1,824.78	3,649.55	0.00E+00	1.45E-05	2.90E-05
Am-243	9.8386E-10	1,824.78	3,649.55	0.00E+00	1.80E-06	3.59E-06
C-14	2.2978E-04	1,824.78	3,649.55	0.00E+00	4.19E-01	8.39E-01
Cl-36	1.2261E-06	1,824.78	3,649.55	0.00E+00	2.24E-03	4.47E-03
Cm-243	1.7271E-10	1,824.78	3,649.55	0.00E+00	3.15E-07	6.30E-07
Cm-244	1.3058E-09	1,824.78	3,649.55	0.00E+00	2.38E-06	4.77E-06
Co-60	9.8636E-03	1,824.78	3,649.55	0.00E+00	1.80E+01	3.60E+01
Cs-134	1.9617E-08	1,824.78	3,649.55	0.00E+00	3.58E-05	7.16E-05
Cs-135	3.0316E-05	1,824.78	3,649.55	0.00E+00	5.53E-02	1.11E-01
Cs-137	1.0263E+00	1,824.78	3,649.55	0.00E+00	1.87E+03	3.75E+03
Eu-154	2.0017E-04	1,824.78	3,649.55	0.00E+00	3.65E-01	7.31E-01
Eu-155	8.5957E-05	1,824.78	3,649.55	0.00E+00	1.57E-01	3.14E-01
Fe-55	2.2646E-05	1,824.78	3,649.55	0.00E+00	4.13E-02	8.26E-02
H-3	1.0835E-03	1,824.78	3,649.55	0.00E+00	1.98E+00	3.95E+00
I-129	7.3195E-07	1,824.78	3,649.55	0.00E+00	1.34E-03	2.67E-03
Kr-85	1.5681E-02	1,824.78	3,649.55	0.00E+00	2.86E+01	5.72E+01
Np-237	1.1494E-06	1,824.78	3,649.55	0.00E+00	2.10E-03	4.19E-03
Pa-231	5.8070E-08	1,824.78	3,649.55	0.00E+00	1.06E-04	2.12E-04
Pb-210	1.2985E-12	1,824.78	3,649.55	0.00E+00	2.37E-09	4.74E-09
Pm-147	2.2196E-05	1,824.78	3,649.55	0.00E+00	4.05E-02	8.10E-02
Pu-238	2.6223E-04	1,824.78	3,649.55	0.00E+00	4.79E-01	9.57E-01
Pu-239	6.6739E-04	1,824.78	3,649.55	0.00E+00	1.22E+00	2.44E+00
Pu-240	8.6705E-05	1,824.78	3,649.55	0.00E+00	1.58E-01	3.16E-01
Pu-241	3.4759E-04	1,824.78	3,649.55	0.00E+00	6.34E-01	1.27E+00
Pu-242	1.9717E-09	1,824.78	3,649.55	0.00E+00	3.60E-06	7.20E-06
Ra-226	3.0000E-12	1,824.78	3,649.55	0.00E+00	5.47E-09	1.09E-08
Ra-228	8.3328E-12	1,824.78	3,649.55	0.00E+00	1.52E-08	3.04E-08
Ru-106	6.1464E-15	1,824.78	3,649.55	0.00E+00	1.12E-11	2.24E-11
Se-79	1.3221E-05	1,824.78	3,649.55	0.00E+00	2.41E-02	4.83E-02
Sn-126	1.1491E-05	1,824.78	3,649.55	0.00E+00	2.10E-02	4.19E-02
Sr-90	9.5541E-01	1,824.78	3,649.55	0.00E+00	1.74E+03	3.49E+03
Tc-99	4.6656E-04	1,824.78	3,649.55	0.00E+00	8.51E-01	1.70E+00
Th-229	1.9085E-11	1,824.78	3,649.55	0.00E+00	3.48E-08	6.97E-08
Th-230	2.1913E-10	1,824.78	3,649.55	0.00E+00	4.00E-07	8.00E-07
Th-232	8.3478E-12	1,824.78	3,649.55	0.00E+00	1.52E-08	3.05E-08
Tl-208	1.8752E-08	1,824.78	3,649.55	0.00E+00	3.42E-05	6.84E-05
U-232	5.0782E-08	1,824.78	3,649.55	0.00E+00	9.27E-05	1.85E-04
U-233	3.2596E-09	1,824.78	3,649.55	0.00E+00	5.95E-06	1.19E-05
U-234	3.9817E-07	1,824.78	3,649.55	0.00E+00	7.27E-04	1.45E-03
U-235	-2.7761E-06	1,824.78	0.00	1.10E-01	1.05E-01	1.10E-01
U-236	1.6190E-05	1,824.78	3,649.55	0.00E+00	2.95E-02	5.91E-02
U-238	-2.8547E-09	1,824.78	0.00	1.26E-03	1.25E-03	1.26E-03
Y-90	9.5557E-01	1,824.78	3,649.55	0.00E+00	1.74E+03	3.49E+03
Other Radionuclides					2.22E+03	4.45E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.903E+14
0.0250	3.955E+13
0.0375	3.429E+13
0.0575	3.688E+13
0.0850	2.228E+13
0.1250	1.445E+13
0.2250	1.920E+13
0.3750	8.374E+12
0.5750	1.394E+14
0.8500	1.377E+12
1.2500	3.135E+12
1.7500	3.544E+10
2.2500	1.796E+07
2.7500	2.447E+08
3.5000	2.228E+02
5.0000	9.206E+01
7.0000	1.018E+01
11.0000	1.143E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.13E+01	4.26E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14242653	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,824.78	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,649.55	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.72	
Bounding:	1.43	

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

[1]Fuel decay start date: 1967
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	15.04	30.09	0.00E+00	5.16E-07	1.03E-06
Am-241	1.1458E-04	15.04	30.09	0.00E+00	1.72E-03	3.45E-03
Am-242m	7.9468E-09	15.04	30.09	0.00E+00	1.20E-07	2.39E-07
Am-243	9.8386E-10	15.04	30.09	0.00E+00	1.48E-08	2.96E-08
C-14	2.2978E-04	15.04	30.09	0.00E+00	3.46E-03	6.91E-03
Cl-36	1.2261E-06	15.04	30.09	0.00E+00	1.84E-05	3.69E-05
Cm-243	1.7271E-10	15.04	30.09	0.00E+00	2.60E-09	5.20E-09
Cm-244	1.3058E-09	15.04	30.09	0.00E+00	1.96E-08	3.93E-08
Co-60	9.8636E-03	15.04	30.09	0.00E+00	1.48E-01	2.97E-01
Cs-134	1.9617E-08	15.04	30.09	0.00E+00	2.95E-07	5.90E-07
Cs-135	3.0316E-05	15.04	30.09	0.00E+00	4.56E-04	9.12E-04
Cs-137	1.0263E+00	15.04	30.09	0.00E+00	1.54E+01	3.09E+01
Eu-154	2.0017E-04	15.04	30.09	0.00E+00	3.01E-03	6.02E-03
Eu-155	8.5957E-05	15.04	30.09	0.00E+00	1.29E-03	2.59E-03
Fe-55	2.2646E-05	15.04	30.09	0.00E+00	3.41E-04	6.81E-04
H-3	1.0835E-03	15.04	30.09	0.00E+00	1.63E-02	3.26E-02
I-129	7.3195E-07	15.04	30.09	0.00E+00	1.10E-05	2.20E-05
Kr-85	1.5661E-02	15.04	30.09	0.00E+00	2.36E-01	4.71E-01
Np-237	1.1494E-06	15.04	30.09	0.00E+00	1.73E-05	3.46E-05
Pa-231	5.8070E-08	15.04	30.09	0.00E+00	8.74E-07	1.75E-06
Pb-210	1.2985E-12	15.04	30.09	0.00E+00	1.95E-11	3.91E-11
Pm-147	2.2196E-05	15.04	30.09	0.00E+00	3.34E-04	6.68E-04
Pu-238	2.6223E-04	15.04	30.09	0.00E+00	3.94E-03	7.89E-03
Pu-239	6.6739E-04	15.04	30.09	0.00E+00	1.00E-02	2.01E-02
Pu-240	8.6705E-05	15.04	30.09	0.00E+00	1.30E-03	2.61E-03
Pu-241	3.4759E-04	15.04	30.09	0.00E+00	5.23E-03	1.05E-02
Pu-242	1.9717E-09	15.04	30.09	0.00E+00	2.97E-08	5.93E-08
Ra-226	3.0000E-12	15.04	30.09	0.00E+00	4.51E-11	9.03E-11
Ra-228	8.3328E-12	15.04	30.09	0.00E+00	1.25E-10	2.51E-10
Ru-106	6.1464E-15	15.04	30.09	0.00E+00	9.25E-14	1.85E-13
Se-79	1.3221E-05	15.04	30.09	0.00E+00	1.99E-04	3.98E-04
Sn-126	1.1491E-05	15.04	30.09	0.00E+00	1.73E-04	3.46E-04
Sr-90	9.5541E-01	15.04	30.09	0.00E+00	1.44E+01	2.87E+01
Tc-99	4.6656E-04	15.04	30.09	0.00E+00	7.02E-03	1.40E-02
Th-229	1.9085E-11	15.04	30.09	0.00E+00	2.87E-10	5.74E-10
Th-230	2.1913E-10	15.04	30.09	0.00E+00	3.30E-09	6.59E-09
Th-232	8.3478E-12	15.04	30.09	0.00E+00	1.26E-10	2.51E-10
Tl-208	1.8752E-08	15.04	30.09	0.00E+00	2.82E-07	5.64E-07
U-232	5.0782E-08	15.04	30.09	0.00E+00	7.64E-07	1.53E-06
U-233	3.2596E-09	15.04	30.09	0.00E+00	4.90E-08	9.81E-08
U-234	3.9817E-07	15.04	30.09	0.00E+00	5.99E-06	1.20E-05
U-235	-2.7761E-06	15.04	0.00	1.60E-03	1.56E-03	1.60E-03
U-236	1.6190E-05	15.04	30.09	0.00E+00	2.44E-04	4.87E-04
U-238	-2.8547E-09	15.04	0.00	1.84E-05	1.83E-05	1.84E-05
Y-90	9.5557E-01	15.04	30.09	0.00E+00	1.44E+01	2.87E+01
Other Radionuclides					1.83E+01	3.67E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.569E+12
0.0250	3.260E+11
0.0375	2.826E+11
0.0575	3.040E+11
0.0850	1.836E+11
0.1250	1.191E+11
0.2250	1.583E+11
0.3750	6.903E+10
0.5750	1.149E+12
0.8500	1.135E+10
1.2500	2.584E+10
1.7500	2.922E+08
2.2500	1.461E+05
2.7500	2.017E+04
3.5000	1.903E+00
5.0000	7.867E-01
7.0000	8.703E-02
11.0000	9.777E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.76E-01	3.51E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		15.04	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		30.09	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	9,621.24	19,242.47	0.00E+00	2.25E-04	4.49E-04
Am-241	1.1135E-04	9,621.24	19,242.47	0.00E+00	1.07E+00	2.14E+00
Am-242m	8.5075E-09	9,621.24	19,242.47	0.00E+00	8.19E-05	1.64E-04
Am-243	9.8519E-10	9,621.24	19,242.47	0.00E+00	9.48E-06	1.90E-05
C-14	2.3012E-04	9,621.24	19,242.47	0.00E+00	2.21E+00	4.43E+00
Cl-36	1.2261E-06	9,621.24	19,242.47	0.00E+00	1.18E-02	2.36E-02
Cm-243	2.4875E-10	9,621.24	19,242.47	0.00E+00	2.39E-06	4.79E-06
Cm-244	2.3178E-09	9,621.24	19,242.47	0.00E+00	2.23E-05	4.46E-05
Co-60	7.0849E-02	9,621.24	19,242.47	0.00E+00	6.82E+02	1.36E+03
Cs-134	3.0266E-06	9,621.24	19,242.47	0.00E+00	2.91E-02	5.82E-02
Cs-135	3.0316E-05	9,621.24	19,242.47	0.00E+00	2.92E-01	5.83E-01
Cs-137	1.4511E+00	9,621.24	19,242.47	0.00E+00	1.40E+04	2.79E+04
Eu-154	6.6955E-04	9,621.24	19,242.47	0.00E+00	6.44E+00	1.29E+01
Eu-155	6.9850E-04	9,621.24	19,242.47	0.00E+00	6.72E+00	1.34E+01
Fe-55	1.2318E-03	9,621.24	19,242.47	0.00E+00	1.19E+01	2.37E+01
H-3	2.5141E-03	9,621.24	19,242.47	0.00E+00	2.42E+01	4.84E+01
I-129	7.3195E-07	9,621.24	19,242.47	0.00E+00	7.04E-03	1.41E-02
Kr-85	4.1281E-02	9,621.24	19,242.47	0.00E+00	3.97E+02	7.94E+02
Np-237	1.1489E-06	9,621.24	19,242.47	0.00E+00	1.11E-02	2.21E-02
Pa-231	4.5241E-06	9,621.24	19,242.47	0.00E+00	4.35E-04	8.71E-04
Pb-210	6.4476E-13	9,621.24	19,242.47	0.00E+00	6.20E-09	1.24E-08
Pm-147	1.1651E-03	9,621.24	19,242.47	0.00E+00	1.12E+01	2.24E+01
Pu-238	2.9517E-04	9,621.24	19,242.47	0.00E+00	2.84E+00	5.68E+00
Pu-239	6.6772E-04	9,621.24	19,242.47	0.00E+00	6.42E+00	1.28E+01
Pu-240	8.6839E-05	9,621.24	19,242.47	0.00E+00	8.35E-01	1.67E+00
Pu-241	7.1514E-04	9,621.24	19,242.47	0.00E+00	6.88E+00	1.38E+01
Pu-242	1.9717E-09	9,621.24	19,242.47	0.00E+00	1.90E-05	3.79E-05
Ra-226	1.7654E-12	9,621.24	19,242.47	0.00E+00	1.70E-08	3.40E-08
Ra-228	8.2928E-12	9,621.24	19,242.47	0.00E+00	7.98E-08	1.60E-07
Ru-106	1.8419E-10	9,621.24	19,242.47	0.00E+00	1.77E-06	3.54E-06
Se-79	1.3223E-05	9,621.24	19,242.47	0.00E+00	1.27E-01	2.54E-01
Sn-126	1.1493E-05	9,621.24	19,242.47	0.00E+00	1.11E-01	2.21E-01
Sr-90	1.3649E+00	9,621.24	19,242.47	0.00E+00	1.31E+04	2.63E+04
Tc-99	4.6656E-04	9,621.24	19,242.47	0.00E+00	4.49E+00	8.98E+00
Th-229	1.4547E-11	9,621.24	19,242.47	0.00E+00	1.40E-07	2.80E-07
Th-230	1.6617E-10	9,621.24	19,242.47	0.00E+00	1.60E-06	3.20E-06
Th-232	8.3361E-12	9,621.24	19,242.47	0.00E+00	8.02E-08	1.60E-07
Tl-208	2.1664E-08	9,621.24	19,242.47	0.00E+00	2.08E-04	4.17E-04
U-232	5.8669E-08	9,621.24	19,242.47	0.00E+00	5.64E-04	1.13E-03
U-233	3.1847E-09	9,621.24	19,242.47	0.00E+00	3.06E-05	6.13E-05
U-234	3.8769E-07	9,621.24	19,242.47	0.00E+00	3.73E-03	7.46E-03
U-235	-2.7761E-06	9,621.24	0.00	2.28E-01	2.02E-01	2.28E-01
U-236	1.6190E-05	9,621.24	19,242.47	0.00E+00	1.56E-01	3.12E-01
U-238	-2.8547E-09	9,621.24	0.00	1.57E-01	1.57E-01	1.57E-01
Y-90	1.3652E+00	9,621.24	19,242.47	0.00E+00	1.31E+04	2.63E+04
Other Radionuclides					1.59E+04	3.18E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.436E+15
0.0250	2.985E+14
0.0375	2.561E+14
0.0575	2.783E+14
0.0850	1.681E+14
0.1250	1.092E+14
0.2250	1.447E+14
0.3750	6.313E+13
0.5750	1.040E+15
0.8500	1.053E+13
1.2500	1.046E+14
1.7500	2.715E+11
2.2500	5.637E+08
2.7500	1.629E+07
3.5000	1.984E+03
5.0000	8.313E+02
7.0000	9.348E+01
11.0000	1.060E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E+02	3.36E+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 %:	18.49024597	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	297.34	9,621.24
Bounding:	623.28	19,242.47

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	32.36
Bounding:	0.72	30.87

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM (ASSEMBLY)
SNF ID #: 385
Fuel Units & Descr: 2 - 7 X 7 ROD ARRAY
Heavy Metal Mass: BOL=288.335kg; EOL=285.305kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1976
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage:
16"x15'
1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	2,881.39	5,762.77	0.00E+00	3.09E-06	6.19E-06
Am-241	1.4751E-01	2,881.39	5,762.77	0.00E+00	4.25E+02	8.50E+02
Am-242m	2.6809E-04	2,881.39	5,762.77	0.00E+00	7.72E-01	1.54E+00
Am-243	6.2484E-04	2,881.39	5,762.77	0.00E+00	1.80E+00	3.60E+00
C-14	4.7820E-05	2,881.39	5,762.77	0.00E+00	1.38E-01	2.76E-01
Cl-36	8.0297E-07	2,881.39	5,762.77	0.00E+00	2.31E-03	4.63E-03
Cm-243	1.7426E-04	2,881.39	5,762.77	0.00E+00	5.02E-01	1.00E+00
Cm-244	2.7616E-02	2,881.39	5,762.77	0.00E+00	7.96E+01	1.59E+02
Co-60	3.5610E-04	2,881.39	5,762.77	0.00E+00	1.03E+00	2.05E+00
Cs-134	2.6260E-07	2,881.39	5,762.77	0.00E+00	7.57E-04	1.51E-03
Cs-135	1.4433E-05	2,881.39	5,762.77	0.00E+00	4.16E-02	8.32E-02
Cs-137	9.8870E-01	2,881.39	5,762.77	0.00E+00	2.85E+03	5.70E+03
Eu-154	6.0320E-03	2,881.39	5,762.77	0.00E+00	1.74E+01	3.48E+01
Eu-155	2.1770E-04	2,881.39	5,762.77	0.00E+00	6.27E-01	1.25E+00
Fe-55	7.9296E-07	2,881.39	5,762.77	0.00E+00	2.28E-03	4.57E-03
H-3	8.9486E-03	2,881.39	5,762.77	0.00E+00	2.58E+01	5.16E+01
I-129	9.8288E-07	2,881.39	5,762.77	0.00E+00	2.83E-03	5.66E-03
Kr-85	1.0707E-02	2,881.39	5,762.77	0.00E+00	3.09E+01	6.17E+01
Np-237	1.1927E-05	2,881.39	5,762.77	0.00E+00	3.44E-02	6.87E-02
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	6.6263E-02	2,881.39	5,762.77	0.00E+00	1.91E+02	3.82E+02
Pu-239	1.1618E-02	2,881.39	5,762.77	0.00E+00	3.35E+01	6.70E+01
Pu-240	1.5142E-02	2,881.39	5,762.77	0.00E+00	4.36E+01	8.73E+01
Pu-241	4.3766E-01	2,881.39	5,762.77	0.00E+00	1.26E+03	2.52E+03
Pu-242	6.4260E-05	2,881.39	5,762.77	0.00E+00	1.85E-01	3.70E-01
Ra-226	3.8501E-10	2,881.39	5,762.77	0.00E+00	1.11E-06	2.22E-06
Ra-228	5.2955E-12	2,881.39	5,762.77	0.00E+00	1.53E-08	3.05E-08
Ru-106	2.0413E-14	2,881.39	5,762.77	0.00E+00	5.88E-11	1.18E-10
Se-79	1.2376E-05	2,881.39	5,762.77	0.00E+00	3.57E-02	7.13E-02
Sn-126	2.5210E-05	2,881.39	5,762.77	0.00E+00	7.26E-02	1.45E-01
Sr-90	6.4163E-01	2,881.39	5,762.77	0.00E+00	1.85E+03	3.70E+03
Tc-99	3.9357E-04	2,881.39	5,762.77	0.00E+00	1.13E+00	2.27E+00
Th-229	1.5644E-10	2,881.39	5,762.77	0.00E+00	4.51E-07	9.02E-07
Th-230	2.7972E-08	2,881.39	5,762.77	0.00E+00	8.06E-05	1.61E-04
Th-232	5.3036E-12	2,881.39	5,762.77	0.00E+00	1.53E-08	3.06E-08
Tl-208	1.5136E-07	2,881.39	5,762.77	0.00E+00	4.36E-04	8.72E-04
U-232	4.1005E-07	2,881.39	5,762.77	0.00E+00	1.18E-03	2.36E-03
U-233	2.5856E-08	2,881.39	5,762.77	0.00E+00	7.45E-05	1.49E-04
U-234	5.2665E-05	2,881.39	5,762.77	0.00E+00	1.52E-01	3.03E-01
U-235	-1.4487E-06	2,881.39	0.00	1.51E-02	1.10E-02	1.51E-02
U-236	7.5888E-06	2,881.39	5,762.77	0.00E+00	2.19E-02	4.37E-02
U-238	-2.6129E-07	2,881.39	0.00	9.46E-02	9.38E-02	9.46E-02
Y-90	6.4180E-01	2,881.39	5,762.77	0.00E+00	1.85E+03	3.70E+03
Other Radionuclides					2.75E+03	5.49E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.193E+14
0.0250	4.394E+13
0.0375	4.141E+13
0.0575	5.181E+13
0.0850	2.421E+13
0.1250	1.611E+13
0.2250	2.067E+13
0.3750	6.927E+12
0.5750	2.102E+14
0.8500	2.053E+12
1.2500	1.306E+12
1.7500	5.743E+10
2.2500	9.439E+06
2.7500	3.327E+07
3.5000	2.374E+06
5.0000	1.015E+06
7.0000	1.169E+05
11.0000	1.342E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.21E+01	1.84E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	1.16
Bounding:	0.57	2.32

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM RODS
SNF ID #: 386
Fuel Units & Descr: 20 - ROD
Heavy Metal Mass: BOL=79kg; EOL=71.12kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1976
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	7,493.51	14,987.01	0.00E+00	8.04E-06	1.61E-05
Am-241	1.4751E-01	7,493.51	14,987.01	0.00E+00	1.11E+03	2.21E+03
Am-242m	2.6809E-04	7,493.51	14,987.01	0.00E+00	2.01E+00	4.02E+00
Am-243	6.2484E-04	7,493.51	14,987.01	0.00E+00	4.68E+00	9.36E+00
C-14	4.7820E-05	7,493.51	14,987.01	0.00E+00	3.58E-01	7.17E-01
Cl-36	8.0297E-07	7,493.51	14,987.01	0.00E+00	6.02E-03	1.20E-02
Cm-243	1.7426E-04	7,493.51	14,987.01	0.00E+00	1.31E+00	2.61E+00
Cm-244	2.7616E-02	7,493.51	14,987.01	0.00E+00	2.07E+02	4.14E+02
Co-60	3.5610E-04	7,493.51	14,987.01	0.00E+00	2.67E+00	5.34E+00
Cs-134	2.6260E-07	7,493.51	14,987.01	0.00E+00	1.97E-03	3.94E-03
Cs-135	1.4433E-05	7,493.51	14,987.01	0.00E+00	1.08E-01	2.16E-01
Cs-137	9.8870E-01	7,493.51	14,987.01	0.00E+00	7.41E+03	1.48E+04
Eu-154	6.0320E-03	7,493.51	14,987.01	0.00E+00	4.52E+01	9.04E+01
Eu-155	2.1770E-04	7,493.51	14,987.01	0.00E+00	1.63E+00	3.26E+00
Fe-55	7.9296E-07	7,493.51	14,987.01	0.00E+00	5.94E-03	1.19E-02
H-3	8.9486E-03	7,493.51	14,987.01	0.00E+00	6.71E+01	1.34E+02
I-129	9.8288E-07	7,493.51	14,987.01	0.00E+00	7.37E-03	1.47E-02
Kr-85	1.0707E-02	7,493.51	14,987.01	0.00E+00	8.02E+01	1.60E+02
Np-237	1.1927E-05	7,493.51	14,987.01	0.00E+00	8.94E-02	1.79E-01
Pa-231	1.4703E-09	7,493.51	14,987.01	0.00E+00	1.10E-05	2.20E-05
Pb-210	1.6828E-10	7,493.51	14,987.01	0.00E+00	1.26E-06	2.52E-06
Pm-147	6.9606E-06	7,493.51	14,987.01	0.00E+00	5.22E-02	1.04E-01
Pu-238	6.6263E-02	7,493.51	14,987.01	0.00E+00	4.97E+02	9.93E+02
Pu-239	1.1618E-02	7,493.51	14,987.01	0.00E+00	8.71E+01	1.74E+02
Pu-240	1.5142E-02	7,493.51	14,987.01	0.00E+00	1.13E+02	2.27E+02
Pu-241	4.3766E-01	7,493.51	14,987.01	0.00E+00	3.28E+03	6.56E+03
Pu-242	6.4260E-05	7,493.51	14,987.01	0.00E+00	4.82E-01	9.63E-01
Ra-226	3.8501E-10	7,493.51	14,987.01	0.00E+00	2.89E-06	5.77E-06
Ra-228	5.2955E-12	7,493.51	14,987.01	0.00E+00	3.97E-08	7.94E-08
Ru-106	2.0413E-14	7,493.51	14,987.01	0.00E+00	1.53E-10	3.06E-10
Se-79	1.2376E-05	7,493.51	14,987.01	0.00E+00	9.27E-02	1.85E-01
Sn-126	2.5210E-05	7,493.51	14,987.01	0.00E+00	1.89E-01	3.78E-01
Sr-90	6.4163E-01	7,493.51	14,987.01	0.00E+00	4.81E+03	9.62E+03
Tc-99	3.9357E-04	7,493.51	14,987.01	0.00E+00	2.95E+00	5.90E+00
Th-229	1.5644E-10	7,493.51	14,987.01	0.00E+00	1.17E-06	2.34E-06
Th-230	2.7972E-08	7,493.51	14,987.01	0.00E+00	2.10E-04	4.19E-04
Th-232	5.3036E-12	7,493.51	14,987.01	0.00E+00	3.97E-08	7.95E-08
Tl-208	1.5136E-07	7,493.51	14,987.01	0.00E+00	1.13E-03	2.27E-03
U-232	4.1005E-07	7,493.51	14,987.01	0.00E+00	3.07E-03	6.15E-03
U-233	2.5856E-08	7,493.51	14,987.01	0.00E+00	1.94E-04	3.88E-04
U-234	5.2665E-05	7,493.51	14,987.01	0.00E+00	3.95E-01	7.89E-01
U-235	-1.4487E-06	7,493.51	0.00	4.15E-03	0.00E+00	4.15E-03
U-236	7.5888E-06	7,493.51	14,987.01	0.00E+00	5.69E-02	1.14E-01
U-238	-2.6129E-07	7,493.51	0.00	2.59E-02	2.39E-02	2.59E-02
Y-90	6.4180E-01	7,493.51	14,987.01	0.00E+00	4.81E+03	9.62E+03
Other Radionuclides					7.14E+03	1.43E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.703E+14
0.0250	1.143E+14
0.0375	1.077E+14
0.0575	1.348E+14
0.0850	6.296E+13
0.1250	4.189E+13
0.2250	5.375E+13
0.3750	2.322E+13
0.5750	5.467E+14
0.8500	5.338E+12
1.2500	3.397E+12
1.7500	1.493E+11
2.2500	2.455E+07
2.7500	8.652E+07
3.5000	6.172E+06
5.0000	2.638E+06
7.0000	3.039E+05
11.0000	3.489E+04

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	From SFD	Estimated
Nominal:	809.75	7,493.51
Bounding:	943.26	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM UNIT I CORE I
SNF ID #: 169
Fuel Units & Descr: 2 - SCRAP
Heavy Metal Mass: BOL=3.746kg; EOL=3.56kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x15" 0.15

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.2062E-06	176.28	352.57	0.00E+00	7.41E-04	1.48E-03
Am-241	3.2229E-03	176.28	352.57	0.00E+00	5.68E-01	1.14E+00
Am-242m	2.2381E-06	176.28	352.57	0.00E+00	3.95E-04	7.89E-04
Am-243	4.6006E-05	176.28	352.57	0.00E+00	8.11E-03	1.62E-02
C-14	2.3082E-05	176.28	352.57	0.00E+00	4.07E-03	8.14E-03
Cl-36	1.0667E-06	176.28	352.57	0.00E+00	1.88E-04	3.76E-04
Cm-243	1.7602E-05	176.28	352.57	0.00E+00	3.10E-03	6.21E-03
Cm-244	3.6307E-03	176.28	352.57	0.00E+00	6.40E-01	1.28E+00
Co-60	6.2585E-05	176.28	352.57	0.00E+00	1.10E-02	2.21E-02
Cs-134	2.4585E-07	176.28	352.57	0.00E+00	4.33E-05	8.67E-05
Cs-135	2.4711E-05	176.28	352.57	0.00E+00	4.36E-03	8.71E-03
Cs-137	9.3838E-01	176.28	352.57	0.00E+00	1.65E+02	3.31E+02
Eu-154	4.6887E-03	176.28	352.57	0.00E+00	8.27E-01	1.65E+00
Eu-155	1.2793E-04	176.28	352.57	0.00E+00	2.26E-02	4.51E-02
Fe-55	8.1951E-10	176.28	352.57	0.00E+00	1.44E-07	2.89E-07
H-3	1.6839E-03	176.28	352.57	0.00E+00	2.97E-01	5.94E-01
I-129	1.0092E-06	176.28	352.57	0.00E+00	1.78E-04	3.56E-04
Kr-85	1.4981E-02	176.28	352.57	0.00E+00	2.64E+00	5.28E+00
Np-237	1.2556E-05	176.28	352.57	0.00E+00	2.21E-03	4.43E-03
Pa-231	4.7360E-06	176.28	352.57	0.00E+00	8.35E-04	1.67E-03
Pb-210	2.1901E-09	176.28	352.57	0.00E+00	3.86E-07	7.72E-07
Pm-147	2.8781E-06	176.28	352.57	0.00E+00	5.07E-04	1.01E-03
Pu-238	1.4430E-01	176.28	352.57	0.00E+00	2.54E+01	5.09E+01
Pu-239	1.3572E-04	176.28	352.57	0.00E+00	2.39E-02	4.78E-02
Pu-240	2.7537E-04	176.28	352.57	0.00E+00	4.85E-02	9.71E-02
Pu-241	9.3995E-03	176.28	352.57	0.00E+00	1.66E+00	3.31E+00
Pu-242	3.8866E-06	176.28	352.57	0.00E+00	6.85E-04	1.37E-03
Ra-226	4.1243E-09	176.28	352.57	0.00E+00	7.27E-07	1.45E-06
Ra-228	9.1949E-07	176.28	352.57	0.00E+00	1.62E-04	3.24E-04
Ru-106	1.1667E-15	176.28	352.57	0.00E+00	2.06E-13	4.11E-13
Se-79	2.1074E-05	176.28	352.57	0.00E+00	3.72E-03	7.43E-03
Sn-126	2.2192E-05	176.28	352.57	0.00E+00	3.91E-03	7.82E-03
Sr-90	8.8642E-01	176.28	352.57	0.00E+00	1.56E+02	3.13E+02
Tc-99	3.3323E-04	176.28	352.57	0.00E+00	5.87E-02	1.17E-01
Th-229	1.3517E-05	176.28	352.57	0.00E+00	2.38E-03	4.77E-03
Th-230	2.2822E-07	176.28	352.57	0.00E+00	4.02E-05	8.05E-05
Th-232	-6.9673E-08	176.28	0.00	3.71E-04	3.58E-04	3.71E-04
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.735E+13
0.0250	3.543E+12
0.0375	3.075E+12
0.0575	3.322E+12
0.0850	2.005E+12
0.1250	1.319E+12
0.2250	1.736E+12
0.3750	7.518E+11
0.5750	1.234E+13
0.8500	1.542E+11
1.2500	7.446E+10
1.7500	4.734E+09
2.2500	3.939E+05
2.7500	6.379E+09
3.5000	2.104E+04
5.0000	8.956E+03
7.0000	1.027E+03
11.0000	1.177E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.82E+00	5.63E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	GRAPHITE	GRAPHITE
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.333	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		176.28	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	115.37	352.57	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.47	
Bounding:	0.94	3.06

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM UNIT I CORE I
SNF ID #: 170
Fuel Units & Descr: 814 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=1707.365kg; EOL=1660.153kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1969
Estimates as of: 2030
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	4.2062E-06	44,649.60	52,578.31	0.00E+00	1.88E-01	2.21E-01
Am-241	3.2229E-03	44,649.60	52,578.31	0.00E+00	1.44E+02	1.69E+02
Am-242m	2.2381E-06	44,649.60	52,578.31	0.00E+00	9.99E-02	1.18E-01
Am-243	4.6006E-05	44,649.60	52,578.31	0.00E+00	2.05E+00	2.42E+00
C-14	2.3082E-05	44,649.60	52,578.31	0.00E+00	1.03E+00	1.21E+00
Cl-36	1.0667E-06	44,649.60	52,578.31	0.00E+00	4.76E-02	5.61E-02
Cm-243	1.7602E-06	44,649.60	52,578.31	0.00E+00	7.86E-01	9.26E-01
Cm-244	3.6307E-03	44,649.60	52,578.31	0.00E+00	1.62E+02	1.91E+02
Co-60	6.2585E-05	44,649.60	52,578.31	0.00E+00	2.79E+00	3.29E+00
Cs-134	2.4585E-07	44,649.60	52,578.31	0.00E+00	1.10E-02	1.29E-02
Cs-135	2.4711E-05	44,649.60	52,578.31	0.00E+00	1.10E+00	1.30E+00
Cs-137	9.3838E-01	44,649.60	52,578.31	0.00E+00	4.19E+04	4.93E+04
Eu-154	4.6887E-03	44,649.60	52,578.31	0.00E+00	2.09E+02	2.47E+02
Eu-155	1.2793E-04	44,649.60	52,578.31	0.00E+00	5.71E+00	6.73E+00
Fe-55	8.1951E-10	44,649.60	52,578.31	0.00E+00	3.66E-05	4.31E-05
H-3	1.6839E-03	44,649.60	52,578.31	0.00E+00	7.52E+01	8.85E+01
I-129	1.0092E-06	44,649.60	52,578.31	0.00E+00	4.51E-02	5.31E-02
Kr-85	1.4981E-02	44,649.60	52,578.31	0.00E+00	6.69E+02	7.88E+02
Np-237	1.2556E-05	44,649.60	52,578.31	0.00E+00	5.61E-01	6.60E-01
Pa-231	4.7360E-06	44,649.60	52,578.31	0.00E+00	2.11E-01	2.49E-01
Pb-210	2.1901E-09	44,649.60	52,578.31	0.00E+00	9.78E-05	1.15E-04
Pm-147	2.8781E-06	44,649.60	52,578.31	0.00E+00	1.29E-01	1.51E-01
Pu-238	1.4430E-01	44,649.60	52,578.31	0.00E+00	6.44E+03	7.59E+03
Pu-239	1.3572E-04	44,649.60	52,578.31	0.00E+00	6.06E+00	7.14E+00
Pu-240	2.7537E-04	44,649.60	52,578.31	0.00E+00	1.23E+01	1.45E+01
Pu-241	9.3995E-03	44,649.60	52,578.31	0.00E+00	4.20E+02	4.94E+02
Pu-242	3.8866E-06	44,649.60	52,578.31	0.00E+00	1.74E-01	2.04E-01
Ra-226	4.1243E-09	44,649.60	52,578.31	0.00E+00	1.84E-04	2.17E-04
Ra-228	9.1949E-07	44,649.60	52,578.31	0.00E+00	4.11E-02	4.83E-02
Ru-106	1.1667E-15	44,649.60	52,578.31	0.00E+00	5.21E-11	6.13E-11
Se-79	2.1074E-05	44,649.60	52,578.31	0.00E+00	9.41E-01	1.11E+00
Sn-126	2.2192E-05	44,649.60	52,578.31	0.00E+00	9.91E-01	1.17E+00
Sr-90	8.8642E-01	44,649.60	52,578.31	0.00E+00	3.96E+04	4.66E+04
Tc-99	3.3323E-04	44,649.60	52,578.31	0.00E+00	1.49E+01	1.75E+01
Th-229	1.3517E-05	44,649.60	52,578.31	0.00E+00	6.04E-01	7.11E-01
Th-230	2.2822E-07	44,649.60	52,578.31	0.00E+00	1.02E-02	1.20E-02
Th-232	-6.9673E-08	44,649.60	0.00	1.69E-01	1.66E-01	1.69E-01
Tl-208	5.1524E-04	44,649.60	52,578.31	0.00E+00	2.30E+01	2.71E+01
U-232	1.3950E-03	44,649.60	52,578.31	0.00E+00	6.23E+01	7.33E+01
U-233	2.0602E-03	44,649.60	52,578.31	0.00E+00	9.20E+01	1.08E+02
U-234	2.9513E-04	44,649.60	52,578.31	0.00E+00	1.32E+01	1.55E+01
U-235	-1.7343E-06	44,649.60	0.00	3.38E-01	2.60E-01	3.38E-01
U-236	8.6281E-06	44,649.60	52,578.31	0.00E+00	3.85E-01	4.54E-01
U-238	-5.6065E-09	44,649.60	0.00	3.36E-03	3.11E-03	3.36E-03
Y-90	8.8642E-01	44,649.60	52,578.31	0.00E+00	3.96E+04	4.66E+04
Other Radionuclides					4.03E+04	4.75E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.588E+15
0.0250	5.283E+14
0.0375	4.586E+14
0.0575	4.954E+14
0.0850	2.989E+14
0.1250	1.967E+14
0.2250	2.589E+14
0.3750	1.121E+14
0.5750	1.840E+15
0.8500	2.300E+13
1.2500	1.110E+13
1.7500	7.060E+11
2.2500	5.874E+07
2.7500	9.512E+11
3.5000	3.137E+08
5.0000	1.336E+06
7.0000	1.532E+05
11.0000	1.755E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.13E+02	8.40E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	GRAPHITE	GRAPHITE
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.1525882	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		44,649.60	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	52,578.31	89,299.20	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.26		1.00
Bounding:	0.31	1.70	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM UNIT I CORE II
SNF ID #: 171
Fuel Units & Descr: 787 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=1389.055kg; EOL=1289.657kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.2062E-06	94,003.34	101,007.91	0.00E+00	3.95E-01	4.25E-01
Am-241	3.2229E-03	94,003.34	101,007.91	0.00E+00	3.03E+02	3.26E+02
Am-242m	2.2381E-06	94,003.34	101,007.91	0.00E+00	2.10E-01	2.26E-01
Am-243	4.6006E-05	94,003.34	101,007.91	0.00E+00	4.32E+00	4.65E+00
C-14	2.3082E-05	94,003.34	101,007.91	0.00E+00	2.17E+00	2.33E+00
Cl-36	1.0667E-06	94,003.34	101,007.91	0.00E+00	1.00E-01	1.08E-01
Cm-243	1.7602E-05	94,003.34	101,007.91	0.00E+00	1.65E+00	1.78E+00
Cm-244	3.6307E-03	94,003.34	101,007.91	0.00E+00	3.41E+02	3.67E+02
Co-60	6.2585E-05	94,003.34	101,007.91	0.00E+00	5.88E+00	6.32E+00
Cs-134	2.4585E-07	94,003.34	101,007.91	0.00E+00	2.31E-02	2.48E-02
Cs-135	2.4711E-05	94,003.34	101,007.91	0.00E+00	2.32E+00	2.50E+00
Cs-137	9.3838E-01	94,003.34	101,007.91	0.00E+00	8.82E+04	9.48E+04
Eu-154	4.6887E-03	94,003.34	101,007.91	0.00E+00	4.41E+02	4.74E+02
Eu-155	1.2793E-04	94,003.34	101,007.91	0.00E+00	1.20E+01	1.29E+01
Fe-55	8.1951E-10	94,003.34	101,007.91	0.00E+00	7.70E-05	8.28E-05
H-3	1.6839E-03	94,003.34	101,007.91	0.00E+00	1.58E+02	1.70E+02
I-129	1.0092E-06	94,003.34	101,007.91	0.00E+00	9.49E-02	1.02E-01
Kr-85	1.4981E-02	94,003.34	101,007.91	0.00E+00	1.41E+03	1.51E+03
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	-6.9673E-08	94,003.34	0.00	1.37E-01	1.31E-01	1.37E-01
Tl-206	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.972E+15
0.0250	1.015E+15
0.0375	8.811E+14
0.0575	9.518E+14
0.0850	5.743E+14
0.1250	3.778E+14
0.2250	4.973E+14
0.3750	2.154E+14
0.5750	3.535E+15
0.8500	4.419E+13
1.2500	2.133E+13
1.7500	1.356E+12
2.2500	1.128E+08
2.7500	1.827E+12
3.5000	6.027E+06
5.0000	2.566E+06
7.0000	2.943E+05
11.0000	3.372E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.80E+03	1.61E+03
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 %:	93.15000286	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		94,003.34	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	101,007.91	188,006.68	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	
Bounding:	0.73	1.86

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PEACH BOTTOM UNIT I CORE II (INTACT)
SNF ID #: 206
Fuel Units & Descr: 9 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=11.925kg; EOL=11.977kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	4.2062E-06	674.97	867.05	0.00E+00	2.84E-03	3.65E-03
Am-241	3.2229E-03	674.97	867.05	0.00E+00	2.18E+00	2.79E+00
Am-242m	2.2381E-06	674.97	867.05	0.00E+00	1.51E-03	1.94E-03
Am-243	4.6006E-05	674.97	867.05	0.00E+00	3.11E-02	3.99E-02
C-14	2.3082E-05	674.97	867.05	0.00E+00	1.56E-02	2.00E-02
Cl-36	1.0667E-06	674.97	867.05	0.00E+00	7.20E-04	9.25E-04
Cm-243	1.7602E-05	674.97	867.05	0.00E+00	1.19E-02	1.53E-02
Cm-244	3.6307E-03	674.97	867.05	0.00E+00	2.45E+00	3.15E+00
Co-60	6.2585E-05	674.97	867.05	0.00E+00	4.22E-02	5.43E-02
Cs-134	2.4585E-07	674.97	867.05	0.00E+00	1.66E-04	2.13E-04
Cs-135	2.4711E-05	674.97	867.05	0.00E+00	1.67E-02	2.14E-02
Cs-137	9.3838E-01	674.97	867.05	0.00E+00	6.33E+02	8.14E+02
Eu-154	4.6887E-03	674.97	867.05	0.00E+00	3.16E+00	4.07E+00
Eu-155	1.2793E-04	674.97	867.05	0.00E+00	8.63E-02	1.11E-01
Fe-55	8.1951E-10	674.97	867.05	0.00E+00	5.53E-07	7.11E-07
H-3	1.6839E-03	674.97	867.05	0.00E+00	1.14E+00	1.46E+00
I-129	1.0092E-06	674.97	867.05	0.00E+00	6.81E-04	8.75E-04
Kr-85	1.4981E-02	674.97	867.05	0.00E+00	1.01E+01	1.30E+01
Np-237	1.2556E-05	674.97	867.05	0.00E+00	8.48E-03	1.09E-02
Pa-231	4.7360E-06	674.97	867.05	0.00E+00	3.20E-03	4.11E-03
Pb-210	2.1901E-09	674.97	867.05	0.00E+00	1.48E-06	1.90E-06
Pm-147	2.8781E-06	674.97	867.05	0.00E+00	1.94E-03	2.50E-03
Pu-238	1.4430E-01	674.97	867.05	0.00E+00	9.74E+01	1.25E+02
Pu-239	1.3572E-04	674.97	867.05	0.00E+00	9.16E-02	1.18E-01
Pu-240	2.7537E-04	674.97	867.05	0.00E+00	1.86E-01	2.39E-01
Pu-241	9.3995E-03	674.97	867.05	0.00E+00	6.34E+00	8.15E+00
Pu-242	3.8866E-06	674.97	867.05	0.00E+00	2.62E-03	3.37E-03
Ra-226	4.1243E-09	674.97	867.05	0.00E+00	2.78E-06	3.58E-06
Ra-228	9.1949E-07	674.97	867.05	0.00E+00	6.21E-04	7.97E-04
Ru-106	1.1667E-15	674.97	867.05	0.00E+00	7.87E-13	1.01E-12
Se-79	2.1074E-05	674.97	867.05	0.00E+00	1.42E-02	1.83E-02
Sn-126	2.2192E-05	674.97	867.05	0.00E+00	1.50E-02	1.92E-02
Sr-90	8.8642E-01	674.97	867.05	0.00E+00	5.98E+02	7.69E+02
Tc-99	3.3323E-04	674.97	867.05	0.00E+00	2.25E-01	2.89E-01
Th-229	1.3517E-05	674.97	867.05	0.00E+00	9.12E-03	1.17E-02
Th-230	2.2822E-07	674.97	867.05	0.00E+00	1.54E-04	1.98E-04
Th-232	-6.9673E-08	674.97	0.00	1.18E-03	1.13E-03	1.18E-03
Tl-208	5.1524E-04	674.97	867.05	0.00E+00	3.48E-01	4.47E-01
U-232	1.3950E-03	674.97	867.05	0.00E+00	9.42E-01	1.21E+00
U-233	2.0602E-03	674.97	867.05	0.00E+00	1.39E+00	1.79E+00
U-234	2.9513E-04	674.97	867.05	0.00E+00	1.99E-01	2.56E-01
U-235	-1.7343E-06	674.97	0.00	2.36E-03	1.19E-03	2.36E-03
U-236	8.6281E-06	674.97	867.05	0.00E+00	5.82E-03	7.48E-03
U-238	-5.6065E-09	674.97	0.00	2.35E-05	1.97E-05	2.35E-05
Y-90	8.8642E-01	674.97	867.05	0.00E+00	5.98E+02	7.69E+02
Other Radionuclides					6.10E+02	7.84E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.268E+13
0.0250	8.712E+12
0.0375	7.563E+12
0.0575	8.170E+12
0.0850	4.930E+12
0.1250	3.243E+12
0.2250	4.269E+12
0.3750	1.849E+12
0.5750	3.034E+13
0.8500	3.793E+11
1.2500	1.831E+11
1.7500	1.164E+10
2.2500	9.686E+05
2.7500	1.569E+10
3.5000	5.174E+04
5.0000	2.202E+04
7.0000	2.527E+03
11.0000	2.894E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	674.97	-49.37	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	867.05	-98.73	Bounding burnup taken directly from SFD (converted to MWd).

Checks

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

Estimated EOL HM/Given EOL HM: 0.94

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1963
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	22,320.13	22,320.13	0.00E+00	5.21E-04	5.21E-04
Am-241	1.1135E-04	22,320.13	22,320.13	0.00E+00	2.49E+00	2.49E+00
Am-242m	8.5075E-09	22,320.13	22,320.13	0.00E+00	1.90E-04	1.90E-04
Am-243	9.8519E-10	22,320.13	22,320.13	0.00E+00	2.20E-05	2.20E-05
C-14	2.3012E-04	22,320.13	22,320.13	0.00E+00	5.14E+00	5.14E+00
Cl-36	1.2261E-06	22,320.13	22,320.13	0.00E+00	2.74E-02	2.74E-02
Cm-243	2.4875E-10	22,320.13	22,320.13	0.00E+00	5.55E-06	5.55E-06
Cm-244	2.3178E-09	22,320.13	22,320.13	0.00E+00	5.17E-05	5.17E-05
Co-60	7.0849E-02	22,320.13	22,320.13	0.00E+00	1.58E+03	1.58E+03
Cs-134	3.0266E-06	22,320.13	22,320.13	0.00E+00	6.76E-02	6.76E-02
Cs-135	3.0316E-05	22,320.13	22,320.13	0.00E+00	6.77E-01	6.77E-01
Cs-137	1.4511E+00	22,320.13	22,320.13	0.00E+00	3.24E+04	3.24E+04
Eu-154	6.6955E-04	22,320.13	22,320.13	0.00E+00	1.49E+01	1.49E+01
Eu-155	6.9850E-04	22,320.13	22,320.13	0.00E+00	1.56E+01	1.56E+01
Fe-55	1.2318E-03	22,320.13	22,320.13	0.00E+00	2.75E+01	2.75E+01
H-3	2.5141E-03	22,320.13	22,320.13	0.00E+00	5.61E+01	5.61E+01
I-129	7.3195E-07	22,320.13	22,320.13	0.00E+00	1.63E-02	1.63E-02
Kr-85	4.1281E-02	22,320.13	22,320.13	0.00E+00	9.21E+02	9.21E+02
Np-237	1.1489E-06	22,320.13	22,320.13	0.00E+00	2.56E-02	2.56E-02
Pa-231	4.5241E-08	22,320.13	22,320.13	0.00E+00	1.01E-03	1.01E-03
Pb-210	6.4476E-13	22,320.13	22,320.13	0.00E+00	1.44E-08	1.44E-08
Pm-147	1.1651E-03	22,320.13	22,320.13	0.00E+00	2.60E+01	2.60E+01
Pu-238	2.9517E-04	22,320.13	22,320.13	0.00E+00	6.59E+00	6.59E+00
Pu-239	6.6772E-04	22,320.13	22,320.13	0.00E+00	1.49E+01	1.49E+01
Pu-240	8.6839E-05	22,320.13	22,320.13	0.00E+00	1.94E+00	1.94E+00
Pu-241	7.1514E-04	22,320.13	22,320.13	0.00E+00	1.60E+01	1.60E+01
Pu-242	1.9717E-09	22,320.13	22,320.13	0.00E+00	4.40E-05	4.40E-05
Ra-226	1.7654E-12	22,320.13	22,320.13	0.00E+00	3.94E-08	3.94E-08
Ra-228	8.2928E-12	22,320.13	22,320.13	0.00E+00	1.85E-07	1.85E-07
Ru-106	1.8419E-10	22,320.13	22,320.13	0.00E+00	4.11E-06	4.11E-06
Se-79	1.3223E-05	22,320.13	22,320.13	0.00E+00	2.95E-01	2.95E-01
Sn-126	1.1493E-05	22,320.13	22,320.13	0.00E+00	2.57E-01	2.57E-01
Sr-90	1.3649E+00	22,320.13	22,320.13	0.00E+00	3.05E+04	3.05E+04
Tc-99	4.6656E-04	22,320.13	22,320.13	0.00E+00	1.04E+01	1.04E+01
Th-229	1.4547E-11	22,320.13	22,320.13	0.00E+00	3.25E-07	3.25E-07
Th-230	1.6617E-10	22,320.13	22,320.13	0.00E+00	3.71E-06	3.71E-06
Th-232	8.3361E-12	22,320.13	22,320.13	0.00E+00	1.86E-07	1.86E-07
Tl-208	2.1664E-08	22,320.13	22,320.13	0.00E+00	4.84E-04	4.84E-04
U-232	5.8669E-08	22,320.13	22,320.13	0.00E+00	1.31E-03	1.31E-03
U-233	3.1847E-09	22,320.13	22,320.13	0.00E+00	7.11E-05	7.11E-05
U-234	3.8769E-07	22,320.13	22,320.13	0.00E+00	8.65E-03	8.65E-03
U-235	-2.7761E-06	22,320.13	0.00	9.54E-02	3.35E-02	9.54E-02
U-236	1.6190E-05	22,320.13	22,320.13	0.00E+00	3.61E-01	3.61E-01
U-238	-2.8547E-09	22,320.13	0.00	1.03E-03	9.68E-04	1.03E-03
Y-90	1.3652E+00	22,320.13	22,320.13	0.00E+00	3.05E+04	3.05E+04
Other Radionuclides					3.68E+04	3.68E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.866E+15
0.0250	3.462E+14
0.0375	2.994E+14
0.0575	3.228E+14
0.0850	1.950E+14
0.1250	1.266E+14
0.2250	1.679E+14
0.3750	7.322E+13
0.5750	1.206E+15
0.8500	1.221E+13
1.2500	1.213E+14
1.7500	3.149E+11
2.2500	6.538E+08
2.7500	1.890E+07
3.5000	1.333E+03
5.0000	5.481E+02
7.0000	6.052E+01
11.0000	6.791E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.90E+02	3.90E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		22,320.13
Bounding:		22,320.13

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MIXED MATERIAL EXP.DCC-2
SNF ID #: 431
Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
Heavy Metal Mass: BOL= ; EOL=20.631kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1984
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	19,489.03	19,489.03	0.00E+00	4.55E-04	4.55E-04
Am-241	1.1135E-04	19,489.03	19,489.03	0.00E+00	2.17E+00	2.17E+00
Am-242m	8.5075E-09	19,489.03	19,489.03	0.00E+00	1.66E-04	1.66E-04
Am-243	9.8519E-10	19,489.03	19,489.03	0.00E+00	1.92E-05	1.92E-05
C-14	2.3012E-04	19,489.03	19,489.03	0.00E+00	4.48E+00	4.48E+00
Cl-36	1.2261E-06	19,489.03	19,489.03	0.00E+00	2.39E-02	2.39E-02
Cm-243	2.4875E-10	19,489.03	19,489.03	0.00E+00	4.85E-06	4.85E-06
Cm-244	2.3178E-09	19,489.03	19,489.03	0.00E+00	4.52E-05	4.52E-05
Co-60	7.0849E-02	19,489.03	19,489.03	0.00E+00	1.38E+03	1.38E+03
Cs-134	3.0266E-06	19,489.03	19,489.03	0.00E+00	5.90E-02	5.90E-02
Cs-135	3.0316E-05	19,489.03	19,489.03	0.00E+00	5.91E-01	5.91E-01
Cs-137	1.4511E+00	19,489.03	19,489.03	0.00E+00	2.83E+04	2.83E+04
Eu-154	6.6955E-04	19,489.03	19,489.03	0.00E+00	1.30E+01	1.30E+01
Eu-155	6.9850E-04	19,489.03	19,489.03	0.00E+00	1.36E+01	1.36E+01
Fe-55	1.2318E-03	19,489.03	19,489.03	0.00E+00	2.40E+01	2.40E+01
H-3	2.5141E-03	19,489.03	19,489.03	0.00E+00	4.90E+01	4.90E+01
I-129	7.3195E-07	19,489.03	19,489.03	0.00E+00	1.43E-02	1.43E-02
Kr-85	4.1281E-02	19,489.03	19,489.03	0.00E+00	8.05E+02	8.05E+02
Np-237	1.1489E-06	19,489.03	19,489.03	0.00E+00	2.24E-02	2.24E-02
Pa-231	4.5241E-08	19,489.03	19,489.03	0.00E+00	8.82E-04	8.82E-04
Pb-210	6.4476E-13	19,489.03	19,489.03	0.00E+00	1.26E-08	1.26E-08
Pm-147	1.1651E-03	19,489.03	19,489.03	0.00E+00	2.27E+01	2.27E+01
Pu-238	2.9517E-04	19,489.03	19,489.03	0.00E+00	5.75E+00	5.75E+00
Pu-239	6.6772E-04	19,489.03	19,489.03	0.00E+00	1.30E+01	1.30E+01
Pu-240	8.6839E-05	19,489.03	19,489.03	0.00E+00	1.69E+00	1.69E+00
Pu-241	7.1514E-04	19,489.03	19,489.03	0.00E+00	1.39E+01	1.39E+01
Pu-242	1.9717E-09	19,489.03	19,489.03	0.00E+00	3.84E-05	3.84E-05
Ra-226	1.7654E-12	19,489.03	19,489.03	0.00E+00	3.44E-08	3.44E-08
Ra-228	8.2928E-12	19,489.03	19,489.03	0.00E+00	1.62E-07	1.62E-07
Ru-106	1.8419E-10	19,489.03	19,489.03	0.00E+00	3.59E-06	3.59E-06
Se-79	1.3223E-05	19,489.03	19,489.03	0.00E+00	2.58E-01	2.58E-01
Sn-126	1.1493E-05	19,489.03	19,489.03	0.00E+00	2.24E-01	2.24E-01
Sr-90	1.3649E+00	19,489.03	19,489.03	0.00E+00	2.66E+04	2.66E+04
Tc-99	4.6656E-04	19,489.03	19,489.03	0.00E+00	9.09E+00	9.09E+00
Th-229	1.4547E-11	19,489.03	19,489.03	0.00E+00	2.84E-07	2.84E-07
Th-230	1.6617E-10	19,489.03	19,489.03	0.00E+00	3.24E-06	3.24E-06
Th-232	8.3361E-12	19,489.03	19,489.03	0.00E+00	1.62E-07	1.62E-07
Tl-208	2.1664E-08	19,489.03	19,489.03	0.00E+00	4.22E-04	4.22E-04
U-232	5.8669E-08	19,489.03	19,489.03	0.00E+00	1.14E-03	1.14E-03
U-233	3.1847E-09	19,489.03	19,489.03	0.00E+00	6.21E-05	6.21E-05
U-234	3.8769E-07	19,489.03	19,489.03	0.00E+00	7.56E-03	7.56E-03
U-235	-2.7761E-06	19,489.03	0.00	8.33E-02	2.92E-02	8.33E-02
U-236	1.6190E-05	19,489.03	19,489.03	0.00E+00	3.16E-01	3.16E-01
U-238	-2.8547E-09	19,489.03	0.00	9.01E-04	8.45E-04	9.01E-04
Y-90	1.3652E+00	19,489.03	19,489.03	0.00E+00	2.66E+04	2.66E+04
Other Radionuclides					3.22E+04	3.22E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.455E+15
0.0250	3.023E+14
0.0375	2.615E+14
0.0575	2.818E+14
0.0850	1.703E+14
0.1250	1.106E+14
0.2250	1.466E+14
0.3750	6.393E+13
0.5750	1.053E+15
0.8500	1.066E+13
1.2500	1.060E+14
1.7500	2.750E+11
2.2500	5.709E+06
2.7500	1.650E+07
3.5000	1.164E+03
5.0000	4.786E+02
7.0000	5.284E+01
11.0000	5.929E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.40E+02	3.40E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

This Template was used for the following reasons:

This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		19,489.03
Bounding:		19,489.03

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup.

Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

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

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL 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

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	19,237.75	19,237.75	0.00E+00	4.49E-04	4.49E-04
Am-241	1.1135E-04	19,237.75	19,237.75	0.00E+00	2.14E+00	2.14E+00
Am-242m	8.5075E-09	19,237.75	19,237.75	0.00E+00	1.64E-04	1.64E-04
Am-243	9.8519E-10	19,237.75	19,237.75	0.00E+00	1.90E-05	1.90E-05
C-14	2.3012E-04	19,237.75	19,237.75	0.00E+00	4.43E+00	4.43E+00
Cl-36	1.2261E-06	19,237.75	19,237.75	0.00E+00	2.36E-02	2.36E-02
Cm-243	2.4875E-10	19,237.75	19,237.75	0.00E+00	4.79E-06	4.79E-06
Cm-244	2.3178E-09	19,237.75	19,237.75	0.00E+00	4.46E-05	4.46E-05
Co-60	7.0849E-02	19,237.75	19,237.75	0.00E+00	1.36E+03	1.36E+03
Cs-134	3.0266E-06	19,237.75	19,237.75	0.00E+00	5.82E-02	5.82E-02
Cs-135	3.0316E-05	19,237.75	19,237.75	0.00E+00	5.83E-01	5.83E-01
Cs-137	1.4511E+00	19,237.75	19,237.75	0.00E+00	2.79E+04	2.79E+04
Eu-154	6.6955E-04	19,237.75	19,237.75	0.00E+00	1.29E+01	1.29E+01
Eu-155	6.9850E-04	19,237.75	19,237.75	0.00E+00	1.34E+01	1.34E+01
Fe-55	1.2318E-03	19,237.75	19,237.75	0.00E+00	2.37E+01	2.37E+01
H-3	2.5141E-03	19,237.75	19,237.75	0.00E+00	4.84E+01	4.84E+01
I-129	7.3195E-07	19,237.75	19,237.75	0.00E+00	1.41E-02	1.41E-02
Kr-85	4.1281E-02	19,237.75	19,237.75	0.00E+00	7.94E+02	7.94E+02
Np-237	1.1489E-06	19,237.75	19,237.75	0.00E+00	2.21E-02	2.21E-02
Pa-231	4.5241E-08	19,237.75	19,237.75	0.00E+00	8.70E-04	8.70E-04
Pb-210	6.4476E-13	19,237.75	19,237.75	0.00E+00	1.24E-08	1.24E-08
Pm-147	1.1651E-03	19,237.75	19,237.75	0.00E+00	2.24E+01	2.24E+01
Pu-238	2.9517E-04	19,237.75	19,237.75	0.00E+00	5.68E+00	5.68E+00
Pu-239	6.6772E-04	19,237.75	19,237.75	0.00E+00	1.28E+01	1.28E+01
Pu-240	8.6839E-05	19,237.75	19,237.75	0.00E+00	1.67E+00	1.67E+00
Pu-241	7.1514E-04	19,237.75	19,237.75	0.00E+00	1.38E+01	1.38E+01
Pu-242	1.9717E-09	19,237.75	19,237.75	0.00E+00	3.79E-05	3.79E-05
Ra-226	1.7654E-12	19,237.75	19,237.75	0.00E+00	3.40E-08	3.40E-08
Ra-228	8.2928E-12	19,237.75	19,237.75	0.00E+00	1.60E-07	1.60E-07
Ru-106	1.8419E-10	19,237.75	19,237.75	0.00E+00	3.54E-06	3.54E-06
Se-79	1.3223E-05	19,237.75	19,237.75	0.00E+00	2.54E-01	2.54E-01
Sn-126	1.1493E-05	19,237.75	19,237.75	0.00E+00	2.21E-01	2.21E-01
Sr-90	1.3649E+00	19,237.75	19,237.75	0.00E+00	2.63E+04	2.63E+04
Tc-99	4.6656E-04	19,237.75	19,237.75	0.00E+00	8.98E+00	8.98E+00
Th-229	1.4547E-11	19,237.75	19,237.75	0.00E+00	2.80E-07	2.80E-07
Th-230	1.6617E-10	19,237.75	19,237.75	0.00E+00	3.20E-06	3.20E-06
Th-232	8.3361E-12	19,237.75	19,237.75	0.00E+00	1.60E-07	1.60E-07
Tl-208	2.1664E-08	19,237.75	19,237.75	0.00E+00	4.17E-04	4.17E-04
U-232	5.8669E-08	19,237.75	19,237.75	0.00E+00	1.13E-03	1.13E-03
U-233	3.1847E-09	19,237.75	19,237.75	0.00E+00	6.13E-05	6.13E-05
U-234	3.8769E-07	19,237.75	19,237.75	0.00E+00	7.46E-03	7.46E-03
U-235	-2.7761E-06	19,237.75	0.00	8.23E-02	2.89E-02	8.23E-02
U-236	1.6190E-05	19,237.75	19,237.75	0.00E+00	3.11E-01	3.11E-01
U-238	-2.8547E-09	19,237.75	0.00	8.89E-04	8.35E-04	8.89E-04
Y-90	1.3652E+00	19,237.75	19,237.75	0.00E+00	2.63E+04	2.63E+04
Other Radionuclides					3.18E+04	3.18E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.436E+15
0.0250	2.984E+14
0.0375	2.581E+14
0.0575	2.782E+14
0.0850	1.681E+14
0.1250	1.091E+14
0.2250	1.447E+14
0.3750	6.311E+13
0.5750	1.040E+15
0.8500	1.052E+13
1.2500	1.046E+14
1.7500	2.714E+11
2.2500	5.635E+08
2.7500	1.829E+07
3.5000	1.149E+03
5.0000	4.724E+02
7.0000	5.216E+01
11.0000	5.853E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.36E+02	3.36E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

This Template was used for the following reasons:

This fuel matches on all parameters except cladding (SST is conservative) and enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		19,237.75
Bounding:		19,237.75

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1988
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated Canister usage: 18"x15' 0.36

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	218.58	218.58	0.00E+00	5.04E-04	5.04E-04
Am-241	8.4448E+00	218.58	218.58	0.00E+00	1.85E+03	1.85E+03
Am-242m	1.6848E-02	218.58	218.58	0.00E+00	3.68E+00	3.68E+00
Am-243	1.6320E-02	218.58	218.58	0.00E+00	3.57E+00	3.57E+00
C-14	1.2090E-01	218.58	218.58	0.00E+00	2.64E+01	2.64E+01
Cl-36	2.2849E-03	218.58	218.58	0.00E+00	4.99E-01	4.99E-01
Cm-243	8.6624E-04	218.58	218.58	0.00E+00	1.89E-01	1.89E-01
Cm-244	1.6848E-01	218.58	218.58	0.00E+00	3.68E+01	3.68E+01
Co-60	2.8086E+01	218.58	218.58	0.00E+00	6.14E+03	6.14E+03
Cs-134	3.4148E-04	218.58	218.58	0.00E+00	7.46E-02	7.46E-02
Cs-135	4.3976E-04	218.58	218.58	0.00E+00	9.61E-02	9.61E-02
Cs-137	2.1049E+01	218.58	218.58	0.00E+00	4.60E+03	4.60E+03
Eu-154	1.2500E+00	218.58	218.58	0.00E+00	2.73E+02	2.73E+02
Eu-155	6.8986E-02	218.58	218.58	0.00E+00	1.51E+01	1.51E+01
Fe-55	2.9308E-01	218.58	218.58	0.00E+00	6.41E+01	6.41E+01
H-3	2.4311E-01	218.58	218.58	0.00E+00	5.31E+01	5.31E+01
I-129	1.0618E-05	218.58	218.58	0.00E+00	2.32E-03	2.32E-03
Kr-85	5.9882E-01	218.58	218.58	0.00E+00	1.31E+02	1.31E+02
Np-237	1.5668E-04	218.58	218.58	0.00E+00	3.42E-02	3.42E-02
Pa-231	2.8656E-06	218.58	218.58	0.00E+00	6.26E-04	6.26E-04
Pb-210	2.3918E-08	218.58	218.58	0.00E+00	5.23E-06	5.23E-06
Pm-147	1.6900E-02	218.58	218.58	0.00E+00	3.69E+00	3.69E+00
Pu-238	-8.6120E-01	218.58	0.00	5.91E+01	0.00E+00	5.91E+01
Pu-239	-4.8440E-02	218.58	0.00	7.15E+00	0.00E+00	7.15E+00
Pu-240	-3.0095E-01	218.58	0.00	9.13E+00	0.00E+00	9.13E+00
Pu-241	-1.0411E+02	218.58	0.00	2.35E+03	0.00E+00	2.35E+03
Pu-242	-1.1381E-04	218.58	0.00	3.95E-02	1.47E-02	3.95E-02
Ra-226	6.4400E-08	218.58	218.58	0.00E+00	1.41E-05	1.41E-05
Ra-228	5.9952E-07	218.58	218.58	0.00E+00	1.31E-04	1.31E-04
Ru-106	8.5526E-07	218.58	218.58	0.00E+00	1.87E-04	1.87E-04
Se-79	1.9181E-04	218.58	218.58	0.00E+00	4.19E-02	4.19E-02
Sn-126	1.6671E-04	218.58	218.58	0.00E+00	3.64E-02	3.64E-02
Sr-90	1.9799E+01	218.58	218.58	0.00E+00	4.33E+03	4.33E+03
Tc-99	6.7678E-03	218.58	218.58	0.00E+00	1.48E+00	1.48E+00
Th-229	1.7488E-06	218.58	218.58	0.00E+00	3.82E-04	3.82E-04
Th-230	5.8704E-06	218.58	218.58	0.00E+00	1.28E-03	1.28E-03
Th-232	6.0208E-07	218.58	218.58	0.00E+00	1.32E-04	1.32E-04
Tl-208	8.7573E-05	218.58	218.58	0.00E+00	1.91E-02	1.91E-02
U-232	2.3706E-04	218.58	218.58	0.00E+00	5.18E-02	5.18E-02
U-233	3.6128E-04	218.58	218.58	0.00E+00	7.90E-02	7.90E-02
U-234	1.2788E-02	218.58	218.58	0.00E+00	2.80E+00	2.80E+00
U-235	5.7486E-04	218.58	218.58	1.98E-04	1.26E-01	1.26E-01
U-236	2.3485E-04	218.58	218.58	0.00E+00	5.13E-02	5.13E-02
U-238	1.1581E-04	218.58	218.58	2.46E-05	2.53E-02	2.53E-02
Y-90	1.9804E+01	218.58	218.58	0.00E+00	4.33E+03	4.33E+03
Other Radionuclides					1.35E+04	1.35E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.679E+14
0.0250	5.330E+13
0.0375	4.656E+13
0.0575	7.327E+13
0.0850	2.859E+13
0.1250	2.241E+13
0.2250	2.477E+13
0.3750	1.060E+13
0.5750	1.723E+14
0.8500	6.584E+12
1.2500	4.603E+14
1.7500	2.036E+11
2.2500	2.414E+09
2.7500	6.802E+08
3.5000	5.443E+05
5.0000	2.312E+05
7.0000	2.647E+04
11.0000	3.029E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.15E+02	2.16E+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:		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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX FUEL
SNF ID #: 415
Fuel Units & Descr: 7 - FUEL MELTED IN EXP
Heavy Metal Mass: BOL= ; EOL=0.01kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1968
Estimates as of: 2030
Template: (Worst Case)
[2]Template 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	1.056E+12
Co-60	2.8086E+01	9.31	9.31	0.00E+00	2.62E+02	2.62E+02	0.3750	4.515E+11
Cs-134	3.4148E-04	9.31	9.31	0.00E+00	3.18E-03	3.18E-03	0.5750	7.341E+12
Cs-135	4.3976E-04	9.31	9.31	0.00E+00	4.10E-03	4.10E-03	0.8500	2.806E+11
Cs-137	2.1049E+01	9.31	9.31	0.00E+00	1.96E+02	1.96E+02	1.2500	1.961E+13
Eu-154	1.2500E+00	9.31	9.31	0.00E+00	1.16E+01	1.16E+01	1.7500	8.675E+09
Eu-155	6.8986E-02	9.31	9.31	0.00E+00	6.42E-01	6.42E-01	2.2500	1.028E+08
Fe-55	2.9308E-01	9.31	9.31	0.00E+00	2.73E+00	2.73E+00	2.7500	2.896E+07
H-3	2.4311E-01	9.31	9.31	0.00E+00	2.26E+00	2.26E+00	3.5000	2.319E+04
I-129	1.0618E-05	9.31	9.31	0.00E+00	9.89E-05	9.89E-05	5.0000	9.850E+03
Kr-85	5.9882E-01	9.31	9.31	0.00E+00	5.58E+00	5.58E+00	7.0000	1.128E+03
Np-237	1.5668E-04	9.31	9.31	0.00E+00	1.46E-03	1.46E-03	11.0000	1.291E+02
Pa-231	2.8656E-06	9.31	9.31	0.00E+00	2.67E-05	2.67E-05		
Pb-210	2.3918E-08	9.31	9.31	0.00E+00	2.23E-07	2.23E-07		
Pm-147	1.6900E-02	9.31	9.31	0.00E+00	1.57E-01	1.57E-01		
Pu-238	-8.6120E-01	9.31	0.00	2.52E+00	0.00E+00	2.52E+00		
Pu-239	-4.8440E-02	9.31	0.00	3.05E-01	0.00E+00	3.05E-01		
Pu-240	-3.0095E-01	9.31	0.00	3.89E-01	0.00E+00	3.89E-01		
Pu-241	-1.0411E+02	9.31	0.00	1.00E+02	0.00E+00	1.00E+02		
Pu-242	-1.1381E-04	9.31	0.00	1.68E-03	6.25E-04	1.68E-03		
Ra-226	6.4400E-08	9.31	9.31	0.00E+00	6.00E-07	6.00E-07		
Ra-228	5.9952E-07	9.31	9.31	0.00E+00	5.58E-06	5.58E-06		
Ru-106	8.5526E-07	9.31	9.31	0.00E+00	7.97E-06	7.97E-06		
Se-79	1.9181E-04	9.31	9.31	0.00E+00	1.79E-03	1.79E-03		
Sn-126	1.6671E-04	9.31	9.31	0.00E+00	1.55E-03	1.55E-03		
Sr-90	1.9799E+01	9.31	9.31	0.00E+00	1.84E+02	1.84E+02		
Tc-99	6.7678E-03	9.31	9.31	0.00E+00	6.30E-02	6.30E-02		
Th-229	1.7488E-06	9.31	9.31	0.00E+00	1.63E-05	1.63E-05		
Th-230	5.8704E-06	9.31	9.31	0.00E+00	5.47E-05	5.47E-05		
Th-232	6.0208E-07	9.31	9.31	0.00E+00	5.61E-06	5.61E-06		
Tl-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	Thermal Power	
U-233	3.6128E-04	9.31	9.31	0.00E+00	3.36E-03	3.36E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	9.18E+00	9.29E+00
U-238	1.1581E-04	9.31	9.31	1.05E-06	1.08E-03	1.08E-03	Total	Total
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
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:		9.31
Bounding:		9.31

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1988
Estimates as of: 2030
Template: (Worst Case)
[2]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

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	54.74	54.74	0.00E+00	1.26E-04	1.26E-04
Am-241	8.4448E+00	54.74	54.74	0.00E+00	4.62E+02	4.62E+02
Am-242m	1.6848E-02	54.74	54.74	0.00E+00	9.22E-01	9.22E-01
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
Cl-36	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-06	54.74	54.74	0.00E+00	1.31E-06	1.31E-06
Pm-147	1.6900E-02	54.74	54.74	0.00E+00	9.25E-01	9.25E-01
Pu-238	-8.6120E-01	54.74	0.00	1.48E+01	0.00E+00	1.48E+01
Pu-239	-4.8440E-02	54.74	0.00	1.79E+00	0.00E+00	1.79E+00
Pu-240	-3.0095E-01	54.74	0.00	2.29E+00	0.00E+00	2.29E+00
Pu-241	-1.0411E+02	54.74	0.00	5.89E+02	0.00E+00	5.89E+02
Pu-242	-1.1381E-04	54.74	0.00	9.90E-03	3.67E-03	9.90E-03
Ra-226	6.4400E-08	54.74	54.74	0.00E+00	3.53E-06	3.53E-06
Ra-228	5.9952E-07	54.74	54.74	0.00E+00	3.28E-05	3.28E-05
Ru-106	8.5526E-07	54.74	54.74	0.00E+00	4.68E-05	4.68E-05
Se-79	1.9181E-04	54.74	54.74	0.00E+00	1.05E-02	1.05E-02
Sn-126	1.6671E-04	54.74	54.74	0.00E+00	9.13E-03	9.13E-03
Sr-90	1.9799E+01	54.74	54.74	0.00E+00	1.08E+03	1.08E+03
Tc-99	6.7678E-03	54.74	54.74	0.00E+00	3.70E-01	3.70E-01
Th-229	1.7488E-06	54.74	54.74	0.00E+00	9.57E-05	9.57E-05
Th-230	5.8704E-06	54.74	54.74	0.00E+00	3.21E-04	3.21E-04
Th-232	6.0208E-07	54.74	54.74	0.00E+00	3.30E-05	3.30E-05
Tl-208	8.7573E-05	54.74	54.74	0.00E+00	4.79E-03	4.79E-03
U-232	2.3706E-04	54.74	54.74	0.00E+00	1.30E-02	1.30E-02
U-233	3.6128E-04	54.74	54.74	0.00E+00	1.98E-02	1.98E-02
U-234	1.2788E-02	54.74	54.74	0.00E+00	7.00E-01	7.00E-01
U-235	5.7486E-04	54.74	54.74	4.96E-05	3.15E-02	3.15E-02
U-236	2.3485E-04	54.74	54.74	0.00E+00	1.29E-02	1.29E-02
U-238	1.1581E-04	54.74	54.74	6.17E-06	6.35E-03	6.35E-03
Y-90	1.9804E+01	54.74	54.74	0.00E+00	1.08E+03	1.08E+03
Other Radionuclides					3.38E+03	3.38E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.708E+13
0.0250	1.335E+13
0.0375	1.166E+13
0.0575	1.835E+13
0.0850	7.161E+12
0.1250	5.613E+12
0.2250	6.204E+12
0.3750	2.653E+12
0.5750	4.315E+13
0.8500	1.649E+12
1.2500	1.153E+14
1.7500	5.099E+10
2.2500	6.044E+08
2.7500	1.703E+08
3.5000	1.363E+05
5.0000	5.789E+04
7.0000	6.630E+03
11.0000	7.586E+02

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		54.74
Bounding:		54.74

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1968
Estimates as of: 2030
Template: (Worst Case)
[2]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

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	2,318.86	2,318.86	0.00E+00	5.35E-03	5.35E-03	Avg. MeV	
Am-241	8.4448E+00	2,318.86	2,318.86	0.00E+00	1.96E+04	1.96E+04	0.0150	2.842E+15
Am-242m	1.6848E-02	2,318.86	2,318.86	0.00E+00	3.91E+01	3.91E+01	0.0250	5.655E+14
Am-243	1.6320E-02	2,318.86	2,318.86	0.00E+00	3.78E+01	3.78E+01	0.0375	4.939E+14
C-14	1.2090E-01	2,318.86	2,318.86	0.00E+00	2.80E+02	2.80E+02	0.0575	7.772E+14
Cl-36	2.2849E-03	2,318.86	2,318.86	0.00E+00	5.30E+00	5.30E+00	0.0850	3.034E+14
Cm-243	8.6624E-04	2,318.86	2,318.86	0.00E+00	2.01E+00	2.01E+00	0.1250	2.378E+14
Cm-244	1.6848E-01	2,318.86	2,318.86	0.00E+00	3.91E+02	3.91E+02	0.2250	2.628E+14
Co-60	2.8086E+01	2,318.86	2,318.86	0.00E+00	6.51E+04	6.51E+04	0.3750	1.124E+14
Cs-134	3.4148E-04	2,318.86	2,318.86	0.00E+00	7.92E-01	7.92E-01	0.5750	1.828E+15
Cs-135	4.3976E-04	2,318.86	2,318.86	0.00E+00	1.02E+00	1.02E+00	0.8500	6.985E+13
Cs-137	2.1049E+01	2,318.86	2,318.86	0.00E+00	4.88E+04	4.88E+04	1.2500	4.883E+15
Eu-154	1.2500E+00	2,318.86	2,318.86	0.00E+00	2.90E+03	2.90E+03	1.7500	2.160E+12
Eu-155	6.8986E-02	2,318.86	2,318.86	0.00E+00	1.60E+02	1.60E+02	2.2500	2.561E+10
Fe-55	2.9308E-01	2,318.86	2,318.86	0.00E+00	6.80E+02	6.80E+02	2.7500	7.216E+09
H-3	2.4311E-01	2,318.86	2,318.86	0.00E+00	5.64E+02	5.64E+02	3.5000	5.775E+06
I-129	1.0618E-05	2,318.86	2,318.86	0.00E+00	2.46E-02	2.46E-02	5.0000	2.452E+06
Kr-85	5.9882E-01	2,318.86	2,318.86	0.00E+00	1.39E+03	1.39E+03	7.0000	2.808E+05
Np-237	1.5668E-04	2,318.86	2,318.86	0.00E+00	3.63E-01	3.63E-01	11.0000	3.214E+04
Pa-231	2.8656E-06	2,318.86	2,318.86	0.00E+00	6.64E-03	6.64E-03		
Pb-210	2.3918E-06	2,318.86	2,318.86	0.00E+00	5.55E-05	5.55E-05		
Pm-147	1.6900E-02	2,318.86	2,318.86	0.00E+00	3.92E+01	3.92E+01		
Pu-238	-8.6120E-01	2,318.86	0.00	6.27E+02	0.00E+00	6.27E+02		
Pu-239	-4.8440E-02	2,318.86	0.00	7.59E+01	0.00E+00	7.59E+01		
Pu-240	-3.0095E-01	2,318.86	0.00	9.69E+01	0.00E+00	9.69E+01		
Pu-241	-1.0411E+02	2,318.86	0.00	2.49E+04	0.00E+00	2.49E+04		
Pu-242	-1.1381E-04	2,318.86	0.00	4.19E-01	1.56E-01	4.19E-01		
Ra-226	6.4400E-08	2,318.86	2,318.86	0.00E+00	1.49E-04	1.49E-04		
Ra-228	5.9952E-07	2,318.86	2,318.86	0.00E+00	1.39E-03	1.39E-03		
Ru-106	8.5526E-07	2,318.86	2,318.86	0.00E+00	1.98E-03	1.98E-03		
Se-79	1.9181E-04	2,318.86	2,318.86	0.00E+00	4.45E-01	4.45E-01		
Sn-126	1.6671E-04	2,318.86	2,318.86	0.00E+00	3.87E-01	3.87E-01		
Sr-90	1.9799E+01	2,318.86	2,318.86	0.00E+00	4.59E+04	4.59E+04		
Tc-99	6.7678E-03	2,318.86	2,318.86	0.00E+00	1.57E+01	1.57E+01		
Th-229	1.7488E-06	2,318.86	2,318.86	0.00E+00	4.06E-03	4.06E-03		
Th-230	5.8704E-06	2,318.86	2,318.86	0.00E+00	1.36E-02	1.36E-02		
Th-232	6.0208E-07	2,318.86	2,318.86	0.00E+00	1.40E-03	1.40E-03		
Tl-208	8.7573E-05	2,318.86	2,318.86	0.00E+00	2.03E-01	2.03E-01		
U-232	2.3706E-04	2,318.86	2,318.86	0.00E+00	5.50E-01	5.50E-01		
U-233	3.6128E-04	2,318.86	2,318.86	0.00E+00	8.38E-01	8.38E-01		
U-234	1.2788E-02	2,318.86	2,318.86	0.00E+00	2.97E+01	2.97E+01		
U-235	5.7486E-04	2,318.86	2,318.86	2.10E-03	1.34E+00	1.34E+00		
U-236	2.3485E-04	2,318.86	2,318.86	0.00E+00	5.45E-01	5.45E-01		
U-238	1.1581E-04	2,318.86	2,318.86	2.61E-04	2.69E-01	2.69E-01		
Y-90	1.9804E+01	2,318.86	2,318.86	0.00E+00	4.59E+04	4.59E+04		
Other Radionuclides					1.43E+05	1.43E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.29E+03	2.31E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		2,318.86
Bounding:		2,318.86

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1988
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	614.88	614.88	0.00E+00	1.42E-03	1.42E-03
Am-241	8.4448E+00	614.88	614.88	0.00E+00	5.19E+03	5.19E+03
Am-242m	1.6848E-02	614.88	614.88	0.00E+00	1.04E+01	1.04E+01
Am-243	1.6320E-02	614.88	614.88	0.00E+00	1.00E+01	1.00E+01
C-14	1.2090E-01	614.88	614.88	0.00E+00	7.43E+01	7.43E+01
Cl-36	2.2849E-03	614.88	614.88	0.00E+00	1.40E+00	1.40E+00
Cm-243	8.6624E-04	614.88	614.88	0.00E+00	5.33E-01	5.33E-01
Cm-244	1.6848E-01	614.88	614.88	0.00E+00	1.04E+02	1.04E+02
Co-60	2.8086E+01	614.88	614.88	0.00E+00	1.73E+04	1.73E+04
Cs-134	3.4148E-04	614.88	614.88	0.00E+00	2.10E-01	2.10E-01
Cs-135	4.3976E-04	614.88	614.88	0.00E+00	2.70E-01	2.70E-01
Cs-137	2.1049E+01	614.88	614.88	0.00E+00	1.29E+04	1.29E+04
Eu-154	1.2500E+00	614.88	614.88	0.00E+00	7.69E+02	7.69E+02
Eu-155	6.8986E-02	614.88	614.88	0.00E+00	4.24E+01	4.24E+01
Fe-55	2.9308E-01	614.88	614.88	0.00E+00	1.80E+02	1.80E+02
H-3	2.4311E-01	614.88	614.88	0.00E+00	1.49E+02	1.49E+02
I-129	1.0618E-05	614.88	614.88	0.00E+00	6.53E-03	6.53E-03
Kr-85	5.9882E-01	614.88	614.88	0.00E+00	3.68E+02	3.68E+02
Np-237	1.5668E-04	614.88	614.88	0.00E+00	9.63E-02	9.63E-02
Pa-231	2.8656E-06	614.88	614.88	0.00E+00	1.76E-03	1.76E-03
Pb-210	2.3918E-08	614.88	614.88	0.00E+00	1.47E-05	1.47E-05
Pm-147	1.6900E-02	614.88	614.88	0.00E+00	1.04E+01	1.04E+01
Pu-238	-8.6120E-01	614.88	0.00	1.66E+02	0.00E+00	1.66E+02
Pu-239	-4.8440E-02	614.88	0.00	2.01E+01	0.00E+00	2.01E+01
Pu-240	-3.0095E-01	614.88	0.00	2.57E+01	0.00E+00	2.57E+01
Pu-241	-1.0411E+02	614.88	0.00	6.61E+03	0.00E+00	6.61E+03
Pu-242	-1.1381E-04	614.88	0.00	1.11E-01	4.12E-02	1.11E-01
Ra-226	6.4400E-08	614.88	614.88	0.00E+00	3.96E-05	3.96E-05
Ra-228	5.9952E-07	614.88	614.88	0.00E+00	3.69E-04	3.69E-04
Ru-106	8.5526E-07	614.88	614.88	0.00E+00	5.26E-04	5.26E-04
Se-79	1.9181E-04	614.88	614.88	0.00E+00	1.18E-01	1.18E-01
Sn-126	1.6671E-04	614.88	614.88	0.00E+00	1.03E-01	1.03E-01
Sr-90	1.9799E+01	614.88	614.88	0.00E+00	1.22E+04	1.22E+04
Tc-99	6.7678E-03	614.88	614.88	0.00E+00	4.16E+00	4.16E+00
Th-229	1.7488E-06	614.88	614.88	0.00E+00	1.08E-03	1.08E-03
Th-230	5.8704E-06	614.88	614.88	0.00E+00	3.61E-03	3.61E-03
Th-232	6.0208E-07	614.88	614.88	0.00E+00	3.70E-04	3.70E-04
Tl-208	8.7573E-05	614.88	614.88	0.00E+00	5.38E-02	5.38E-02
U-232	2.3706E-04	614.88	614.88	0.00E+00	1.46E-01	1.46E-01
U-233	3.6128E-04	614.88	614.88	0.00E+00	2.22E-01	2.22E-01
U-234	1.2788E-02	614.88	614.88	0.00E+00	7.86E+00	7.86E+00
U-235	5.7486E-04	614.88	614.88	5.57E-04	3.54E-01	3.54E-01
U-236	2.3485E-04	614.88	614.88	0.00E+00	1.44E-01	1.44E-01
U-238	1.1581E-04	614.88	614.88	6.93E-05	7.13E-02	7.13E-02
Y-90	1.9804E+01	614.88	614.88	0.00E+00	1.22E+04	1.22E+04
Other Radionuclides					3.79E+04	3.79E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.535E+14
0.0250	1.499E+14
0.0375	1.310E+14
0.0575	2.061E+14
0.0850	8.044E+13
0.1250	6.305E+13
0.2250	6.969E+13
0.3750	2.981E+13
0.5750	4.847E+14
0.8500	1.852E+13
1.2500	1.295E+15
1.7500	5.727E+11
2.2500	6.790E+09
2.7500	1.913E+09
3.5000	1.531E+06
5.0000	6.503E+05
7.0000	7.447E+04
11.0000	8.521E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.06E+02	8.13E+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:	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:		614.88
Bounding:		614.88

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1988
Estimates as of: 2030
Template: (Worst Case)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	4.75	4.75	0.00E+00	1.10E-05	1.10E-05
Am-241	8.4448E+00	4.75	4.75	0.00E+00	4.01E+01	4.01E+01
Am-242m	1.6848E-02	4.75	4.75	0.00E+00	8.01E-02	8.01E-02
Am-243	1.6320E-02	4.75	4.75	0.00E+00	7.75E-02	7.75E-02
C-14	1.2090E-01	4.75	4.75	0.00E+00	5.74E-01	5.74E-01
Cl-36	2.2849E-03	4.75	4.75	0.00E+00	1.09E-02	1.09E-02
Cm-243	8.6624E-04	4.75	4.75	0.00E+00	4.12E-03	4.12E-03
Cm-244	1.6848E-01	4.75	4.75	0.00E+00	8.01E-01	8.01E-01
Co-60	2.8086E+01	4.75	4.75	0.00E+00	1.33E+02	1.33E+02
Cs-134	3.4148E-04	4.75	4.75	0.00E+00	1.62E-03	1.62E-03
Cs-135	4.3976E-04	4.75	4.75	0.00E+00	2.09E-03	2.09E-03
Cs-137	2.1049E+01	4.75	4.75	0.00E+00	1.00E+02	1.00E+02
Eu-154	1.2500E+00	4.75	4.75	0.00E+00	5.94E+00	5.94E+00
Eu-155	6.8986E-02	4.75	4.75	0.00E+00	3.28E-01	3.28E-01
Fe-55	2.9308E-01	4.75	4.75	0.00E+00	1.39E+00	1.39E+00
H-3	2.4311E-01	4.75	4.75	0.00E+00	1.16E+00	1.16E+00
I-129	1.0618E-05	4.75	4.75	0.00E+00	5.05E-05	5.05E-05
Kr-85	5.9882E-01	4.75	4.75	0.00E+00	2.85E+00	2.85E+00
Np-237	1.5668E-04	4.75	4.75	0.00E+00	7.45E-04	7.45E-04
Pa-231	2.8656E-06	4.75	4.75	0.00E+00	1.36E-05	1.36E-05
Pb-210	2.3918E-08	4.75	4.75	0.00E+00	1.14E-07	1.14E-07
Pm-147	1.6900E-02	4.75	4.75	0.00E+00	8.03E-02	8.03E-02
Pu-238	-8.6120E-01	4.75	0.00	1.29E+00	0.00E+00	1.29E+00
Pu-239	-4.8440E-02	4.75	0.00	1.55E-01	0.00E+00	1.55E-01
Pu-240	-3.0095E-01	4.75	0.00	1.99E-01	0.00E+00	1.99E-01
Pu-241	-1.0411E+02	4.75	0.00	5.11E+01	0.00E+00	5.11E+01
Pu-242	-1.1381E-04	4.75	0.00	8.60E-04	3.19E-04	8.60E-04
Ra-226	6.4400E-08	4.75	4.75	0.00E+00	3.06E-07	3.06E-07
Ra-228	5.9952E-07	4.75	4.75	0.00E+00	2.85E-06	2.85E-06
Ru-106	8.5526E-07	4.75	4.75	0.00E+00	4.06E-06	4.06E-06
Se-79	1.9181E-04	4.75	4.75	0.00E+00	9.11E-04	9.11E-04
Sn-126	1.6671E-04	4.75	4.75	0.00E+00	7.92E-04	7.92E-04
Sr-90	1.9799E+01	4.75	4.75	0.00E+00	9.41E+01	9.41E+01
Tc-99	6.7678E-03	4.75	4.75	0.00E+00	3.22E-02	3.22E-02
Th-229	1.7488E-06	4.75	4.75	0.00E+00	8.31E-06	8.31E-06
Th-230	5.8704E-06	4.75	4.75	0.00E+00	2.79E-05	2.79E-05
Th-232	6.0208E-07	4.75	4.75	0.00E+00	2.86E-06	2.86E-06
Tl-208	8.7573E-05	4.75	4.75	0.00E+00	4.16E-04	4.16E-04
U-232	2.3706E-04	4.75	4.75	0.00E+00	1.13E-03	1.13E-03
U-233	3.6128E-04	4.75	4.75	0.00E+00	1.72E-03	1.72E-03
U-234	1.2788E-02	4.75	4.75	0.00E+00	6.08E-02	6.08E-02
U-235	5.7486E-04	4.75	4.75	4.30E-06	2.74E-03	2.74E-03
U-236	2.3485E-04	4.75	4.75	0.00E+00	1.12E-03	1.12E-03
U-238	1.1581E-04	4.75	4.75	5.35E-07	5.51E-04	5.51E-04
Y-90	1.9804E+01	4.75	4.75	0.00E+00	9.41E+01	9.41E+01
Other Radionuclides					2.93E+02	2.93E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.823E+12
0.0250	1.159E+12
0.0375	1.012E+12
0.0575	1.593E+12
0.0850	6.216E+11
0.1250	4.872E+11
0.2250	5.385E+11
0.3750	2.303E+11
0.5750	3.746E+12
0.8500	1.431E+11
1.2500	1.001E+13
1.7500	4.426E+09
2.2500	5.247E+07
2.7500	1.479E+07
3.5000	1.183E+04
5.0000	5.026E+03
7.0000	5.755E+02
11.0000	6.585E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.68E+00	4.74E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX STAR 3
SNF ID #: 433
Fuel Units & Descr: 1 - SCRAP
Heavy Metal Mass: BOL= ; EOL=0.055kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1984
Estimates as of: 2030
Template: (Worst Case)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	52.27	52.27	0.00E+00	1.21E-04	1.21E-04
Am-241	8.4448E+00	52.27	52.27	0.00E+00	4.41E+02	4.41E+02
Am-242m	1.6848E-02	52.27	52.27	0.00E+00	8.81E-01	8.81E-01
Am-243	1.6320E-02	52.27	52.27	0.00E+00	8.53E-01	8.53E-01
C-14	1.2090E-01	52.27	52.27	0.00E+00	6.32E+00	6.32E+00
Cl-36	2.2849E-03	52.27	52.27	0.00E+00	1.19E-01	1.19E-01
Cm-243	8.6624E-04	52.27	52.27	0.00E+00	4.53E-02	4.53E-02
Cm-244	1.6848E-01	52.27	52.27	0.00E+00	8.81E+00	8.81E+00
Co-60	2.8086E+01	52.27	52.27	0.00E+00	1.47E+03	1.47E+03
Cs-134	3.4148E-04	52.27	52.27	0.00E+00	1.78E-02	1.78E-02
Cs-135	4.3976E-04	52.27	52.27	0.00E+00	2.30E-02	2.30E-02
Cs-137	2.1049E+01	52.27	52.27	0.00E+00	1.10E+03	1.10E+03
Eu-154	1.2500E+00	52.27	52.27	0.00E+00	6.53E+01	6.53E+01
Eu-155	6.8986E-02	52.27	52.27	0.00E+00	3.61E+00	3.61E+00
Fe-55	2.9308E-01	52.27	52.27	0.00E+00	1.53E+01	1.53E+01
H-3	2.4311E-01	52.27	52.27	0.00E+00	1.27E+01	1.27E+01
I-129	1.0618E-05	52.27	52.27	0.00E+00	5.55E-04	5.55E-04
Kr-85	5.9882E-01	52.27	52.27	0.00E+00	3.13E+01	3.13E+01
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-06	1.25E-06
Pm-147	1.6900E-02	52.27	52.27	0.00E+00	8.83E-01	8.83E-01
Pu-238	-8.6120E-01	52.27	0.00	1.41E+01	0.00E+00	1.41E+01
Pu-239	-4.8440E-02	52.27	0.00	1.71E+00	0.00E+00	1.71E+00
Pu-240	-3.0095E-01	52.27	0.00	2.18E+00	0.00E+00	2.18E+00
Pu-241	-1.0411E+02	52.27	0.00	5.62E+02	0.00E+00	5.62E+02
Pu-242	-1.1381E-04	52.27	0.00	9.45E-03	3.51E-03	9.45E-03
Ra-226	6.4400E-08	52.27	52.27	0.00E+00	3.37E-06	3.37E-06
Ra-228	5.9952E-07	52.27	52.27	0.00E+00	3.13E-05	3.13E-05
Ru-106	8.5526E-07	52.27	52.27	0.00E+00	4.47E-05	4.47E-05
Se-79	1.9181E-04	52.27	52.27	0.00E+00	1.00E-02	1.00E-02
Sn-126	1.6671E-04	52.27	52.27	0.00E+00	8.71E-03	8.71E-03
Sr-90	1.9799E+01	52.27	52.27	0.00E+00	1.03E+03	1.03E+03
Tc-99	6.7678E-03	52.27	52.27	0.00E+00	3.54E-01	3.54E-01
Th-229	1.7488E-06	52.27	52.27	0.00E+00	9.14E-05	9.14E-05
Th-230	5.8704E-06	52.27	52.27	0.00E+00	3.07E-04	3.07E-04
Th-232	6.0208E-07	52.27	52.27	0.00E+00	3.15E-05	3.15E-05
Tl-208	8.7573E-05	52.27	52.27	0.00E+00	4.58E-03	4.58E-03
U-232	2.3706E-04	52.27	52.27	0.00E+00	1.24E-02	1.24E-02
U-233	3.6128E-04	52.27	52.27	0.00E+00	1.89E-02	1.89E-02
U-234	1.2788E-02	52.27	52.27	0.00E+00	6.68E-01	6.68E-01
U-235	5.7486E-04	52.27	52.27	4.73E-05	3.01E-02	3.01E-02
U-236	2.3485E-04	52.27	52.27	0.00E+00	1.23E-02	1.23E-02
U-238	1.1581E-04	52.27	52.27	5.89E-06	6.06E-03	6.06E-03
Y-90	1.9804E+01	52.27	52.27	0.00E+00	1.04E+03	1.04E+03
Other Radionuclides					3.22E+03	3.22E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.405E+13
0.0250	1.275E+13
0.0375	1.113E+13
0.0575	1.752E+13
0.0850	6.838E+12
0.1250	5.359E+12
0.2250	5.924E+12
0.3750	2.534E+12
0.5750	4.120E+13
0.8500	1.575E+12
1.2500	1.101E+14
1.7500	4.869E+10
2.2500	5.772E+08
2.7500	1.627E+08
3.5000	1.302E+05
5.0000	5.528E+04
7.0000	6.331E+03
11.0000	7.244E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.15E+01	5.21E+01
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:		52.27
Bounding:		52.27

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1984
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	57.02	57.02	0.00E+00	1.32E-04	1.32E-04
Am-241	8.4448E+00	57.02	57.02	0.00E+00	4.82E+02	4.82E+02
Am-242m	1.6848E-02	57.02	57.02	0.00E+00	9.61E-01	9.61E-01
Am-243	1.6320E-02	57.02	57.02	0.00E+00	9.31E-01	9.31E-01
C-14	1.2090E-01	57.02	57.02	0.00E+00	6.89E+00	6.89E+00
Cl-36	2.2849E-03	57.02	57.02	0.00E+00	1.30E-01	1.30E-01
Cm-243	8.6624E-04	57.02	57.02	0.00E+00	4.94E-02	4.94E-02
Cm-244	1.6848E-01	57.02	57.02	0.00E+00	9.61E+00	9.61E+00
Co-60	2.8086E+01	57.02	57.02	0.00E+00	1.60E+03	1.60E+03
Cs-134	3.4146E-04	57.02	57.02	0.00E+00	1.95E-02	1.95E-02
Cs-135	4.3976E-04	57.02	57.02	0.00E+00	2.51E-02	2.51E-02
Cs-137	2.1049E+01	57.02	57.02	0.00E+00	1.20E+03	1.20E+03
Eu-154	1.2500E+00	57.02	57.02	0.00E+00	7.13E+01	7.13E+01
Eu-155	6.8986E-02	57.02	57.02	0.00E+00	3.93E+00	3.93E+00
Fe-55	2.9308E-01	57.02	57.02	0.00E+00	1.67E+01	1.67E+01
H-3	2.4311E-01	57.02	57.02	0.00E+00	1.39E+01	1.39E+01
I-129	1.0618E-05	57.02	57.02	0.00E+00	6.05E-04	6.05E-04
Kr-85	5.9882E-01	57.02	57.02	0.00E+00	3.41E+01	3.41E+01
Np-237	1.5668E-04	57.02	57.02	0.00E+00	8.93E-03	8.93E-03
Pa-231	2.8656E-06	57.02	57.02	0.00E+00	1.63E-04	1.63E-04
Pb-210	2.3918E-06	57.02	57.02	0.00E+00	1.36E-06	1.36E-06
Pm-147	1.6900E-02	57.02	57.02	0.00E+00	9.64E-01	9.64E-01
Pu-238	-8.6120E-01	57.02	0.00	1.54E+01	0.00E+00	1.54E+01
Pu-239	-4.8440E-02	57.02	0.00	1.87E+00	0.00E+00	1.87E+00
Pu-240	-3.0095E-01	57.02	0.00	2.38E+00	0.00E+00	2.38E+00
Pu-241	-1.0411E+02	57.02	0.00	6.13E+02	0.00E+00	6.13E+02
Pu-242	-1.1381E-04	57.02	0.00	1.03E-02	3.82E-03	1.03E-02
Ra-226	6.4400E-08	57.02	57.02	0.00E+00	3.67E-06	3.67E-06
Ra-228	5.9952E-07	57.02	57.02	0.00E+00	3.42E-05	3.42E-05
Ru-106	8.5526E-07	57.02	57.02	0.00E+00	4.88E-05	4.88E-05
Se-79	1.9181E-04	57.02	57.02	0.00E+00	1.09E-02	1.09E-02
Sn-126	1.6671E-04	57.02	57.02	0.00E+00	9.51E-03	9.51E-03
Sr-90	1.9799E+01	57.02	57.02	0.00E+00	1.13E+03	1.13E+03
Tc-99	6.7678E-03	57.02	57.02	0.00E+00	3.86E-01	3.86E-01
Th-229	1.7488E-06	57.02	57.02	0.00E+00	9.97E-05	9.97E-05
Th-230	5.8704E-06	57.02	57.02	0.00E+00	3.35E-04	3.35E-04
Th-232	6.0208E-07	57.02	57.02	0.00E+00	3.43E-05	3.43E-05
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.987E+13
0.0250	1.390E+13
0.0375	1.215E+13
0.0575	1.911E+13
0.0850	7.460E+12
0.1250	5.847E+12
0.2250	6.462E+12
0.3750	2.764E+12
0.5750	4.495E+13
0.8500	1.718E+12
1.2500	1.201E+14
1.7500	5.311E+10
2.2500	6.296E+08
2.7500	1.774E+08
3.5000	1.420E+05
5.0000	6.031E+04
7.0000	6.906E+03
11.0000	7.902E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.62E+01	5.69E+01
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:		57.02
Bounding:		57.02

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	132.10	132.10	0.00E+00	3.05E-04	3.05E-04
Am-241	8.4448E+00	132.10	132.10	0.00E+00	1.12E+03	1.12E+03
Am-242m	1.6848E-02	132.10	132.10	0.00E+00	2.23E+00	2.23E+00
Am-243	1.6320E-02	132.10	132.10	0.00E+00	2.16E+00	2.16E+00
C-14	1.2090E-01	132.10	132.10	0.00E+00	1.60E+01	1.60E+01
Cl-36	2.2849E-03	132.10	132.10	0.00E+00	3.02E-01	3.02E-01
Cm-243	8.6624E-04	132.10	132.10	0.00E+00	1.14E-01	1.14E-01
Cm-244	1.6848E-01	132.10	132.10	0.00E+00	2.23E+01	2.23E+01
Co-60	2.8086E+01	132.10	132.10	0.00E+00	3.71E+03	3.71E+03
Cs-134	3.4148E-04	132.10	132.10	0.00E+00	4.51E-02	4.51E-02
Cs-135	4.3976E-04	132.10	132.10	0.00E+00	5.81E-02	5.81E-02
Cs-137	2.1049E+01	132.10	132.10	0.00E+00	2.78E+03	2.78E+03
Eu-154	1.2500E+00	132.10	132.10	0.00E+00	1.65E+02	1.65E+02
Eu-155	6.8986E-02	132.10	132.10	0.00E+00	9.11E+00	9.11E+00
Fe-55	2.9308E-01	132.10	132.10	0.00E+00	3.87E+01	3.87E+01
H-3	2.4311E-01	132.10	132.10	0.00E+00	3.21E+01	3.21E+01
I-129	1.0618E-05	132.10	132.10	0.00E+00	1.40E-03	1.40E-03
Kr-85	5.9882E-01	132.10	132.10	0.00E+00	7.91E+01	7.91E+01
Np-237	1.5668E-04	132.10	132.10	0.00E+00	2.07E-02	2.07E-02
Pa-231	2.8656E-06	132.10	132.10	0.00E+00	3.79E-04	3.79E-04
Pb-210	2.3918E-06	132.10	132.10	0.00E+00	3.16E-06	3.16E-06
Pm-147	1.6900E-02	132.10	132.10	0.00E+00	2.23E+00	2.23E+00
Pu-238	-8.6120E-01	132.10	0.00	3.57E+01	0.00E+00	3.57E+01
Pu-239	-4.8440E-02	132.10	0.00	4.32E+00	0.00E+00	4.32E+00
Pu-240	-3.0095E-01	132.10	0.00	5.52E+00	0.00E+00	5.52E+00
Pu-241	-1.0411E+02	132.10	0.00	1.42E+03	0.00E+00	1.42E+03
Pu-242	-1.1381E-04	132.10	0.00	2.39E-02	8.86E-03	2.39E-02
Ra-226	6.4400E-08	132.10	132.10	0.00E+00	8.51E-06	8.51E-06
Ra-228	5.9952E-07	132.10	132.10	0.00E+00	7.92E-05	7.92E-05
Ru-106	8.5526E-07	132.10	132.10	0.00E+00	1.13E-04	1.13E-04
Se-79	1.9181E-04	132.10	132.10	0.00E+00	2.53E-02	2.53E-02
Sn-126	1.6671E-04	132.10	132.10	0.00E+00	2.20E-02	2.20E-02
Sr-90	1.9799E+01	132.10	132.10	0.00E+00	2.62E+03	2.62E+03
Tc-99	6.7678E-03	132.10	132.10	0.00E+00	8.94E-01	8.94E-01
Th-229	1.7488E-06	132.10	132.10	0.00E+00	2.31E-04	2.31E-04
Th-230	5.8704E-06	132.10	132.10	0.00E+00	7.75E-04	7.75E-04
Th-232	6.0208E-07	132.10	132.10	0.00E+00	7.95E-05	7.95E-05
Tl-208	8.7573E-05	132.10	132.10	0.00E+00	1.16E-02	1.16E-02
U-232	2.3706E-04	132.10	132.10	0.00E+00	3.13E-02	3.13E-02
U-233	3.6128E-04	132.10	132.10	0.00E+00	4.77E-02	4.77E-02
U-234	1.2788E-02	132.10	132.10	0.00E+00	1.69E+00	1.69E+00
U-235	5.7486E-04	132.10	132.10	1.20E-04	7.61E-02	7.61E-02
U-236	2.3485E-04	132.10	132.10	0.00E+00	3.10E-02	3.10E-02
U-238	1.1581E-04	132.10	132.10	1.49E-05	1.53E-02	1.53E-02
Y-90	1.9804E+01	132.10	132.10	0.00E+00	2.62E+03	2.62E+03
Other Radionuclides					8.15E+03	8.15E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.619E+14
0.0250	3.221E+13
0.0375	2.814E+13
0.0575	4.428E+13
0.0850	1.728E+13
0.1250	1.354E+13
0.2250	1.497E+13
0.3750	6.403E+12
0.5750	1.041E+14
0.8500	3.979E+12
1.2500	2.782E+14
1.7500	1.230E+11
2.2500	1.459E+09
2.7500	4.111E+08
3.5000	3.290E+05
5.0000	1.397E+05
7.0000	1.600E+04
11.0000	1.831E+03

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
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:		132.10
Bounding:		132.10

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX STAR 6
SNF ID #: 436
Fuel Units & Descr: 1 - SCRAP
Heavy Metal Mass: BOL= ; EOL=0.069kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated Canister usage: 16"x15' 0.07

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.3072E-06	65.57	65.57	0.00E+00	1.51E-04	1.51E-04
Am-241	8.4448E+00	65.57	65.57	0.00E+00	5.54E+02	5.54E+02
Am-242m	1.6848E-02	65.57	65.57	0.00E+00	1.10E+00	1.10E+00
Am-243	1.6320E-02	65.57	65.57	0.00E+00	1.07E+00	1.07E+00
C-14	1.2090E-01	65.57	65.57	0.00E+00	7.93E+00	7.93E+00
Cl-36	2.2849E-03	65.57	65.57	0.00E+00	1.50E-01	1.50E-01
Cm-243	8.6624E-04	65.57	65.57	0.00E+00	5.68E-02	5.68E-02
Cm-244	1.6848E-01	65.57	65.57	0.00E+00	1.10E+01	1.10E+01
Co-60	2.8086E+01	65.57	65.57	0.00E+00	1.84E+03	1.84E+03
Cs-134	3.4148E-04	65.57	65.57	0.00E+00	2.24E-02	2.24E-02
Cs-135	4.3976E-04	65.57	65.57	0.00E+00	2.88E-02	2.88E-02
Cs-137	2.1049E+01	65.57	65.57	0.00E+00	1.38E+03	1.38E+03
Eu-154	1.2500E+00	65.57	65.57	0.00E+00	8.20E+01	8.20E+01
Eu-155	6.8986E-02	65.57	65.57	0.00E+00	4.52E+00	4.52E+00
Fe-55	2.9308E-01	65.57	65.57	0.00E+00	1.92E+01	1.92E+01
H-3	2.4311E-01	65.57	65.57	0.00E+00	1.59E+01	1.59E+01
I-129	1.0618E-05	65.57	65.57	0.00E+00	6.96E-04	6.96E-04
Kr-85	5.9882E-01	65.57	65.57	0.00E+00	3.93E+01	3.93E+01
Np-237	1.5668E-04	65.57	65.57	0.00E+00	1.03E-02	1.03E-02
Pa-231	2.8656E-06	65.57	65.57	0.00E+00	1.88E-04	1.88E-04
Pb-210	2.3918E-06	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
Tl-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
U-233	3.6128E-04	65.57	65.57	0.00E+00	2.37E-02	2.37E-02
U-234	1.2788E-02	65.57	65.57	0.00E+00	8.39E-01	8.39E-01
U-235	5.7486E-04	65.57	65.57	5.94E-05	3.78E-02	3.78E-02
U-236	2.3485E-04	65.57	65.57	0.00E+00	1.54E-02	1.54E-02
U-238	1.1581E-04	65.57	65.57	7.39E-06	7.60E-03	7.60E-03
Y-90	1.9804E+01	65.57	65.57	0.00E+00	1.30E+03	1.30E+03
Other Radionuclides					4.04E+03	4.04E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.036E+13
0.0250	1.599E+13
0.0375	1.397E+13
0.0575	2.198E+13
0.0850	8.578E+12
0.1250	6.724E+12
0.2250	7.432E+12
0.3750	3.179E+12
0.5750	5.169E+13
0.8500	1.975E+12
1.2500	1.381E+14
1.7500	6.108E+10
2.2500	7.241E+08
2.7500	2.041E+08
3.5000	1.633E+05
5.0000	6.935E+04
7.0000	7.942E+03
11.0000	9.087E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.48E+01	6.54E+01
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:		65.57
Bounding:		65.57

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX STAR 7
SNF ID #: 422
Fuel Units & Descr: 1 - SCRAP
Heavy Metal Mass: BOL= ; EOL=0.348kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186365
Template Decay Time: 35 years

Estimated Canister usage: 18"x15' 0.07

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	330.72	330.72	0.00E+00	7.63E-04	7.63E-04
Am-241	8.4448E+00	330.72	330.72	0.00E+00	2.79E+03	2.79E+03
Am-242m	1.6848E-02	330.72	330.72	0.00E+00	5.57E+00	5.57E+00
Am-243	1.6320E-02	330.72	330.72	0.00E+00	5.40E+00	5.40E+00
C-14	1.2090E-01	330.72	330.72	0.00E+00	4.00E+01	4.00E+01
Cl-36	2.2849E-03	330.72	330.72	0.00E+00	7.56E-01	7.56E-01
Cm-243	8.6624E-04	330.72	330.72	0.00E+00	2.86E-01	2.86E-01
Cm-244	1.6848E-01	330.72	330.72	0.00E+00	5.57E+01	5.57E+01
Co-60	2.8086E+01	330.72	330.72	0.00E+00	9.29E+03	9.29E+03
Cs-134	3.4148E-04	330.72	330.72	0.00E+00	1.13E-01	1.13E-01
Cs-135	4.3976E-04	330.72	330.72	0.00E+00	1.45E-01	1.45E-01
Cs-137	2.1049E+01	330.72	330.72	0.00E+00	6.96E+03	6.96E+03
Eu-154	1.2500E+00	330.72	330.72	0.00E+00	4.13E+02	4.13E+02
Eu-155	6.8986E-02	330.72	330.72	0.00E+00	2.28E+01	2.28E+01
Fe-55	2.9308E-01	330.72	330.72	0.00E+00	9.69E+01	9.69E+01
H-3	2.4311E-01	330.72	330.72	0.00E+00	8.04E+01	8.04E+01
I-129	1.0618E-05	330.72	330.72	0.00E+00	3.51E-03	3.51E-03
Kr-85	5.9882E-01	330.72	330.72	0.00E+00	1.98E+02	1.98E+02
Np-237	1.5668E-04	330.72	330.72	0.00E+00	5.18E-02	5.18E-02
Pa-231	2.8656E-06	330.72	330.72	0.00E+00	9.48E-04	9.48E-04
Pb-210	2.3918E-06	330.72	330.72	0.00E+00	7.91E-06	7.91E-06
Pm-147	1.6900E-02	330.72	330.72	0.00E+00	5.59E+00	5.59E+00
Pu-238	-8.6120E-01	330.72	0.00	8.94E+01	0.00E+00	8.94E+01
Pu-239	-4.8440E-02	330.72	0.00	1.08E+01	0.00E+00	1.08E+01
Pu-240	-3.0095E-01	330.72	0.00	1.38E+01	0.00E+00	1.38E+01
Pu-241	-1.0411E+02	330.72	0.00	3.56E+03	0.00E+00	3.56E+03
Pu-242	-1.1381E-04	330.72	0.00	5.98E-02	2.22E-02	5.98E-02
Ra-226	6.4400E-08	330.72	330.72	0.00E+00	2.13E-05	2.13E-05
Ra-228	5.9952E-07	330.72	330.72	0.00E+00	1.98E-04	1.98E-04
Ru-106	8.5526E-07	330.72	330.72	0.00E+00	2.83E-04	2.83E-04
Se-79	1.9181E-04	330.72	330.72	0.00E+00	6.34E-02	6.34E-02
Sn-126	1.6671E-04	330.72	330.72	0.00E+00	5.51E-02	5.51E-02
Sr-90	1.9799E+01	330.72	330.72	0.00E+00	6.55E+03	6.55E+03
Tc-99	6.7678E-03	330.72	330.72	0.00E+00	2.24E+00	2.24E+00
Th-229	1.7488E-06	330.72	330.72	0.00E+00	5.78E-04	5.78E-04
Th-230	5.8704E-06	330.72	330.72	0.00E+00	1.94E-03	1.94E-03
Th-232	6.0208E-07	330.72	330.72	0.00E+00	1.99E-04	1.99E-04
Tl-208	8.7573E-05	330.72	330.72	0.00E+00	2.90E-02	2.90E-02
U-232	2.3706E-04	330.72	330.72	0.00E+00	7.84E-02	7.84E-02
U-233	3.6128E-04	330.72	330.72	0.00E+00	1.19E-01	1.19E-01
U-234	1.2788E-02	330.72	330.72	0.00E+00	4.23E+00	4.23E+00
U-235	5.7486E-04	330.72	330.72	2.99E-04	1.90E-01	1.90E-01
U-236	2.3485E-04	330.72	330.72	0.00E+00	7.77E-02	7.77E-02
U-238	1.1581E-04	330.72	330.72	3.73E-05	3.83E-02	3.83E-02
Y-90	1.9804E+01	330.72	330.72	0.00E+00	6.55E+03	6.55E+03
Other Radionuclides					2.04E+04	2.04E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.053E+14
0.0250	6.065E+13
0.0375	7.045E+13
0.0575	1.109E+14
0.0850	4.327E+13
0.1250	3.391E+13
0.2250	3.748E+13
0.3750	1.603E+13
0.5750	2.607E+14
0.8500	9.962E+12
1.2500	6.964E+14
1.7500	3.060E+11
2.2500	3.652E+09
2.7500	1.029E+09
3.5000	8.236E+05
5.0000	3.498E+05
7.0000	4.006E+04
11.0000	4.583E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.26E+02	3.30E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		330.72
Bounding:		330.72

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 591.64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: 18"x15' 0.44

II. Estimates

Radionuclide	m Ci/MWd From Template	x_a Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_a Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	61.01	61.01	0.00E+00	1.54E-04	1.54E-04
Am-241	8.6432E+00	61.01	61.01	0.00E+00	5.27E+02	5.27E+02
Am-242m	1.5728E-02	61.01	61.01	0.00E+00	9.60E-01	9.60E-01
Am-243	1.6288E-02	61.01	61.01	0.00E+00	9.94E-01	9.94E-01
C-14	1.2068E-01	61.01	61.01	0.00E+00	7.36E+00	7.36E+00
Cl-36	2.2849E-03	61.01	61.01	0.00E+00	1.39E-01	1.39E-01
Cm-243	6.0144E-04	61.01	61.01	0.00E+00	3.67E-02	3.67E-02
Cm-244	9.4880E-02	61.01	61.01	0.00E+00	5.79E+00	5.79E+00
Co-60	3.9052E+00	61.01	61.01	0.00E+00	2.38E+02	2.38E+02
Cs-134	2.2139E-06	61.01	61.01	0.00E+00	1.35E-04	1.35E-04
Cs-135	4.3976E-04	61.01	61.01	0.00E+00	2.68E-02	2.68E-02
Cs-137	1.4887E+01	61.01	61.01	0.00E+00	9.08E+02	9.08E+02
Eu-154	3.7342E-01	61.01	61.01	0.00E+00	2.28E+01	2.28E+01
Eu-155	8.4893E-03	61.01	61.01	0.00E+00	5.18E-01	5.18E-01
Fe-55	5.3750E-03	61.01	61.01	0.00E+00	3.28E-01	3.28E-01
H-3	1.0472E-01	61.01	61.01	0.00E+00	6.39E+00	6.39E+00
I-129	1.0618E-05	61.01	61.01	0.00E+00	6.48E-04	6.48E-04
Kr-85	2.2717E-01	61.01	61.01	0.00E+00	1.39E+01	1.39E+01
Np-237	1.6400E-04	61.01	61.01	0.00E+00	1.00E-02	1.00E-02
Pa-231	2.8688E-06	61.01	61.01	0.00E+00	1.75E-04	1.75E-04
Pb-210	4.7312E-08	61.01	61.01	0.00E+00	2.89E-06	2.89E-06
Pm-147	3.2198E-04	61.01	61.01	0.00E+00	1.96E-02	1.96E-02
Pu-238	-1.1924E+00	61.01	0.00	1.65E+01	0.00E+00	1.65E+01
Pu-239	-4.8600E-02	61.01	0.00	2.00E+00	0.00E+00	2.00E+00
Pu-240	-3.0127E-01	61.01	0.00	2.55E+00	0.00E+00	2.55E+00
Pu-241	-1.2917E+02	61.01	0.00	6.56E+02	0.00E+00	6.56E+02
Pu-242	-1.1381E-04	61.01	0.00	1.10E-02	4.09E-03	1.10E-02
Ra-226	1.0760E-07	61.01	61.01	0.00E+00	6.56E-06	6.56E-06
Ra-228	6.0160E-07	61.01	61.01	0.00E+00	3.67E-05	3.67E-05
Ru-106	1.3388E-13	61.01	61.01	0.00E+00	8.17E-12	8.17E-12
Se-79	1.9179E-04	61.01	61.01	0.00E+00	1.17E-02	1.17E-02
Sn-126	1.6669E-04	61.01	61.01	0.00E+00	1.02E-02	1.02E-02
Sr-90	1.3859E+01	61.01	61.01	0.00E+00	8.46E+02	8.46E+02
Tc-99	6.7678E-03	61.01	61.01	0.00E+00	4.13E-01	4.13E-01
Th-229	2.2592E-06	61.01	61.01	0.00E+00	1.38E-04	1.38E-04
Th-230	7.5955E-06	61.01	61.01	0.00E+00	4.63E-04	4.63E-04
Th-232	6.0208E-07	61.01	61.01	0.00E+00	3.67E-05	3.67E-05
Tl-208	7.5795E-05	61.01	61.01	0.00E+00	4.62E-03	4.62E-03
U-232	2.0521E-04	61.01	61.01	0.00E+00	1.25E-02	1.25E-02
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	5.7486E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.172E+13
0.0250	1.021E+13
0.0375	8.635E+12
0.0575	1.631E+13
0.0850	5.467E+12
0.1250	3.868E+12
0.2250	4.732E+12
0.3750	2.048E+12
0.5750	3.389E+13
0.8500	7.423E+11
1.2500	1.819E+13
1.7500	2.187E+10
2.2500	9.455E+07
2.7500	1.628E+08
3.5000	8.862E+04
5.0000	3.745E+04
7.0000	4.265E+03
11.0000	4.865E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.27E+01	3.34E+01
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:	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:		61.01
Bounding:		61.01

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: 501.64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1978
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	2,348.47	2,546.71	0.00E+00	2.52E-06	2.73E-06
Am-241	1.4751E-01	2,348.47	2,546.71	0.00E+00	3.46E+02	3.76E+02
Am-242m	2.6809E-04	2,348.47	2,546.71	0.00E+00	6.30E-01	6.83E-01
Am-243	6.2484E-04	2,348.47	2,546.71	0.00E+00	1.47E+00	1.59E+00
C-14	4.7820E-05	2,348.47	2,546.71	0.00E+00	1.12E-01	1.22E-01
Cl-36	8.0297E-07	2,348.47	2,546.71	0.00E+00	1.89E-03	2.04E-03
Cm-243	1.7426E-04	2,348.47	2,546.71	0.00E+00	4.09E-01	4.44E-01
Cm-244	2.7616E-02	2,348.47	2,546.71	0.00E+00	6.49E+01	7.03E+01
Co-60	3.5610E-04	2,348.47	2,546.71	0.00E+00	8.36E-01	9.07E-01
Cs-134	2.6260E-07	2,348.47	2,546.71	0.00E+00	6.17E-04	6.69E-04
Cs-135	1.4433E-05	2,348.47	2,546.71	0.00E+00	3.39E-02	3.68E-02
Cs-137	9.8870E-01	2,348.47	2,546.71	0.00E+00	2.32E+03	2.52E+03
Eu-154	6.0320E-03	2,348.47	2,546.71	0.00E+00	1.42E+01	1.54E+01
Eu-155	2.1770E-04	2,348.47	2,546.71	0.00E+00	5.11E-01	5.54E-01
Fe-55	7.9296E-07	2,348.47	2,546.71	0.00E+00	1.86E-03	2.02E-03
H-3	8.9486E-03	2,348.47	2,546.71	0.00E+00	2.10E+01	2.28E+01
I-129	9.8288E-07	2,348.47	2,546.71	0.00E+00	2.31E-03	2.50E-03
Kr-85	1.0707E-02	2,348.47	2,546.71	0.00E+00	2.51E+01	2.73E+01
Np-237	1.1927E-05	2,348.47	2,546.71	0.00E+00	2.80E-02	3.04E-02
Pa-231	1.4703E-09	2,348.47	2,546.71	0.00E+00	3.45E-06	3.74E-06
Pb-210	1.6828E-10	2,348.47	2,546.71	0.00E+00	3.95E-07	4.29E-07
Pm-147	6.9606E-06	2,348.47	2,546.71	0.00E+00	1.63E-02	1.77E-02
Pu-238	6.6263E-02	2,348.47	2,546.71	0.00E+00	1.56E+02	1.69E+02
Pu-239	1.1618E-02	2,348.47	2,546.71	0.00E+00	2.73E+01	2.96E+01
Pu-240	1.5142E-02	2,348.47	2,546.71	0.00E+00	3.56E+01	3.86E+01
Pu-241	4.3766E-01	2,348.47	2,546.71	0.00E+00	1.03E+03	1.11E+03
Pu-242	6.4260E-05	2,348.47	2,546.71	0.00E+00	1.51E-01	1.64E-01
Ra-226	3.8501E-10	2,348.47	2,546.71	0.00E+00	9.04E-07	9.81E-07
Ra-228	5.2955E-12	2,348.47	2,546.71	0.00E+00	1.24E-08	1.35E-08
Ru-106	2.0413E-14	2,348.47	2,546.71	0.00E+00	4.79E-11	5.20E-11
Se-79	1.2376E-05	2,348.47	2,546.71	0.00E+00	2.91E-02	3.15E-02
Sn-126	2.5210E-05	2,348.47	2,546.71	0.00E+00	5.92E-02	6.42E-02
Sr-90	6.4163E-01	2,348.47	2,546.71	0.00E+00	1.51E+03	1.63E+03
Tc-99	3.9357E-04	2,348.47	2,546.71	0.00E+00	9.24E-01	1.00E+00
Th-229	1.5644E-10	2,348.47	2,546.71	0.00E+00	3.67E-07	3.98E-07
Th-230	2.7972E-08	2,348.47	2,546.71	0.00E+00	6.57E-05	7.12E-05
Th-232	5.3036E-12	2,348.47	2,546.71	0.00E+00	1.25E-08	1.35E-08
Tl-208	1.5136E-07	2,348.47	2,546.71	0.00E+00	3.55E-04	3.85E-04
U-232	4.1005E-07	2,348.47	2,546.71	0.00E+00	9.63E-04	1.04E-03
U-233	2.5856E-06	2,348.47	2,546.71	0.00E+00	6.07E-05	6.58E-05
U-234	5.2665E-05	2,348.47	2,546.71	0.00E+00	1.24E-01	1.34E-01
U-235	-1.4487E-06	2,348.47	0.00	3.30E-02	2.96E-02	3.30E-02
U-236	7.5888E-06	2,348.47	2,546.71	0.00E+00	1.78E-02	1.93E-02
U-238	-2.6129E-07	2,348.47	0.00	8.05E-02	7.98E-02	8.05E-02
Y-90	6.4180E-01	2,348.47	2,546.71	0.00E+00	1.51E+03	1.63E+03
Other Radionuclides					2.24E+03	2.43E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.691E+13
0.0250	1.942E+13
0.0375	1.830E+13
0.0575	2.290E+13
0.0850	1.070E+13
0.1250	7.118E+12
0.2250	9.135E+12
0.3750	3.945E+12
0.5750	9.290E+13
0.8500	9.071E+11
1.2500	5.772E+11
1.7500	2.538E+10
2.2500	4.172E+08
2.7500	1.470E+07
3.5000	1.049E+06
5.0000	4.484E+05
7.0000	5.166E+04
11.0000	5.932E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.25E+01	4.81E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	5.996	0 to 5

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,348.47
Bounding:	2,546.71	4,696.95

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	
Bounding:	0.29	1.84

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: 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3547E-10	920.05	1,840.09	0.00E+00	2.17E-07	4.33E-07
Am-241	6.5811E-02	920.05	1,840.09	0.00E+00	6.05E+01	1.21E+02
Am-242m	3.2913E-04	920.05	1,840.09	0.00E+00	3.03E-01	6.06E-01
Am-243	6.2742E-04	920.05	1,840.09	0.00E+00	5.77E-01	1.15E+00
C-14	4.8078E-05	920.05	1,840.09	0.00E+00	4.42E-02	8.85E-02
Cl-36	8.0313E-07	920.05	1,840.09	0.00E+00	7.39E-04	1.48E-03
Cm-243	5.2003E-04	920.05	1,840.09	0.00E+00	4.78E-01	9.57E-01
Cm-244	1.5441E-01	920.05	1,840.09	0.00E+00	1.42E+02	2.84E+02
Co-60	1.3196E-01	920.05	1,840.09	0.00E+00	1.21E+02	2.43E+02
Cs-134	9.6528E-01	920.05	1,840.09	0.00E+00	8.88E+02	1.78E+03
Cs-135	1.4433E-05	920.05	1,840.09	0.00E+00	1.33E-02	2.66E-02
Cs-137	2.7939E+00	920.05	1,840.09	0.00E+00	2.57E+03	5.14E+03
Eu-154	2.2626E-01	920.05	1,840.09	0.00E+00	2.08E+02	4.16E+02
Eu-155	1.1680E-01	920.05	1,840.09	0.00E+00	1.07E+02	2.15E+02
Fe-55	1.2760E-01	920.05	1,840.09	0.00E+00	1.17E+02	2.35E+02
H-3	1.1168E-01	920.05	1,840.09	0.00E+00	1.03E+02	2.05E+02
I-129	9.8288E-07	920.05	1,840.09	0.00E+00	9.04E-04	1.81E-03
Kr-85	1.9606E-01	920.05	1,840.09	0.00E+00	1.80E+02	3.61E+02
Np-237	9.6915E-06	920.05	1,840.09	0.00E+00	8.92E-03	1.78E-02
Pa-231	8.5917E-10	920.05	1,840.09	0.00E+00	7.90E-07	1.58E-06
Pb-210	1.6247E-12	920.05	1,840.09	0.00E+00	1.49E-09	2.99E-09
Pm-147	1.0063E+00	920.05	1,840.09	0.00E+00	9.26E+02	1.85E+03
Pu-238	9.4428E-02	920.05	1,840.09	0.00E+00	8.69E+01	1.74E+02
Pu-239	1.1631E-02	920.05	1,840.09	0.00E+00	1.07E+01	2.14E+01
Pu-240	1.4919E-02	920.05	1,840.09	0.00E+00	1.37E+01	2.75E+01
Pu-241	3.8130E+00	920.05	1,840.09	0.00E+00	3.51E+03	7.02E+03
Pu-242	6.4260E-05	920.05	1,840.09	0.00E+00	5.91E-02	1.18E-01
Ra-226	1.2608E-11	920.05	1,840.09	0.00E+00	1.16E-08	2.32E-08
Ra-228	3.8986E-12	920.05	1,840.09	0.00E+00	3.59E-09	7.17E-09
Ru-106	5.4910E-01	920.05	1,840.09	0.00E+00	5.05E+02	1.01E+03
Se-79	1.2380E-05	920.05	1,840.09	0.00E+00	1.14E-02	2.28E-02
Sn-126	2.5210E-05	920.05	1,840.09	0.00E+00	2.32E-02	4.64E-02
Sr-90	1.8718E+00	920.05	1,840.09	0.00E+00	1.72E+03	3.44E+03
Tc-99	3.9357E-04	920.05	1,840.09	0.00E+00	3.62E-01	7.24E-01
Th-229	2.9603E-11	920.05	1,840.09	0.00E+00	2.72E-08	5.45E-08
Th-230	4.5559E-09	920.05	1,840.09	0.00E+00	4.19E-06	8.38E-06
Th-232	5.2826E-12	920.05	1,840.09	0.00E+00	4.86E-09	9.72E-09
Tl-208	1.9654E-07	920.05	1,840.09	0.00E+00	1.81E-04	3.62E-04
U-232	5.7607E-07	920.05	1,840.09	0.00E+00	5.30E-04	1.06E-03
U-233	2.3288E-08	920.05	1,840.09	0.00E+00	2.14E-05	4.29E-05
U-234	4.1182E-05	920.05	1,840.09	0.00E+00	3.79E-02	7.58E-02
U-235	-1.4494E-06	920.05	0.00	2.76E-02	2.62E-02	2.76E-02
U-236	7.5646E-06	920.05	1,840.09	0.00E+00	6.96E-03	1.39E-02
U-238	-2.6129E-07	920.05	0.00	1.02E-01	1.02E-01	1.02E-01
Y-90	1.8718E+00	920.05	1,840.09	0.00E+00	1.72E+03	3.44E+03
Other Radionuclides					3.82E+03	7.64E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.626E+14
0.0250	6.048E+13
0.0375	5.662E+13
0.0575	5.276E+13
0.0850	3.332E+13
0.1250	3.016E+13
0.2250	2.835E+13
0.3750	1.591E+13
0.5750	2.933E+14
0.8500	6.786E+13
1.2500	3.156E+13
1.7500	4.894E+11
2.2500	2.456E+11
2.7500	8.226E+09
3.5000	1.055E+09
5.0000	1.732E+06
7.0000	1.997E+05
11.0000	2.294E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.64E+01	1.13E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		920.05	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,840.09	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

[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: 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

[1]Fuel decay start date: 1965
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 65 years

Estimated Canister usage: $18"x10'$ 2.96

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.2581E-09	35,707.51	71,415.03	0.00E+00	4.49E-05	8.98E-05
Am-241	1.4761E-01	35,707.51	71,415.03	0.00E+00	5.27E+03	1.05E+04
Am-242m	2.5032E-04	35,707.51	71,415.03	0.00E+00	8.94E+00	1.79E+01
Am-243	6.2387E-04	35,707.51	71,415.03	0.00E+00	2.23E+01	4.46E+01
C-14	4.7739E-05	35,707.51	71,415.03	0.00E+00	1.70E+00	3.41E+00
Cl-36	8.0297E-07	35,707.51	71,415.03	0.00E+00	2.87E-02	5.73E-02
Cm-243	1.2099E-04	35,707.51	71,415.03	0.00E+00	4.32E+00	8.64E+00
Cm-244	1.5560E-02	35,707.51	71,415.03	0.00E+00	5.56E+02	1.11E+03
Co-60	4.9580E-05	35,707.51	71,415.03	0.00E+00	1.77E+00	3.54E+00
Cs-134	1.7022E-09	35,707.51	71,415.03	0.00E+00	6.08E-05	1.22E-04
Cs-135	1.4433E-05	35,707.51	71,415.03	0.00E+00	5.15E-01	1.03E+00
Cs-137	6.9929E-01	35,707.51	71,415.03	0.00E+00	2.50E+04	4.99E+04
Eu-154	1.8023E-03	35,707.51	71,415.03	0.00E+00	6.44E+01	1.29E+02
Eu-155	2.6793E-05	35,707.51	71,415.03	0.00E+00	9.57E-01	1.91E+00
Fe-55	1.4580E-08	35,707.51	71,415.03	0.00E+00	5.21E-04	1.04E-03
H-3	3.8566E-03	35,707.51	71,415.03	0.00E+00	1.38E+02	2.75E+02
I-129	9.8288E-07	35,707.51	71,415.03	0.00E+00	3.51E-02	7.02E-02
Kr-85	4.0617E-03	35,707.51	71,415.03	0.00E+00	1.45E+02	2.90E+02
Np-237	1.2645E-05	35,707.51	71,415.03	0.00E+00	4.52E-01	9.03E-01
Pa-231	1.6376E-09	35,707.51	71,415.03	0.00E+00	5.85E-05	1.17E-04
Pb-210	2.8795E-10	35,707.51	71,415.03	0.00E+00	1.03E-05	2.06E-05
Pm-147	1.3264E-07	35,707.51	71,415.03	0.00E+00	4.74E-03	9.47E-03
Pu-238	5.8882E-02	35,707.51	71,415.03	0.00E+00	2.10E+03	4.21E+03
Pu-239	1.1613E-02	35,707.51	71,415.03	0.00E+00	4.15E+02	8.29E+02
Pu-240	1.5142E-02	35,707.51	71,415.03	0.00E+00	5.41E+02	1.08E+03
Pu-241	2.1269E-01	35,707.51	71,415.03	0.00E+00	7.59E+03	1.52E+04
Pu-242	6.4260E-05	35,707.51	71,415.03	0.00E+00	2.29E+00	4.59E+00
Ra-226	5.8689E-10	35,707.51	71,415.03	0.00E+00	2.10E-05	4.19E-05
Ra-228	5.3036E-12	35,707.51	71,415.03	0.00E+00	1.89E-07	3.79E-07
Ru-106	6.8136E-19	35,707.51	71,415.03	0.00E+00	2.43E-14	4.87E-14
Se-79	1.2372E-05	35,707.51	71,415.03	0.00E+00	4.42E-01	8.84E-01
Sn-126	2.5194E-05	35,707.51	71,415.03	0.00E+00	9.00E-01	1.80E+00
Sr-90	4.4913E-01	35,707.51	71,415.03	0.00E+00	1.60E+04	3.21E+04
Tc-99	3.9357E-04	35,707.51	71,415.03	0.00E+00	1.41E+01	2.81E+01
Th-229	1.9331E-10	35,707.51	71,415.03	0.00E+00	6.90E-06	1.38E-05
Th-230	3.5223E-08	35,707.51	71,415.03	0.00E+00	1.26E-03	2.52E-03
Th-232	5.3085E-12	35,707.51	71,415.03	0.00E+00	1.90E-07	3.79E-07
Tl-208	1.3102E-07	35,707.51	71,415.03	0.00E+00	4.68E-03	9.36E-03
U-232	3.5497E-07	35,707.51	71,415.03	0.00E+00	1.27E-02	2.54E-02
U-233	2.6647E-08	35,707.51	71,415.03	0.00E+00	9.52E-04	1.90E-03
U-234	5.5023E-05	35,707.51	71,415.03	0.00E+00	1.96E+00	3.93E+00
U-235	-1.4485E-06	35,707.51	0.00	6.93E-02	1.76E-02	6.93E-02
U-236	7.5969E-06	35,707.51	71,415.03	0.00E+00	2.71E-01	5.43E-01
U-238	-2.6129E-07	35,707.51	0.00	1.70E-01	1.61E-01	1.70E-01
Y-90	4.4913E-01	35,707.51	71,415.03	0.00E+00	1.60E+04	3.21E+04
Other Radionuclides					2.42E+04	4.84E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.933E+15
0.0250	3.840E+14
0.0375	3.590E+14
0.0575	4.926E+14
0.0850	2.101E+14
0.1250	1.371E+14
0.2250	1.787E+14
0.3750	7.735E+13
0.5750	1.841E+15
0.8500	1.476E+13
1.2500	6.900E+12
1.7500	3.970E+11
2.2500	6.992E+07
2.7500	3.478E+08
3.5000	1.726E+07
5.0000	7.371E+06
7.0000	8.485E+05
11.0000	9.739E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.24E+02	1.05E+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 %:	5.965123646	0 to 5

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		35,707.51
Bounding:		71,415.03

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:	1.90	
Bounding:	3.80	

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: RESIDUE FAILED PBF RODS
SNF ID #: 381
Fuel Units & Descr: 1 - DEBRIS
Heavy Metal Mass: BOL= ; EOL=1.109kg
ROD Storage Site: INEEL

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

Estimated Canister usage: HIC 1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	1,047.61	1,047.61	0.00E+00	2.45E-05	2.45E-05
Am-241	1.1135E-04	1,047.61	1,047.61	0.00E+00	1.17E-01	1.17E-01
Am-242m	8.5075E-09	1,047.61	1,047.61	0.00E+00	8.91E-06	8.91E-06
Am-243	9.8519E-10	1,047.61	1,047.61	0.00E+00	1.03E-06	1.03E-06
C-14	2.3012E-04	1,047.61	1,047.61	0.00E+00	2.41E-01	2.41E-01
Cl-36	1.2261E-06	1,047.61	1,047.61	0.00E+00	1.28E-03	1.28E-03
Cm-243	2.4875E-10	1,047.61	1,047.61	0.00E+00	2.61E-07	2.61E-07
Cm-244	2.3178E-09	1,047.61	1,047.61	0.00E+00	2.43E-06	2.43E-06
Co-60	7.0849E-02	1,047.61	1,047.61	0.00E+00	7.42E+01	7.42E+01
Cs-134	3.0266E-06	1,047.61	1,047.61	0.00E+00	3.17E-03	3.17E-03
Cs-135	3.0316E-05	1,047.61	1,047.61	0.00E+00	3.18E-02	3.18E-02
Cs-137	1.4511E+00	1,047.61	1,047.61	0.00E+00	1.52E+03	1.52E+03
Eu-154	6.6955E-04	1,047.61	1,047.61	0.00E+00	7.01E-01	7.01E-01
Eu-155	6.9850E-04	1,047.61	1,047.61	0.00E+00	7.32E-01	7.32E-01
Fe-55	1.2318E-03	1,047.61	1,047.61	0.00E+00	1.29E+00	1.29E+00
H-3	2.5141E-03	1,047.61	1,047.61	0.00E+00	2.63E+00	2.63E+00
I-129	7.3195E-07	1,047.61	1,047.61	0.00E+00	7.67E-04	7.67E-04
Kr-85	4.1281E-02	1,047.61	1,047.61	0.00E+00	4.32E+01	4.32E+01
Np-237	1.1489E-06	1,047.61	1,047.61	0.00E+00	1.20E-03	1.20E-03
Pa-231	4.5241E-08	1,047.61	1,047.61	0.00E+00	4.74E-05	4.74E-05
Pb-210	6.4476E-13	1,047.61	1,047.61	0.00E+00	6.75E-10	6.75E-10
Pm-147	1.1651E-03	1,047.61	1,047.61	0.00E+00	1.22E+00	1.22E+00
Pu-238	2.9517E-04	1,047.61	1,047.61	0.00E+00	3.09E-01	3.09E-01
Pu-239	6.6772E-04	1,047.61	1,047.61	0.00E+00	7.00E-01	7.00E-01
Pu-240	8.6839E-05	1,047.61	1,047.61	0.00E+00	9.10E-02	9.10E-02
Pu-241	7.1514E-04	1,047.61	1,047.61	0.00E+00	7.49E-01	7.49E-01
Pu-242	1.9717E-09	1,047.61	1,047.61	0.00E+00	2.07E-06	2.07E-06
Ra-226	1.7654E-12	1,047.61	1,047.61	0.00E+00	1.85E-09	1.85E-09
Ra-228	8.2928E-12	1,047.61	1,047.61	0.00E+00	8.69E-09	8.69E-09
Ru-106	1.8419E-10	1,047.61	1,047.61	0.00E+00	1.93E-07	1.93E-07
Se-79	1.3223E-05	1,047.61	1,047.61	0.00E+00	1.39E-02	1.39E-02
Sn-126	1.1493E-05	1,047.61	1,047.61	0.00E+00	1.20E-02	1.20E-02
Sr-90	1.3649E+00	1,047.61	1,047.61	0.00E+00	1.43E+03	1.43E+03
Tc-99	4.6656E-04	1,047.61	1,047.61	0.00E+00	4.89E-01	4.89E-01
Th-229	1.4547E-11	1,047.61	1,047.61	0.00E+00	1.52E-08	1.52E-08
Th-230	1.6617E-10	1,047.61	1,047.61	0.00E+00	1.74E-07	1.74E-07
Th-232	8.3361E-12	1,047.61	1,047.61	0.00E+00	8.73E-09	8.73E-09
Tl-208	2.1664E-08	1,047.61	1,047.61	0.00E+00	2.27E-05	2.27E-05
U-232	5.8669E-08	1,047.61	1,047.61	0.00E+00	6.15E-05	6.15E-05
U-233	3.1847E-09	1,047.61	1,047.61	0.00E+00	3.34E-06	3.34E-06
U-234	3.8769E-07	1,047.61	1,047.61	0.00E+00	4.06E-04	4.06E-04
U-235	-2.7761E-06	1,047.61	0.00	4.48E-03	1.57E-03	4.48E-03
U-236	1.6190E-05	1,047.61	1,047.61	0.00E+00	1.70E-02	1.70E-02
U-238	-2.8547E-09	1,047.61	0.00	4.84E-05	4.54E-05	4.84E-05
Y-90	1.3652E+00	1,047.61	1,047.61	0.00E+00	1.43E+03	1.43E+03
Other Radionuclides					1.73E+03	1.73E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.819E+13
0.0250	1.625E+13
0.0375	1.405E+13
0.0575	1.515E+13
0.0850	9.153E+12
0.1250	5.943E+12
0.2250	7.879E+12
0.3750	3.437E+12
0.5750	5.661E+13
0.8500	5.730E+11
1.2500	5.896E+12
1.7500	1.478E+10
2.2500	3.069E+07
2.7500	8.871E+05
3.5000	6.255E+01
5.0000	2.573E+01
7.0000	2.841E+00
11.0000	3.187E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+01	1.83E+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:	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)[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 HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	154,660.60	218,499.95	0.00E+00	1.66E-04	2.35E-04
Am-241	1.4751E-01	154,660.60	218,499.95	0.00E+00	2.28E+04	3.22E+04
Am-242m	2.6809E-04	154,660.60	218,499.95	0.00E+00	4.15E+01	5.86E+01
Am-243	6.2484E-04	154,660.60	218,499.95	0.00E+00	9.66E+01	1.37E+02
C-14	4.7820E-05	154,660.60	218,499.95	0.00E+00	7.40E+00	1.04E+01
Cl-36	8.0297E-07	154,660.60	218,499.95	0.00E+00	1.24E-01	1.75E-01
Cm-243	1.7426E-04	154,660.60	218,499.95	0.00E+00	2.70E+01	3.81E+01
Cm-244	2.7616E-02	154,660.60	218,499.95	0.00E+00	4.27E+03	6.03E+03
Co-60	3.5610E-04	154,660.60	218,499.95	0.00E+00	5.51E+01	7.78E+01
Cs-134	2.6260E-07	154,660.60	218,499.95	0.00E+00	4.06E-02	5.74E-02
Cs-135	1.4433E-05	154,660.60	218,499.95	0.00E+00	2.23E+00	3.15E+00
Cs-137	9.8870E-01	154,660.60	218,499.95	0.00E+00	1.53E+05	2.16E+05
Eu-154	6.0320E-03	154,660.60	218,499.95	0.00E+00	9.33E+02	1.32E+03
Eu-155	2.1770E-04	154,660.60	218,499.95	0.00E+00	3.37E+01	4.76E+01
Fe-55	7.9296E-07	154,660.60	218,499.95	0.00E+00	1.23E-01	1.73E-01
H-3	8.9486E-03	154,660.60	218,499.95	0.00E+00	1.38E+03	1.96E+03
I-129	9.8288E-07	154,660.60	218,499.95	0.00E+00	1.52E-01	2.15E-01
Kr-85	1.0707E-02	154,660.60	218,499.95	0.00E+00	1.66E+03	2.34E+03
Np-237	1.1927E-05	154,660.60	218,499.95	0.00E+00	1.84E+00	2.61E+00
Pa-231	1.4703E-09	154,660.60	218,499.95	0.00E+00	2.27E-04	3.21E-04
Pb-210	1.6828E-10	154,660.60	218,499.95	0.00E+00	2.60E-05	3.68E-05
Pm-147	6.9606E-06	154,660.60	218,499.95	0.00E+00	1.08E+00	1.52E+00
Pu-238	6.6263E-02	154,660.60	218,499.95	0.00E+00	1.02E+04	1.45E+04
Pu-239	1.1618E-02	154,660.60	218,499.95	0.00E+00	1.80E+03	2.54E+03
Pu-240	1.5142E-02	154,660.60	218,499.95	0.00E+00	2.34E+03	3.31E+03
Pu-241	4.3766E-01	154,660.60	218,499.95	0.00E+00	6.77E+04	9.56E+04
Pu-242	6.4260E-05	154,660.60	218,499.95	0.00E+00	9.94E+00	1.40E+01
Ra-226	3.8501E-10	154,660.60	218,499.95	0.00E+00	5.95E-05	8.41E-05
Ra-228	5.2955E-12	154,660.60	218,499.95	0.00E+00	8.19E-07	1.16E-06
Ru-106	2.0413E-14	154,660.60	218,499.95	0.00E+00	3.16E-09	4.46E-09
Se-79	1.2376E-05	154,660.60	218,499.95	0.00E+00	1.91E+00	2.70E+00
Sn-126	2.5210E-05	154,660.60	218,499.95	0.00E+00	3.90E+00	5.51E+00
Sr-90	6.4163E-01	154,660.60	218,499.95	0.00E+00	9.92E+04	1.40E+05
Tc-99	3.9357E-04	154,660.60	218,499.95	0.00E+00	6.09E+01	8.60E+01
Th-229	1.5644E-10	154,660.60	218,499.95	0.00E+00	2.42E-05	3.42E-05
Th-230	2.7972E-08	154,660.60	218,499.95	0.00E+00	4.33E-03	6.11E-03
Th-232	5.3036E-12	154,660.60	218,499.95	0.00E+00	8.20E-07	1.16E-06
Tl-208	1.5136E-07	154,660.60	218,499.95	0.00E+00	2.34E-02	3.31E-02
U-232	4.1005E-07	154,660.60	218,499.95	0.00E+00	6.34E-02	8.96E-02
U-233	2.5856E-08	154,660.60	218,499.95	0.00E+00	4.00E-03	5.65E-03
U-234	5.2665E-05	154,660.60	218,499.95	0.00E+00	8.15E+00	1.15E+01
U-235	-1.4487E-06	154,660.60	0.00	1.15E+00	9.26E-01	1.15E+00
U-236	7.5888E-06	154,660.60	218,499.95	0.00E+00	1.17E+00	1.66E+00
U-238	-2.6129E-07	154,660.60	0.00	4.96E+00	4.92E+00	4.96E+00
Y-90	6.4180E-01	154,660.60	218,499.95	0.00E+00	9.93E+04	1.40E+05
Other Radionuclides					1.47E+05	2.08E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.314E+15
0.0250	1.666E+15
0.0375	1.570E+15
0.0575	1.965E+15
0.0850	9.180E+14
0.1250	6.107E+14
0.2250	7.837E+14
0.3750	3.385E+14
0.5750	7.971E+15
0.8500	7.783E+13
1.2500	4.952E+13
1.7500	2.177E+12
2.2500	3.579E+08
2.7500	1.261E+09
3.5000	9.001E+07
5.0000	3.847E+07
7.0000	4.432E+06
11.0000	5.089E+05

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	154,660.60	152,411.09	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	218,499.95	304,822.18	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

[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: ROVER (UBM)
SNF ID #: 840
Fuel Units & Descr: 65 - PARTICULATE
Heavy Metal Mass: BOL=119.775kg; EOL=119.775kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x15' — 5.91

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7456E-07	2,276.58	4,553.16	0.00E+00	1.99E-03	3.98E-03
Am-241	4.2816E+00	2,276.58	4,553.16	0.00E+00	9.75E+03	1.95E+04
Am-242m	1.9312E-02	2,276.58	4,553.16	0.00E+00	4.40E+01	8.79E+01
Am-243	1.6368E-02	2,276.58	4,553.16	0.00E+00	3.73E+01	7.45E+01
C-14	1.2134E-01	2,276.58	4,553.16	0.00E+00	2.76E+02	5.52E+02
Cl-36	2.2860E-03	2,276.58	4,553.16	0.00E+00	5.20E+00	1.04E+01
Cm-243	1.7968E-03	2,276.58	4,553.16	0.00E+00	4.09E+00	8.18E+00
Cm-244	5.3120E-01	2,276.58	4,553.16	0.00E+00	1.21E+03	2.42E+03
Co-60	1.4534E+03	2,276.58	4,553.16	0.00E+00	3.31E+06	6.62E+06
Cs-134	8.1336E+00	2,276.58	4,553.16	0.00E+00	1.85E+04	3.70E+04
Cs-135	4.3976E-04	2,276.58	4,553.16	0.00E+00	1.00E+00	2.00E+00
Cs-137	4.2070E+01	2,276.58	4,553.16	0.00E+00	9.58E+04	1.92E+05
Eu-154	1.4005E+01	2,276.58	4,553.16	0.00E+00	3.19E+04	6.38E+04
Eu-155	4.5553E+00	2,276.58	4,553.16	0.00E+00	1.04E+04	2.07E+04
Fe-55	8.7194E+02	2,276.58	4,553.16	0.00E+00	1.99E+06	3.97E+06
H-3	1.3083E+00	2,276.58	4,553.16	0.00E+00	2.98E+03	5.96E+03
I-129	1.0618E-05	2,276.58	4,553.16	0.00E+00	2.42E-02	4.83E-02
Kr-85	4.1611E+00	2,276.58	4,553.16	0.00E+00	9.47E+03	1.89E+04
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
Tl-208	1.0992E-04	2,276.58	4,553.16	0.00E+00	2.50E-01	5.00E-01
U-232	3.1650E-04	2,276.58	4,553.16	0.00E+00	7.21E-01	1.44E+00
U-233	3.6144E-04	2,276.58	4,553.16	0.00E+00	8.23E-01	1.65E+00
U-234	1.2788E-02	2,276.58	4,553.16	0.00E+00	2.91E+01	5.82E+01
U-235	5.7486E-04	2,276.58	4,553.16	2.41E-01	1.55E+00	2.86E+00
U-236	2.3485E-04	2,276.58	4,553.16	0.00E+00	5.35E-01	1.07E+00
U-238	1.1581E-04	2,276.58	4,553.16	2.81E-03	2.66E-01	5.30E-01
Y-90	4.0428E+01	2,276.58	4,553.16	0.00E+00	9.20E+04	1.84E+05
Other Radionuclides					2.88E+05	5.75E+05

Gamma Sources

Photon Energy Group (Avg. MeV)	Total Photons/sec (bounding)
0.0150	2.664E+16
0.0250	5.207E+15
0.0375	4.516E+15
0.0575	4.402E+15
0.0850	2.396E+15
0.1250	2.560E+15
0.2250	1.612E+15
0.3750	7.648E+14
0.5750	9.568E+15
0.8500	2.576E+15
1.2500	4.911E+17
1.7500	4.442E+13
2.2500	2.094E+13
2.7500	1.745E+11
3.5000	1.744E+10
5.0000	1.544E+07
7.0000	1.776E+06
11.0000	2.038E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.85E+04	1.13E+05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	(Worst Case)
Fuel Cladding:	NONE	SST/Inconel
BOL HM Constituents:	U	U, Th, & Pu
BOL Enrichment %:	93.02375258	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:		2,276.58
Bounding:		4,553.16

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:	0.57	
Bounding:	1.14	

Estimated EOL HM/Given EOL HM: 13.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT I
SNF ID #: 374
Fuel Units & Descr: 3 - 443 ROD ARRAY
Heavy Metal Mass: BOL=3795.7kg; EOL=3755.2kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	9.7360E-05	50,103.24	88,060.24	0.00E+00	4.88E+00	8.57E+00
Am-241	2.4345E-04	50,103.24	88,060.24	0.00E+00	1.22E+01	2.14E+01
Am-242m	1.4821E-06	50,103.24	88,060.24	0.00E+00	7.43E-02	1.31E-01
Am-243	3.1152E-07	50,103.24	88,060.24	0.00E+00	1.56E-02	2.74E-02
C-14	9.2432E-05	50,103.24	88,060.24	0.00E+00	4.63E+00	8.14E+00
Cl-36	1.8103E-06	50,103.24	88,060.24	0.00E+00	9.07E-02	1.59E-01
Cm-243	3.0597E-07	50,103.24	88,060.24	0.00E+00	1.53E-02	2.69E-02
Cm-244	1.4149E-05	50,103.24	88,060.24	0.00E+00	7.09E-01	1.25E+00
Co-60	8.7369E-04	50,103.24	88,060.24	0.00E+00	4.38E+01	7.69E+01
Cs-134	2.5601E-05	50,103.24	88,060.24	0.00E+00	1.28E+00	2.25E+00
Cs-135	2.8639E-05	50,103.24	88,060.24	0.00E+00	1.43E+00	2.52E+00
Cs-137	1.4772E+00	50,103.24	88,060.24	0.00E+00	7.40E+04	1.30E+05
Eu-154	8.6025E-03	50,103.24	88,060.24	0.00E+00	4.31E+02	7.58E+02
Eu-155	6.6062E-04	50,103.24	88,060.24	0.00E+00	3.31E+01	5.82E+01
Fe-55	2.3011E-06	50,103.24	88,060.24	0.00E+00	1.15E-01	2.03E-01
H-3	2.1277E-03	50,103.24	88,060.24	0.00E+00	1.07E+02	1.87E+02
I-129	1.5853E-06	50,103.24	88,060.24	0.00E+00	7.94E-02	1.40E-01
Kr-85	6.2625E-02	50,103.24	88,060.24	0.00E+00	3.14E+03	5.51E+03
Np-237	1.2620E-07	50,103.24	88,060.24	0.00E+00	6.32E-03	1.11E-02
Pa-231	1.2017E-04	50,103.24	88,060.24	0.00E+00	6.02E+00	1.06E+01
Pb-210	1.4247E-08	50,103.24	88,060.24	0.00E+00	7.14E-04	1.25E-03
Pm-147	2.6224E-04	50,103.24	88,060.24	0.00E+00	1.31E+01	2.31E+01
Pu-238	4.2477E-04	50,103.24	88,060.24	0.00E+00	2.13E+01	3.74E+01
Pu-239	2.7519E-05	50,103.24	88,060.24	0.00E+00	1.38E+00	2.42E+00
Pu-240	1.6184E-05	50,103.24	88,060.24	0.00E+00	8.11E-01	1.43E+00
Pu-241	1.4695E-03	50,103.24	88,060.24	0.00E+00	7.36E+01	1.29E+02
Pu-242	4.0831E-08	50,103.24	88,060.24	0.00E+00	2.05E-03	3.60E-03
Ra-226	2.1423E-08	50,103.24	88,060.24	0.00E+00	1.07E-03	1.89E-03
Ra-228	4.6236E-06	50,103.24	88,060.24	0.00E+00	2.32E-01	4.07E-01
Ru-106	4.0208E-11	50,103.24	88,060.24	0.00E+00	2.01E-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	3.9848E-05	50,103.24	88,060.24	0.00E+00	2.00E+00	3.51E+00
Sr-90	1.4928E+00	50,103.24	88,060.24	0.00E+00	7.48E+04	1.31E+05
Tc-99	3.2525E-04	50,103.24	88,060.24	0.00E+00	1.63E+01	2.86E+01
Th-229	6.4582E-05	50,103.24	88,060.24	0.00E+00	3.24E+00	5.69E+00
Th-230	1.1432E-06	50,103.24	88,060.24	0.00E+00	5.73E-02	1.01E-01
Th-232	-9.0328E-08	50,103.24	0.00	4.01E-01	3.96E-01	4.01E-01
Tl-208	1.3964E-02	50,103.24	88,060.24	0.00E+00	7.00E+02	1.23E+03
U-232	3.7822E-02	50,103.24	88,060.24	0.00E+00	1.90E+03	3.33E+03
U-233	-3.3244E-03	50,103.24	0.00	1.35E+03	1.18E+03	1.35E+03
U-234	8.1769E-04	50,103.24	88,060.24	0.00E+00	4.10E+01	7.20E+01
U-235	5.7813E-08	50,103.24	88,060.24	2.76E-04	3.17E-03	5.37E-03
U-236	1.3273E-07	50,103.24	88,060.24	0.00E+00	6.65E-03	1.17E-02
U-238	-3.1121E-10	50,103.24	0.00	1.76E-04	1.61E-04	1.76E-04
Y-90	1.4928E+00	50,103.24	88,060.24	0.00E+00	7.48E+04	1.31E+05
Other Radionuclides					8.36E+04	1.47E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.263E+15
0.0250	1.496E+15
0.0375	1.279E+15
0.0575	1.398E+15
0.0850	8.927E+14
0.1250	5.594E+14
0.2250	8.005E+14
0.3750	3.214E+14
0.5750	4.906E+15
0.8500	8.770E+13
1.2500	3.874E+13
1.7500	6.042E+12
2.2500	1.756E+08
2.7500	4.318E+13
3.5000	1.626E+05
5.0000	5.097E+04
7.0000	3.727E+03
11.0000	2.853E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+03	2.39E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	0.069989331	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT II
SNF ID #: 375
Fuel Units & Descr: 3 - 261 ROD ARRAY
Heavy Metal Mass: BOL=4373.5kg; EOL=4331.7kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1962
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m Ci/MWd From Template	x_a Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_a Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.7360E-05	64,290.45	110,212.20	0.00E+00	6.26E+00	1.07E+01
Am-241	2.4345E-04	64,290.45	110,212.20	0.00E+00	1.57E+01	2.68E+01
Am-242m	1.4821E-06	64,290.45	110,212.20	0.00E+00	9.53E-02	1.63E-01
Am-243	3.1152E-07	64,290.45	110,212.20	0.00E+00	2.00E-02	3.43E-02
C-14	9.2432E-05	64,290.45	110,212.20	0.00E+00	5.94E+00	1.02E+01
Cl-36	1.8103E-06	64,290.45	110,212.20	0.00E+00	1.16E-01	2.00E-01
Cm-243	3.0597E-07	64,290.45	110,212.20	0.00E+00	1.97E-02	3.37E-02
Cm-244	1.4149E-05	64,290.45	110,212.20	0.00E+00	9.10E-01	1.56E+00
Co-60	8.7369E-04	64,290.45	110,212.20	0.00E+00	5.62E+01	9.63E+01
Cs-134	2.5601E-05	64,290.45	110,212.20	0.00E+00	1.65E+00	2.82E+00
Cs-135	2.8639E-05	64,290.45	110,212.20	0.00E+00	1.84E+00	3.16E+00
Cs-137	1.4772E+00	64,290.45	110,212.20	0.00E+00	9.50E+04	1.63E+05
Eu-154	8.6025E-03	64,290.45	110,212.20	0.00E+00	5.53E+02	9.48E+02
Eu-155	6.6062E-04	64,290.45	110,212.20	0.00E+00	4.25E+01	7.28E+01
Fe-55	2.3011E-06	64,290.45	110,212.20	0.00E+00	1.48E-01	2.54E-01
H-3	2.1277E-03	64,290.45	110,212.20	0.00E+00	1.37E+02	2.35E+02
I-129	1.5853E-06	64,290.45	110,212.20	0.00E+00	1.02E-01	1.75E-01
Kr-85	6.2625E-02	64,290.45	110,212.20	0.00E+00	4.03E+03	6.90E+03
Np-237	1.2620E-07	64,290.45	110,212.20	0.00E+00	8.11E-03	1.39E-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	2.63E-03	4.50E-03
Ra-226	2.1423E-08	64,290.45	110,212.20	0.00E+00	1.38E-03	2.36E-03
Ra-228	4.6236E-06	64,290.45	110,212.20	0.00E+00	2.97E-01	5.10E-01
Ru-106	4.0208E-11	64,290.45	110,212.20	0.00E+00	2.58E-06	4.43E-06
Se-79	3.5417E-05	64,290.45	110,212.20	0.00E+00	2.28E+00	3.90E+00
Sn-126	3.9848E-05	64,290.45	110,212.20	0.00E+00	2.56E+00	4.39E+00
Sr-90	1.4928E+00	64,290.45	110,212.20	0.00E+00	9.60E+04	1.65E+05
Tc-99	3.2525E-04	64,290.45	110,212.20	0.00E+00	2.09E+01	3.58E+01
Th-229	6.4582E-05	64,290.45	110,212.20	0.00E+00	4.15E+00	7.12E+00
Th-230	1.1432E-06	64,290.45	110,212.20	0.00E+00	7.35E-02	1.26E-01
Th-232	-9.0328E-08	64,290.45	0.00	4.62E-01	4.56E-01	4.62E-01
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.090E+15
0.0250	1.872E+15
0.0375	1.600E+15
0.0575	1.749E+15
0.0850	1.117E+15
0.1250	7.001E+14
0.2250	1.002E+15
0.3750	4.023E+14
0.5750	6.143E+15
0.8500	1.098E+14
1.2500	4.849E+13
1.7500	7.562E+12
2.2500	2.197E+08
2.7500	5.404E+13
3.5000	2.026E+05
5.0000	6.353E+04
7.0000	4.647E+03
11.0000	3.560E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+03	2.88E+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:	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)[2]

	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:	0.86	0.63
Bounding:	1.13	0.74

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT III
SNF ID #: 376
Fuel Units & Descr: 6 - 445 ROD ARRAY
Heavy Metal Mass: BOL=8776.5kg; EOL=8700.87kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.7360E-05	129,014.55	221,167.80	0.00E+00	1.26E+01	2.15E+01
Am-241	2.4345E-04	129,014.55	221,167.80	0.00E+00	3.14E+01	5.38E+01
Am-242m	1.4821E-06	129,014.55	221,167.80	0.00E+00	1.91E-01	3.28E-01
Am-243	3.1152E-07	129,014.55	221,167.80	0.00E+00	4.02E-02	6.89E-02
C-14	9.2432E-05	129,014.55	221,167.80	0.00E+00	1.19E+01	2.04E+01
Cl-36	1.8103E-06	129,014.55	221,167.80	0.00E+00	2.34E-01	4.00E-01
Cm-243	3.0597E-07	129,014.55	221,167.80	0.00E+00	3.95E-02	6.77E-02
Cm-244	1.4149E-05	129,014.55	221,167.80	0.00E+00	1.83E+00	3.13E+00
Co-60	8.7369E-04	129,014.55	221,167.80	0.00E+00	1.13E+02	1.93E+02
Cs-134	2.5601E-05	129,014.55	221,167.80	0.00E+00	3.30E+00	5.66E+00
Cs-135	2.8639E-05	129,014.55	221,167.80	0.00E+00	3.69E+00	6.33E+00
Cs-137	1.4772E+00	129,014.55	221,167.80	0.00E+00	1.91E+05	3.27E+05
Eu-154	8.6025E-03	129,014.55	221,167.80	0.00E+00	1.11E+03	1.90E+03
Eu-155	6.6062E-04	129,014.55	221,167.80	0.00E+00	8.52E+01	1.46E+02
Fe-55	2.3011E-06	129,014.55	221,167.80	0.00E+00	2.97E-01	5.09E-01
H-3	2.1277E-03	129,014.55	221,167.80	0.00E+00	2.75E+02	4.71E+02
I-129	1.5853E-06	129,014.55	221,167.80	0.00E+00	2.05E-01	3.51E-01
Kr-85	6.2625E-02	129,014.55	221,167.80	0.00E+00	8.08E+03	1.39E+04
Np-237	1.2620E-07	129,014.55	221,167.80	0.00E+00	1.63E-02	2.79E-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-06	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-06	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
Tl-208	1.3964E-02	129,014.55	221,167.80	0.00E+00	1.80E+03	3.09E+03
U-232	3.7822E-02	129,014.55	221,167.80	0.00E+00	4.88E+03	8.37E+03
U-233	-3.3244E-03	129,014.55	0.00	3.12E+03	2.69E+03	3.12E+03
U-234	8.1769E-04	129,014.55	221,167.80	0.00E+00	1.05E+02	1.81E+02
U-235	5.7813E-08	129,014.55	221,167.80	6.38E-04	8.10E-03	1.34E-02
U-236	1.3273E-07	129,014.55	221,167.80	0.00E+00	1.71E-02	2.94E-02
U-238	-3.1121E-10	129,014.55	0.00	4.08E-04	3.68E-04	4.08E-04
Y-90	1.4928E+00	129,014.55	221,167.80	0.00E+00	1.93E+05	3.30E+05
Other Radionuclides					2.15E+05	3.69E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.824E+16
0.0250	3.757E+15
0.0375	3.211E+15
0.0575	3.510E+15
0.0850	2.242E+15
0.1250	1.405E+15
0.2250	2.010E+15
0.3750	8.073E+14
0.5750	1.233E+16
0.8500	2.203E+14
1.2500	9.731E+13
1.7500	1.518E+13
2.2500	4.409E+08
2.7500	1.084E+14
3.5000	4.067E+05
5.0000	1.275E+05
7.0000	9.326E+03
11.0000	7.144E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.52E+03	5.99E+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:	Th and U	Th and U
BOL Enrichment %:	0.072866152	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	Basis for burnup used in estimate:
Nominal:	129,014.55	73,600.31	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	221,167.80	147,200.62	Bounding burnup taken directly from SFD (converted to MWd).

Checks

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

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	9.7360E-05	25,281.52	51,712.20	0.00E+00	2.46E+00	5.03E+00
Am-241	2.4345E-04	25,281.52	51,712.20	0.00E+00	6.15E+00	1.26E+01
Am-242m	1.4821E-06	25,281.52	51,712.20	0.00E+00	3.75E-02	7.66E-02
Am-243	3.1152E-07	25,281.52	51,712.20	0.00E+00	7.88E-03	1.61E-02
C-14	9.2432E-05	25,281.52	51,712.20	0.00E+00	2.34E+00	4.78E+00
Cl-36	1.8103E-06	25,281.52	51,712.20	0.00E+00	4.58E-02	9.36E-02
Cm-243	3.0597E-07	25,281.52	51,712.20	0.00E+00	7.74E-03	1.58E-02
Cm-244	1.4149E-05	25,281.52	51,712.20	0.00E+00	3.58E-01	7.32E-01
Co-60	8.7369E-04	25,281.52	51,712.20	0.00E+00	2.21E+01	4.52E+01
Cs-134	2.5601E-05	25,281.52	51,712.20	0.00E+00	6.47E-01	1.32E+00
Cs-135	2.8639E-05	25,281.52	51,712.20	0.00E+00	7.24E-01	1.48E+00
Cs-137	1.4772E+00	25,281.52	51,712.20	0.00E+00	3.73E+04	7.64E+04
Eu-154	8.6025E-03	25,281.52	51,712.20	0.00E+00	2.17E+02	4.45E+02
Eu-155	6.6062E-04	25,281.52	51,712.20	0.00E+00	1.67E+01	3.42E+01
Fe-55	2.3011E-06	25,281.52	51,712.20	0.00E+00	5.82E-02	1.19E-01
H-3	2.1277E-03	25,281.52	51,712.20	0.00E+00	5.38E+01	1.10E+02
I-129	1.5853E-06	25,281.52	51,712.20	0.00E+00	4.01E-02	8.20E-02
Kr-85	6.2625E-02	25,281.52	51,712.20	0.00E+00	1.58E+03	3.24E+03
Np-237	1.2620E-07	25,281.52	51,712.20	0.00E+00	3.19E-03	6.53E-03
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
Tl-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	4.00E+03	4.08E+03
U-234	8.1769E-04	25,281.52	51,712.20	0.00E+00	2.07E+01	4.23E+01
U-235	5.7813E-08	25,281.52	51,712.20	8.35E-04	2.30E-03	3.82E-03
U-236	1.3273E-07	25,281.52	51,712.20	0.00E+00	3.36E-03	6.86E-03
U-238	-3.1121E-10	25,281.52	0.00	5.34E-04	5.26E-04	5.34E-04
Y-90	1.4928E+00	25,281.52	51,712.20	0.00E+00	3.77E+04	7.72E+04
Other Radionuclides					4.22E+04	8.63E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.275E+15
0.0250	8.785E+14
0.0375	7.510E+14
0.0575	8.207E+14
0.0850	5.243E+14
0.1250	3.285E+14
0.2250	4.701E+14
0.3750	1.888E+14
0.5750	2.882E+15
0.8500	5.150E+13
1.2500	2.275E+13
1.7500	3.548E+12
2.2500	1.032E+08
2.7500	2.536E+13
3.5000	1.169E+05
5.0000	3.634E+04
7.0000	2.605E+03
11.0000	1.940E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.90E+02	1.60E+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:	Th and U	Th and 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)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	0.00
Bounding:	0.20	0.00

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT 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

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.7360E-05	12,870.00	26,325.00	0.00E+00	1.25E+00	2.56E+00
Am-241	2.4345E-04	12,870.00	26,325.00	0.00E+00	3.13E+00	6.41E+00
Am-242m	1.4821E-06	12,870.00	26,325.00	0.00E+00	1.91E-02	3.90E-02
Am-243	3.1152E-07	12,870.00	26,325.00	0.00E+00	4.01E-03	8.20E-03
C-14	9.2432E-05	12,870.00	26,325.00	0.00E+00	1.19E+00	2.43E+00
Cl-36	1.8103E-06	12,870.00	26,325.00	0.00E+00	2.33E-02	4.77E-02
Cm-243	3.0597E-07	12,870.00	26,325.00	0.00E+00	3.94E-03	8.05E-03
Cm-244	1.4149E-05	12,870.00	26,325.00	0.00E+00	1.82E-01	3.72E-01
Co-60	8.7369E-04	12,870.00	26,325.00	0.00E+00	1.12E+01	2.30E+01
Cs-134	2.5601E-05	12,870.00	26,325.00	0.00E+00	3.29E-01	6.74E-01
Cs-135	2.8639E-05	12,870.00	26,325.00	0.00E+00	3.69E-01	7.54E-01
Cs-137	1.4772E+00	12,870.00	26,325.00	0.00E+00	1.90E+04	3.89E+04
Eu-154	8.6025E-03	12,870.00	26,325.00	0.00E+00	1.11E+02	2.26E+02
Eu-155	6.6062E-04	12,870.00	26,325.00	0.00E+00	8.50E+00	1.74E+01
Fe-55	2.3011E-06	12,870.00	26,325.00	0.00E+00	2.96E-02	6.06E-02
H-3	2.1277E-03	12,870.00	26,325.00	0.00E+00	2.74E+01	5.60E+01
I-129	1.5853E-06	12,870.00	26,325.00	0.00E+00	2.04E-02	4.17E-02
Kr-85	6.2625E-02	12,870.00	26,325.00	0.00E+00	8.06E+02	1.65E+03
Np-237	1.2620E-07	12,870.00	26,325.00	0.00E+00	1.62E-03	3.32E-03
Pa-231	1.2017E-04	12,870.00	26,325.00	0.00E+00	1.55E+00	3.16E+00
Pb-210	1.4247E-08	12,870.00	26,325.00	0.00E+00	1.83E-04	3.75E-04
Pm-147	2.6224E-04	12,870.00	26,325.00	0.00E+00	3.38E+00	6.90E+00
Pu-238	4.2477E-04	12,870.00	26,325.00	0.00E+00	5.47E+00	1.12E+01
Pu-239	2.7519E-05	12,870.00	26,325.00	0.00E+00	3.54E-01	7.24E-01
Pu-240	1.6184E-05	12,870.00	26,325.00	0.00E+00	2.08E-01	4.26E-01
Pu-241	1.4695E-03	12,870.00	26,325.00	0.00E+00	1.89E+01	3.87E+01
Pu-242	4.0831E-08	12,870.00	26,325.00	0.00E+00	5.25E-04	1.07E-03
Ra-226	2.1423E-08	12,870.00	26,325.00	0.00E+00	2.76E-04	5.64E-04
Ra-228	4.6236E-06	12,870.00	26,325.00	0.00E+00	5.95E-02	1.22E-01
Ru-106	4.0208E-11	12,870.00	26,325.00	0.00E+00	5.17E-07	1.06E-06
Se-79	3.5417E-05	12,870.00	26,325.00	0.00E+00	4.56E-01	9.32E-01
Sn-126	3.9848E-05	12,870.00	26,325.00	0.00E+00	5.13E-01	1.05E+00
Sr-90	1.4928E+00	12,870.00	26,325.00	0.00E+00	1.92E+04	3.93E+04
Tc-99	3.2525E-04	12,870.00	26,325.00	0.00E+00	4.19E+00	8.56E+00
Th-229	6.4582E-05	12,870.00	26,325.00	0.00E+00	8.31E-01	1.70E+00
Th-230	1.1432E-06	12,870.00	26,325.00	0.00E+00	1.47E-02	3.01E-02
Th-232	-9.0328E-08	12,870.00	0.00	6.18E-01	6.17E-01	6.18E-01
Tl-208	1.3964E-02	12,870.00	26,325.00	0.00E+00	1.80E+02	3.68E+02
U-232	3.7822E-02	12,870.00	26,325.00	0.00E+00	4.87E+02	9.96E+02
U-233	-3.3244E-03	12,870.00	0.00	2.08E+03	2.03E+03	2.08E+03
U-234	8.1769E-04	12,870.00	26,325.00	0.00E+00	1.05E+01	2.15E+01
U-235	5.7813E-08	12,870.00	26,325.00	4.25E-04	1.17E-03	1.95E-03
U-236	1.3273E-07	12,870.00	26,325.00	0.00E+00	1.71E-03	3.49E-03
U-238	-3.1121E-10	12,870.00	0.00	2.72E-04	2.68E-04	2.72E-04
Y-90	1.4928E+00	12,870.00	26,325.00	0.00E+00	1.92E+04	3.93E+04
Other Radionuclides					2.15E+04	4.39E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.176E+15
0.0250	4.472E+14
0.0375	3.823E+14
0.0575	4.178E+14
0.0850	2.669E+14
0.1250	1.672E+14
0.2250	2.393E+14
0.3750	9.610E+13
0.5750	1.467E+15
0.8500	2.622E+13
1.2500	1.158E+13
1.7500	1.806E+12
2.2500	5.251E+07
2.7500	1.291E+13
3.5000	5.952E+04
5.0000	1.850E+04
7.0000	1.326E+03
11.0000	9.875E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.02E+02	7.82E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	Th and U	Th and 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)[2]

	From SFD	Estimated
Nominal:	12,870.00	5,157.57
Bounding:	26,325.00	10,315.14

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:	0.10	0.40
Bounding:	0.20	0.39

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR SCRAP
SNF ID #: 377
Fuel Units & Descr: 7 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=3127kg; EOL=3116.4kg
ROD Storage Site: INEEL

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

Estimated Canister usage: HIC 7.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.7360E-05	10,315.62	166,981.81	0.00E+00	1.00E+00	1.63E+01
Am-241	2.4345E-04	10,315.62	166,981.81	0.00E+00	2.51E+00	4.07E+01
Am-242m	1.4821E-06	10,315.62	166,981.81	0.00E+00	1.53E-02	2.47E-01
Am-243	3.1152E-07	10,315.62	166,981.81	0.00E+00	3.21E-03	5.20E-02
C-14	9.2432E-05	10,315.62	166,981.81	0.00E+00	9.53E-01	1.54E+01
Cl-36	1.8103E-06	10,315.62	166,981.81	0.00E+00	1.87E-02	3.02E-01
Cm-243	3.0597E-07	10,315.62	166,981.81	0.00E+00	3.16E-03	5.11E-02
Cm-244	1.4149E-05	10,315.62	166,981.81	0.00E+00	1.46E-01	2.36E+00
Co-60	8.7369E-04	10,315.62	166,981.81	0.00E+00	9.01E+00	1.46E+02
Cs-134	2.5601E-05	10,315.62	166,981.81	0.00E+00	2.64E-01	4.27E+00
Cs-135	2.8639E-05	10,315.62	166,981.81	0.00E+00	2.95E-01	4.78E+00
Cs-137	1.4772E+00	10,315.62	166,981.81	0.00E+00	1.52E+04	2.47E+05
Eu-154	8.6025E-03	10,315.62	166,981.81	0.00E+00	8.87E+01	1.44E+03
Eu-155	6.6062E-04	10,315.62	166,981.81	0.00E+00	6.81E+00	1.10E+02
Fe-55	2.3011E-06	10,315.62	166,981.81	0.00E+00	2.37E-02	3.84E-01
H-3	2.1277E-03	10,315.62	166,981.81	0.00E+00	2.19E+01	3.55E+02
I-129	1.5853E-06	10,315.62	166,981.81	0.00E+00	1.64E-02	2.65E-01
Kr-85	6.2625E-02	10,315.62	166,981.81	0.00E+00	6.46E+02	1.05E+04
Np-237	1.2620E-07	10,315.62	166,981.81	0.00E+00	1.30E-03	2.11E-02
Pa-231	1.2017E-04	10,315.62	166,981.81	0.00E+00	1.24E+00	2.01E+01
Pb-210	1.4247E-08	10,315.62	166,981.81	0.00E+00	1.47E-04	2.38E-03
Pm-147	2.6224E-04	10,315.62	166,981.81	0.00E+00	2.71E+00	4.38E+01
Pu-238	4.2477E-04	10,315.62	166,981.81	0.00E+00	4.38E+00	7.09E+01
Pu-239	2.7519E-05	10,315.62	166,981.81	0.00E+00	2.84E-01	4.60E+00
Pu-240	1.6184E-05	10,315.62	166,981.81	0.00E+00	1.67E-01	2.70E+00
Pu-241	1.4695E-03	10,315.62	166,981.81	0.00E+00	1.52E+01	2.45E+02
Pu-242	4.0831E-08	10,315.62	166,981.81	0.00E+00	4.21E-04	6.82E-03
Ra-226	2.1423E-08	10,315.62	166,981.81	0.00E+00	2.21E-04	3.58E-03
Ra-228	4.6236E-06	10,315.62	166,981.81	0.00E+00	4.77E-02	7.72E-01
Ru-106	4.0208E-11	10,315.62	166,981.81	0.00E+00	4.15E-07	6.71E-06
Se-79	3.5417E-05	10,315.62	166,981.81	0.00E+00	3.65E-01	5.91E+00
Sn-126	3.9848E-05	10,315.62	166,981.81	0.00E+00	4.11E-01	6.65E+00
Sr-90	1.4928E+00	10,315.62	166,981.81	0.00E+00	1.54E+04	2.49E+05
Tc-99	3.2525E-04	10,315.62	166,981.81	0.00E+00	3.36E+00	5.43E+01
Th-229	6.4582E-05	10,315.62	166,981.81	0.00E+00	6.66E-01	1.08E+01
Th-230	1.1432E-06	10,315.62	166,981.81	0.00E+00	1.18E-02	1.91E-01
Th-232	-9.0328E-08	10,315.62	0.00	3.30E-01	3.29E-01	3.30E-01
Tl-208	1.3964E-02	10,315.62	166,981.81	0.00E+00	1.44E+02	2.33E+03
U-232	3.7822E-02	10,315.62	166,981.81	0.00E+00	3.90E+02	6.32E+03
U-233	-3.3244E-03	10,315.62	0.00	1.11E+03	1.08E+03	1.11E+03
U-234	8.1769E-04	10,315.62	166,981.81	0.00E+00	8.44E+00	1.37E+02
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.377E+16
0.0250	2.837E+15
0.0375	2.424E+15
0.0575	2.650E+15
0.0850	1.693E+15
0.1250	1.061E+15
0.2250	1.518E+15
0.3750	6.095E+14
0.5750	9.307E+15
0.8500	1.863E+14
1.2500	7.347E+13
1.7500	1.146E+13
2.2500	3.329E+08
2.7500	8.188E+13
3.5000	2.989E+05
5.0000	9.384E+04
7.0000	6.884E+03
11.0000	5.294E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.06E+02	4.48E+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:	Th and U	Th and 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)[2]

	From SFD	Estimated
Nominal:		10,315.62
Bounding:	166,981.81	20,631.25

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	2.39	0.12

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT 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

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.7360E-05	1,654.38	13,061.64	0.00E+00	1.61E-01	1.27E+00
Am-241	2.4345E-04	1,654.38	13,061.64	0.00E+00	4.03E-01	3.18E+00
Am-242m	1.4821E-06	1,654.38	13,061.64	0.00E+00	2.45E-03	1.94E-02
Am-243	3.1152E-07	1,654.38	13,061.64	0.00E+00	5.15E-04	4.07E-03
C-14	9.2432E-05	1,654.38	13,061.64	0.00E+00	1.53E-01	1.21E+00
Cl-36	1.8103E-06	1,654.38	13,061.64	0.00E+00	2.99E-03	2.36E-02
Cm-243	3.0597E-07	1,654.38	13,061.64	0.00E+00	5.06E-04	4.00E-03
Cm-244	1.4149E-05	1,654.38	13,061.64	0.00E+00	2.34E-02	1.85E-01
Co-60	8.7369E-04	1,654.38	13,061.64	0.00E+00	1.45E+00	1.14E+01
Cs-134	2.5601E-05	1,654.38	13,061.64	0.00E+00	4.24E-02	3.34E-01
Cs-135	2.8639E-05	1,654.38	13,061.64	0.00E+00	4.74E-02	3.74E-01
Cs-137	1.4772E+00	1,654.38	13,061.64	0.00E+00	2.44E+03	1.93E+04
Eu-154	8.6025E-03	1,654.38	13,061.64	0.00E+00	1.42E+01	1.12E+02
Eu-155	6.6062E-04	1,654.38	13,061.64	0.00E+00	1.09E+00	8.63E+00
Fe-55	2.3011E-06	1,654.38	13,061.64	0.00E+00	3.81E-03	3.01E-02
H-3	2.1277E-03	1,654.38	13,061.64	0.00E+00	3.52E+00	2.78E+01
I-129	1.5853E-06	1,654.38	13,061.64	0.00E+00	2.62E-03	2.07E-02
Kr-85	6.2625E-02	1,654.38	13,061.64	0.00E+00	1.04E+02	8.18E+02
Np-237	1.2620E-07	1,654.38	13,061.64	0.00E+00	2.09E-04	1.65E-03
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
Tl-208	1.3964E-02	1,654.38	13,061.64	0.00E+00	2.31E+01	1.82E+02
U-232	3.7822E-02	1,654.38	13,061.64	0.00E+00	6.26E+01	4.94E+02
U-233	-3.3244E-03	1,654.38	0.00	8.69E+01	8.14E+01	8.69E+01
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.077E+15
0.0250	2.219E+14
0.0375	1.896E+14
0.0575	2.073E+14
0.0850	1.324E+14
0.1250	8.297E+13
0.2250	1.187E+14
0.3750	4.768E+13
0.5750	7.280E+14
0.8500	1.301E+13
1.2500	5.747E+12
1.7500	8.962E+11
2.2500	2.604E+07
2.7500	6.404E+12
3.5000	2.338E+04
5.0000	7.340E+03
7.0000	5.385E+02
11.0000	4.141E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.65E+01	3.81E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	0.71	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,654.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	13,061.64	3,308.75	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	2.39	0.25

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR SEED
SNF ID #: 380
Fuel Units & Descr: 12 - 619 ROD HEX ARRAY
Heavy Metal Mass: BOL=5218.3kg; EOL=5110.5kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
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
Am-242m	1.4821E-06	155,505.33	278,657.20	0.00E+00	2.30E-01	4.13E-01
Am-243	3.1152E-07	155,505.33	278,657.20	0.00E+00	4.84E-02	8.68E-02
C-14	9.2432E-05	155,505.33	278,657.20	0.00E+00	1.44E+01	2.58E+01
Cl-36	1.8103E-06	155,505.33	278,657.20	0.00E+00	2.82E-01	5.04E-01
Cm-243	3.0597E-07	155,505.33	278,657.20	0.00E+00	4.76E-02	8.53E-02
Cm-244	1.4149E-05	155,505.33	278,657.20	0.00E+00	2.20E+00	3.94E+00
Co-60	8.7369E-04	155,505.33	278,657.20	0.00E+00	1.36E+02	2.43E+02
Cs-134	2.5601E-05	155,505.33	278,657.20	0.00E+00	3.98E+00	7.13E+00
Cs-135	2.8639E-05	155,505.33	278,657.20	0.00E+00	4.45E+00	7.98E+00
Cs-137	1.4772E+00	155,505.33	278,657.20	0.00E+00	2.30E+05	4.12E+05
Eu-154	8.6025E-03	155,505.33	278,657.20	0.00E+00	1.34E+03	2.40E+03
Eu-155	6.6062E-04	155,505.33	278,657.20	0.00E+00	1.03E+02	1.84E+02
Fe-55	2.3011E-06	155,505.33	278,657.20	0.00E+00	3.58E-01	6.41E-01
H-3	2.1277E-03	155,505.33	278,657.20	0.00E+00	3.31E+02	5.93E+02
I-129	1.5853E-06	155,505.33	278,657.20	0.00E+00	2.47E-01	4.42E-01
Kr-85	6.2625E-02	155,505.33	278,657.20	0.00E+00	9.74E+03	1.75E+04
Np-237	1.2620E-07	155,505.33	278,657.20	0.00E+00	1.96E-02	3.52E-02
Pa-231	1.2017E-04	155,505.33	278,657.20	0.00E+00	1.87E+01	3.35E+01
Pb-210	1.4247E-08	155,505.33	278,657.20	0.00E+00	2.22E-03	3.97E-03
Pm-147	2.6224E-04	155,505.33	278,657.20	0.00E+00	4.08E+01	7.31E+01
Pu-238	4.2477E-04	155,505.33	278,657.20	0.00E+00	6.61E+01	1.18E+02
Pu-239	2.7519E-05	155,505.33	278,657.20	0.00E+00	4.28E+00	7.67E+00
Pu-240	1.6184E-05	155,505.33	278,657.20	0.00E+00	2.52E+00	4.51E+00
Pu-241	1.4695E-03	155,505.33	278,657.20	0.00E+00	2.29E+02	4.09E+02
Pu-242	4.0831E-08	155,505.33	278,657.20	0.00E+00	6.35E-03	1.14E-02
Ra-226	2.1423E-08	155,505.33	278,657.20	0.00E+00	3.33E-03	5.97E-03
Ra-228	4.6236E-06	155,505.33	278,657.20	0.00E+00	7.19E-01	1.29E+00
Ru-106	4.0208E-11	155,505.33	278,657.20	0.00E+00	6.25E-06	1.12E-05
Se-79	3.5417E-05	155,505.33	278,657.20	0.00E+00	5.51E+00	9.87E+00
Sn-126	3.9848E-05	155,505.33	278,657.20	0.00E+00	6.20E+00	1.11E+01
Sr-90	1.4928E+00	155,505.33	278,657.20	0.00E+00	2.32E+05	4.16E+05
Tc-99	3.2525E-04	155,505.33	278,657.20	0.00E+00	5.06E+01	9.06E+01
Th-229	6.4582E-05	155,505.33	278,657.20	0.00E+00	1.00E+01	1.80E+01
Th-230	1.1432E-06	155,505.33	278,657.20	0.00E+00	1.78E-01	3.19E-01
Th-232	-9.0328E-08	155,505.33	0.00	5.51E-01	5.37E-01	5.51E-01
Tl-208	1.3964E-02	155,505.33	278,657.20	0.00E+00	2.17E+03	3.89E+03
U-232	3.7822E-02	155,505.33	278,657.20	0.00E+00	5.88E+03	1.05E+04
U-233	-3.3244E-03	155,505.33	0.00	1.85E+03	1.34E+03	1.85E+03
U-234	8.1769E-04	155,505.33	278,657.20	0.00E+00	1.27E+02	2.28E+02
U-235	5.7813E-08	155,505.33	278,657.20	3.79E-04	9.37E-03	1.65E-02
U-236	1.3273E-07	155,505.33	278,657.20	0.00E+00	2.06E-02	3.70E-02
U-238	-3.1121E-10	155,505.33	0.00	2.42E-04	1.94E-04	2.42E-04
Y-90	1.4928E+00	155,505.33	278,657.20	0.00E+00	2.32E+05	4.16E+05
Other Radionuclides					2.59E+05	4.65E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.298E+16
0.0250	4.734E+15
0.0375	4.046E+15
0.0575	4.422E+15
0.0850	2.825E+15
0.1250	1.770E+15
0.2250	2.533E+15
0.3750	1.017E+15
0.5750	1.553E+16
0.8500	2.775E+14
1.2500	1.226E+14
1.7500	1.912E+13
2.2500	5.555E+08
2.7500	1.366E+14
3.5000	4.988E+05
5.0000	1.566E+05
7.0000	1.149E+04
11.0000	8.834E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.18E+03	7.48E+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:	Th and U	Th and U
BOL Enrichment %:	0.070817874	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:	155,505.33	104,906.57
Bounding:	278,657.20	209,813.14

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:	1.33	0.67
Bounding:	2.39	0.75

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR C1 BLKT
SNF ID #: 191
Fuel Units & Descr: 36 - 17 FLAT PLATES
Heavy Metal Mass: BOL=583.92kg; EOL=569.66kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1969
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x15" 36.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	13,560.21	27,120.41	0.00E+00	1.46E-05	2.91E-05
Am-241	1.4751E-01	13,560.21	27,120.41	0.00E+00	2.00E+03	4.00E+03
Am-242m	2.6809E-04	13,560.21	27,120.41	0.00E+00	3.64E+00	7.27E+00
Am-243	6.2484E-04	13,560.21	27,120.41	0.00E+00	8.47E+00	1.69E+01
C-14	4.7820E-05	13,560.21	27,120.41	0.00E+00	6.48E-01	1.30E+00
Cl-36	8.0297E-07	13,560.21	27,120.41	0.00E+00	1.09E-02	2.18E-02
Cm-243	1.7426E-04	13,560.21	27,120.41	0.00E+00	2.36E+00	4.73E+00
Cm-244	2.7616E-02	13,560.21	27,120.41	0.00E+00	3.74E+02	7.49E+02
Co-60	3.5610E-04	13,560.21	27,120.41	0.00E+00	4.83E+00	9.66E+00
Cs-134	2.6260E-07	13,560.21	27,120.41	0.00E+00	3.56E-03	7.12E-03
Cs-135	1.4433E-05	13,560.21	27,120.41	0.00E+00	1.96E-01	3.91E-01
Cs-137	9.8870E-01	13,560.21	27,120.41	0.00E+00	1.34E+04	2.68E+04
Eu-154	6.0320E-03	13,560.21	27,120.41	0.00E+00	8.18E+01	1.64E+02
Eu-155	2.1770E-04	13,560.21	27,120.41	0.00E+00	2.95E+00	5.90E+00
Fe-55	7.9296E-07	13,560.21	27,120.41	0.00E+00	1.08E-02	2.15E-02
H-3	8.9486E-03	13,560.21	27,120.41	0.00E+00	1.21E+02	2.43E+02
I-129	9.8288E-07	13,560.21	27,120.41	0.00E+00	1.33E-02	2.67E-02
Kr-85	1.0707E-02	13,560.21	27,120.41	0.00E+00	1.45E+02	2.90E+02
Np-237	1.1927E-05	13,560.21	27,120.41	0.00E+00	1.62E-01	3.23E-01
Pa-231	1.4703E-09	13,560.21	27,120.41	0.00E+00	1.99E-05	3.99E-05
Pb-210	1.6828E-10	13,560.21	27,120.41	0.00E+00	2.28E-06	4.56E-06
Pm-147	6.9606E-06	13,560.21	27,120.41	0.00E+00	9.44E-02	1.89E-01
Pu-238	6.6263E-02	13,560.21	27,120.41	0.00E+00	8.99E+02	1.80E+03
Pu-239	1.1618E-02	13,560.21	27,120.41	0.00E+00	1.58E+02	3.15E+02
Pu-240	1.5142E-02	13,560.21	27,120.41	0.00E+00	2.05E+02	4.11E+02
Pu-241	4.3766E-01	13,560.21	27,120.41	0.00E+00	5.93E+03	1.19E+04
Pu-242	6.4260E-05	13,560.21	27,120.41	0.00E+00	8.71E-01	1.74E+00
Ra-226	3.8501E-10	13,560.21	27,120.41	0.00E+00	5.22E-06	1.04E-05
Ra-228	5.2955E-12	13,560.21	27,120.41	0.00E+00	7.18E-08	1.44E-07
Ru-106	2.0413E-14	13,560.21	27,120.41	0.00E+00	2.77E-10	5.54E-10
Se-79	1.2376E-05	13,560.21	27,120.41	0.00E+00	1.68E-01	3.36E-01
Sn-126	2.5210E-05	13,560.21	27,120.41	0.00E+00	3.42E-01	6.84E-01
Sr-90	6.4163E-01	13,560.21	27,120.41	0.00E+00	8.70E+03	1.74E+04
Tc-99	3.9357E-04	13,560.21	27,120.41	0.00E+00	5.34E+00	1.07E+01
Th-229	1.5644E-10	13,560.21	27,120.41	0.00E+00	2.12E-06	4.24E-06
Th-230	2.7972E-08	13,560.21	27,120.41	0.00E+00	3.79E-04	7.59E-04
Th-232	5.3036E-12	13,560.21	27,120.41	0.00E+00	7.19E-08	1.44E-07
Tl-208	1.5136E-07	13,560.21	27,120.41	0.00E+00	2.05E-03	4.10E-03
U-232	4.1005E-07	13,560.21	27,120.41	0.00E+00	5.56E-03	1.11E-02
U-233	2.5856E-08	13,560.21	27,120.41	0.00E+00	3.51E-04	7.01E-04
U-234	5.2665E-05	13,560.21	27,120.41	0.00E+00	7.14E-01	1.43E+00
U-235	-1.4487E-06	13,560.21	0.00	1.24E-02	0.00E+00	1.24E-02
U-236	7.5888E-06	13,560.21	27,120.41	0.00E+00	1.03E-01	2.06E-01
U-238	-2.6129E-07	13,560.21	0.00	1.94E-01	1.91E-01	1.94E-01
Y-90	6.4180E-01	13,560.21	27,120.41	0.00E+00	8.70E+03	1.74E+04
Other Radionuclides					1.29E+04	2.58E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.032E+15
0.0250	2.068E+14
0.0375	1.949E+14
0.0575	2.438E+14
0.0850	1.139E+14
0.1250	7.580E+13
0.2250	9.727E+13
0.3750	4.201E+13
0.5750	9.893E+14
0.8500	9.660E+12
1.2500	6.147E+12
1.7500	2.703E+11
2.2500	4.442E+07
2.7500	1.566E+08
3.5000	1.117E+07
5.0000	4.774E+06
7.0000	5.500E+05
11.0000	6.315E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.45E+02	4.91E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.98643828	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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 twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.66	2.09
Bounding:	1.33	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR C2 BLKT
SNF ID #: 192
Fuel Units & Descr: 17 - 17 FLAT PLATES
Heavy Metal Mass: BOL=1323.635kg; EOL=1038.999kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	270,675.47	541,350.94	0.00E+00	2.91E-04	5.81E-04
Am-241	1.4751E-01	270,675.47	541,350.94	0.00E+00	3.99E+04	7.99E+04
Am-242m	2.6809E-04	270,675.47	541,350.94	0.00E+00	7.26E+01	1.45E+02
Am-243	6.2484E-04	270,675.47	541,350.94	0.00E+00	1.69E+02	3.38E+02
C-14	4.7820E-05	270,675.47	541,350.94	0.00E+00	1.29E+01	2.59E+01
Cl-36	8.0297E-07	270,675.47	541,350.94	0.00E+00	2.17E-01	4.35E-01
Cm-243	1.7426E-04	270,675.47	541,350.94	0.00E+00	4.72E+01	9.43E+01
Cm-244	2.7616E-02	270,675.47	541,350.94	0.00E+00	7.48E+03	1.50E+04
Co-60	3.5610E-04	270,675.47	541,350.94	0.00E+00	9.64E+01	1.93E+02
Cs-134	2.6260E-07	270,675.47	541,350.94	0.00E+00	7.11E-02	1.42E-01
Cs-135	1.4433E-05	270,675.47	541,350.94	0.00E+00	3.91E+00	7.81E+00
Cs-137	9.8870E-01	270,675.47	541,350.94	0.00E+00	2.68E+05	5.35E+05
Eu-154	6.0320E-03	270,675.47	541,350.94	0.00E+00	1.63E+03	3.27E+03
Eu-155	2.1770E-04	270,675.47	541,350.94	0.00E+00	5.89E+01	1.18E+02
Fe-55	7.9296E-07	270,675.47	541,350.94	0.00E+00	2.15E-01	4.29E-01
H-3	8.9486E-03	270,675.47	541,350.94	0.00E+00	2.42E+03	4.84E+03
I-129	9.8288E-07	270,675.47	541,350.94	0.00E+00	2.66E-01	5.32E-01
Kr-85	1.0707E-02	270,675.47	541,350.94	0.00E+00	2.90E+03	5.80E+03
Np-237	1.1927E-05	270,675.47	541,350.94	0.00E+00	3.23E+00	6.46E+00
Pa-231	1.4703E-09	270,675.47	541,350.94	0.00E+00	3.98E-04	7.96E-04
Pb-210	1.6828E-10	270,675.47	541,350.94	0.00E+00	4.55E-05	9.11E-05
Pm-147	6.9606E-06	270,675.47	541,350.94	0.00E+00	1.88E+00	3.77E+00
Pu-238	6.6263E-02	270,675.47	541,350.94	0.00E+00	1.79E+04	3.59E+04
Pu-239	1.1618E-02	270,675.47	541,350.94	0.00E+00	3.14E+03	6.29E+03
Pu-240	1.5142E-02	270,675.47	541,350.94	0.00E+00	4.10E+03	8.20E+03
Pu-241	4.3766E-01	270,675.47	541,350.94	0.00E+00	1.18E+05	2.37E+05
Pu-242	6.4260E-05	270,675.47	541,350.94	0.00E+00	1.74E+01	3.48E+01
Ra-226	3.8501E-10	270,675.47	541,350.94	0.00E+00	1.04E-04	2.08E-04
Ra-228	5.2955E-12	270,675.47	541,350.94	0.00E+00	1.43E-06	2.87E-06
Ru-106	2.0413E-14	270,675.47	541,350.94	0.00E+00	5.53E-09	1.11E-08
Se-79	1.2376E-05	270,675.47	541,350.94	0.00E+00	3.35E+00	6.70E+00
Sn-126	2.5210E-05	270,675.47	541,350.94	0.00E+00	6.82E+00	1.36E+01
Sr-90	6.4163E-01	270,675.47	541,350.94	0.00E+00	1.74E+05	3.47E+05
Tc-99	3.9357E-04	270,675.47	541,350.94	0.00E+00	1.07E+02	2.13E+02
Th-229	1.5644E-10	270,675.47	541,350.94	0.00E+00	4.23E-05	8.47E-05
Th-230	2.7972E-08	270,675.47	541,350.94	0.00E+00	7.57E-03	1.51E-02
Th-232	5.3036E-12	270,675.47	541,350.94	0.00E+00	1.44E-06	2.87E-06
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.060E+16
0.0250	4.128E+15
0.0375	3.890E+15
0.0575	4.867E+15
0.0850	2.274E+15
0.1250	1.513E+15
0.2250	1.942E+15
0.3750	8.386E+14
0.5750	1.975E+16
0.8500	1.928E+14
1.2500	1.227E+14
1.7500	5.395E+12
2.2500	8.866E+08
2.7500	3.125E+09
3.5000	2.229E+08
5.0000	9.528E+07
7.0000	1.098E+07
11.0000	1.260E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.90E+03	9.79E+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 %:	0.71	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.17

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 65 years

Estimated Canister usage: 18"x15'
1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_a: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	908.00	1,815.99	0.00E+00	4.17E-05	8.34E-05
Am-241	1.1471E-04	908.00	1,815.99	0.00E+00	1.04E-01	2.08E-01
Am-242m	7.4210E-09	908.00	1,815.99	0.00E+00	6.74E-06	1.35E-05
Am-243	9.8236E-10	908.00	1,815.99	0.00E+00	8.92E-07	1.78E-06
C-14	2.2928E-04	908.00	1,815.99	0.00E+00	2.08E-01	4.16E-01
Cl-36	1.2260E-06	908.00	1,815.99	0.00E+00	1.11E-03	2.23E-03
Cm-243	1.2000E-10	908.00	1,815.99	0.00E+00	1.09E-07	2.18E-07
Cm-244	7.3577E-10	908.00	1,815.99	0.00E+00	6.68E-07	1.34E-06
Co-60	1.3732E-03	908.00	1,815.99	0.00E+00	1.25E+00	2.49E+00
Cs-134	1.2709E-10	908.00	1,815.99	0.00E+00	1.15E-07	2.31E-07
Cs-135	3.0316E-05	908.00	1,815.99	0.00E+00	2.75E-02	5.51E-02
Cs-137	7.2579E-01	908.00	1,815.99	0.00E+00	6.59E+02	1.32E+03
Eu-154	5.9750E-05	908.00	1,815.99	0.00E+00	5.43E-02	1.09E-01
Eu-155	1.0577E-05	908.00	1,815.99	0.00E+00	9.60E-03	1.92E-02
Fe-55	4.1631E-07	908.00	1,815.99	0.00E+00	3.78E-04	7.56E-04
H-3	4.6722E-04	908.00	1,815.99	0.00E+00	4.24E-01	8.48E-01
I-129	7.3195E-07	908.00	1,815.99	0.00E+00	6.65E-04	1.33E-03
Kr-85	5.9418E-03	908.00	1,815.99	0.00E+00	5.40E+00	1.08E+01
Np-237	1.1499E-06	908.00	1,815.99	0.00E+00	1.04E-03	2.09E-03
Pa-231	7.0899E-08	908.00	1,815.99	0.00E+00	6.44E-05	1.29E-04
Pb-210	2.2363E-12	908.00	1,815.99	0.00E+00	2.03E-09	4.06E-09
Pm-147	4.2296E-07	908.00	1,815.99	0.00E+00	3.84E-04	7.68E-04
Pu-238	2.3295E-04	908.00	1,815.99	0.00E+00	2.12E-01	4.23E-01
Pu-239	6.6722E-04	908.00	1,815.99	0.00E+00	6.06E-01	1.21E+00
Pu-240	8.6556E-05	908.00	1,815.99	0.00E+00	7.86E-02	1.57E-01
Pu-241	1.6889E-04	908.00	1,815.99	0.00E+00	1.53E-01	3.07E-01
Pu-242	1.9717E-09	908.00	1,815.99	0.00E+00	1.79E-06	3.58E-06
Ra-226	4.5740E-12	908.00	1,815.99	0.00E+00	4.15E-09	8.31E-09
Ra-228	8.3511E-12	908.00	1,815.99	0.00E+00	7.58E-09	1.52E-08
Ru-106	2.0516E-19	908.00	1,815.99	0.00E+00	1.86E-16	3.73E-16
Se-79	1.3220E-05	908.00	1,815.99	0.00E+00	1.20E-02	2.40E-02
Sn-126	1.1489E-05	908.00	1,815.99	0.00E+00	1.04E-02	2.09E-02
Sr-90	6.6872E-01	908.00	1,815.99	0.00E+00	6.07E+02	1.21E+03
Tc-99	4.6639E-04	908.00	1,815.99	0.00E+00	4.23E-01	8.47E-01
Th-229	2.3727E-11	908.00	1,815.99	0.00E+00	2.15E-08	4.31E-08
Th-230	2.7354E-10	908.00	1,815.99	0.00E+00	2.48E-07	4.97E-07
Th-232	8.3594E-12	908.00	1,815.99	0.00E+00	7.59E-09	1.52E-08
Tl-208	1.6228E-08	908.00	1,815.99	0.00E+00	1.47E-05	2.95E-05
U-232	4.3960E-08	908.00	1,815.99	0.00E+00	3.99E-05	7.98E-05
U-233	3.3344E-09	908.00	1,815.99	0.00E+00	3.03E-06	6.06E-06
U-234	4.0749E-07	908.00	1,815.99	0.00E+00	3.70E-04	7.40E-04
U-235	-2.7761E-06	908.00	0.00	6.08E-03	3.56E-03	6.08E-03
U-236	1.6190E-05	908.00	1,815.99	0.00E+00	1.47E-02	2.94E-02
U-238	-2.8547E-09	908.00	0.00	7.12E-05	6.86E-05	7.12E-05
Y-90	6.6889E-01	908.00	1,815.99	0.00E+00	6.07E+02	1.21E+03
Other Radionuclides					8.25E+02	1.65E+03

Gamma Sources

Photon Energy Group (Avg. MeV)	Total Photons/sec (bounding)
0.0150	6.628E+13
0.0250	1.377E+13
0.0375	1.197E+13
0.0575	1.284E+13
0.0850	7.757E+12
0.1250	5.029E+12
0.2250	6.685E+12
0.3750	2.916E+12
0.5750	4.905E+13
0.8500	4.764E+11
1.2500	3.448E+11
1.7500	1.225E+10
2.2500	2.318E+08
2.7500	1.038E+08
3.5000	1.048E+02
5.0000	4.327E+01
7.0000	4.782E+00
11.0000	5.369E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.39E+00	1.48E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9998016	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		908.00
Bounding:		1,815.99

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:	6.44	
Bounding:	12.87	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1969
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	116,375.01	232,750.02	0.00E+00	3.99E-03	7.98E-03
Am-241	1.1458E-04	116,375.01	232,750.02	0.00E+00	1.33E+01	2.67E+01
Am-242m	7.9468E-09	116,375.01	232,750.02	0.00E+00	9.25E-04	1.85E-03
Am-243	9.8386E-10	116,375.01	232,750.02	0.00E+00	1.14E-04	2.29E-04
C-14	2.2978E-04	116,375.01	232,750.02	0.00E+00	2.67E+01	5.35E+01
Cl-36	1.2261E-06	116,375.01	232,750.02	0.00E+00	1.43E-01	2.85E-01
Cm-243	1.7271E-10	116,375.01	232,750.02	0.00E+00	2.01E-05	4.02E-05
Cm-244	1.3058E-09	116,375.01	232,750.02	0.00E+00	1.52E-04	3.04E-04
Co-60	9.8636E-03	116,375.01	232,750.02	0.00E+00	1.15E+03	2.30E+03
Cs-134	1.9617E-08	116,375.01	232,750.02	0.00E+00	2.28E-03	4.57E-03
Cs-135	3.0316E-05	116,375.01	232,750.02	0.00E+00	3.53E+00	7.06E+00
Cs-137	1.0263E+00	116,375.01	232,750.02	0.00E+00	1.19E+05	2.39E+05
Eu-154	2.0017E-04	116,375.01	232,750.02	0.00E+00	2.33E+01	4.66E+01
Eu-155	8.5957E-05	116,375.01	232,750.02	0.00E+00	1.00E+01	2.00E+01
Fe-55	2.2646E-05	116,375.01	232,750.02	0.00E+00	2.64E+00	5.27E+00
H-3	1.0835E-03	116,375.01	232,750.02	0.00E+00	1.26E+02	2.52E+02
I-129	7.3195E-07	116,375.01	232,750.02	0.00E+00	8.52E-02	1.70E-01
Kr-85	1.5661E-02	116,375.01	232,750.02	0.00E+00	1.82E+03	3.64E+03
Np-237	1.1494E-06	116,375.01	232,750.02	0.00E+00	1.34E-01	2.68E-01
Pa-231	5.8070E-08	116,375.01	232,750.02	0.00E+00	6.76E-03	1.35E-02
Pb-210	1.2985E-12	116,375.01	232,750.02	0.00E+00	1.51E-07	3.02E-07
Pm-147	2.2196E-05	116,375.01	232,750.02	0.00E+00	2.58E+00	5.17E+00
Pu-238	2.6223E-04	116,375.01	232,750.02	0.00E+00	3.05E+01	6.10E+01
Pu-239	6.6739E-04	116,375.01	232,750.02	0.00E+00	7.77E+01	1.55E+02
Pu-240	8.6705E-05	116,375.01	232,750.02	0.00E+00	1.01E+01	2.02E+01
Pu-241	3.4759E-04	116,375.01	232,750.02	0.00E+00	4.05E+01	8.09E+01
Pu-242	1.9717E-09	116,375.01	232,750.02	0.00E+00	2.29E-04	4.59E-04
Ra-226	3.0000E-12	116,375.01	232,750.02	0.00E+00	3.49E-07	6.98E-07
Ra-228	8.3328E-12	116,375.01	232,750.02	0.00E+00	9.70E-07	1.94E-06
Ru-106	6.1464E-15	116,375.01	232,750.02	0.00E+00	7.15E-10	1.43E-09
Se-79	1.3221E-05	116,375.01	232,750.02	0.00E+00	1.54E+00	3.08E+00
Sn-126	1.1491E-05	116,375.01	232,750.02	0.00E+00	1.34E+00	2.67E+00
Sr-90	9.5541E-01	116,375.01	232,750.02	0.00E+00	1.11E+05	2.22E+05
Tc-99	4.6656E-04	116,375.01	232,750.02	0.00E+00	5.43E+01	1.09E+02
Th-229	1.9085E-11	116,375.01	232,750.02	0.00E+00	2.22E-06	4.44E-06
Th-230	2.1913E-10	116,375.01	232,750.02	0.00E+00	2.55E-05	5.10E-05
Th-232	8.3478E-12	116,375.01	232,750.02	0.00E+00	9.71E-07	1.94E-06
Tl-208	1.8752E-08	116,375.01	232,750.02	0.00E+00	2.18E-03	4.36E-03
U-232	5.0782E-08	116,375.01	232,750.02	0.00E+00	5.91E-03	1.18E-02
U-233	3.2596E-09	116,375.01	232,750.02	0.00E+00	3.79E-04	7.59E-04
U-234	3.9817E-07	116,375.01	232,750.02	0.00E+00	4.63E-02	9.27E-02
U-235	-2.7761E-06	116,375.01	0.00	6.90E-01	3.67E-01	6.90E-01
U-236	1.6190E-05	116,375.01	232,750.02	0.00E+00	1.88E+00	3.77E+00
U-238	-2.8547E-09	116,375.01	0.00	6.07E-03	7.74E-03	6.07E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.214E+16
0.0250	2.522E+15
0.0375	2.187E+15
0.0575	2.352E+15
0.0850	1.421E+15
0.1250	9.217E+14
0.2250	1.224E+15
0.3750	5.341E+14
0.5750	8.892E+15
0.8500	8.779E+13
1.2500	1.999E+14
1.7500	2.260E+12
2.2500	1.146E+09
2.7500	1.561E+08
3.5000	1.361E+04
5.0000	5.620E+03
7.0000	6.208E+02
11.0000	6.968E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+03	2.72E+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	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00008304	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		116,375.01
Bounding:		232,750.02

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:	7.27	
Bounding:	14.54	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR-C2-S2
SNF ID #: 196
Fuel Units & Descr: 20 - 19 FLAT PLATES
Heavy Metal Mass: BOL=419.354kg; EOL=301.588kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated Canister usage: 18"x15'
20.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_a: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	111,247.37	222,494.74	0.00E+00	3.81E-03	7.63E-03
Am-241	1.1458E-04	111,247.37	222,494.74	0.00E+00	1.27E+01	2.55E+01
Am-242m	7.9468E-09	111,247.37	222,494.74	0.00E+00	8.84E-04	1.77E-03
Am-243	9.8386E-10	111,247.37	222,494.74	0.00E+00	1.09E-04	2.19E-04
C-14	2.2978E-04	111,247.37	222,494.74	0.00E+00	2.56E+01	5.11E+01
Cl-36	1.2261E-06	111,247.37	222,494.74	0.00E+00	1.36E-01	2.73E-01
Cm-243	1.7271E-10	111,247.37	222,494.74	0.00E+00	1.92E-05	3.84E-05
Cm-244	1.3058E-09	111,247.37	222,494.74	0.00E+00	1.45E-04	2.91E-04
Co-60	9.8636E-03	111,247.37	222,494.74	0.00E+00	1.10E+03	2.19E+03
Cs-134	1.9617E-08	111,247.37	222,494.74	0.00E+00	2.18E-03	4.36E-03
Cs-135	3.0316E-05	111,247.37	222,494.74	0.00E+00	3.37E+00	6.75E+00
Cs-137	1.0263E+00	111,247.37	222,494.74	0.00E+00	1.14E+05	2.28E+05
Eu-154	2.0017E-04	111,247.37	222,494.74	0.00E+00	2.23E+01	4.45E+01
Eu-155	8.5957E-05	111,247.37	222,494.74	0.00E+00	9.56E+00	1.91E+01
Fe-55	2.2646E-05	111,247.37	222,494.74	0.00E+00	2.52E+00	5.04E+00
H-3	1.0835E-03	111,247.37	222,494.74	0.00E+00	1.21E+02	2.41E+02
I-129	7.3195E-07	111,247.37	222,494.74	0.00E+00	8.14E-02	1.63E-01
Kr-85	1.5661E-02	111,247.37	222,494.74	0.00E+00	1.74E+03	3.48E+03
Np-237	1.1494E-06	111,247.37	222,494.74	0.00E+00	1.28E-01	2.56E-01
Pa-231	5.8070E-08	111,247.37	222,494.74	0.00E+00	6.46E-03	1.29E-02
Pb-210	1.2985E-12	111,247.37	222,494.74	0.00E+00	1.44E-07	2.89E-07
Pm-147	2.2196E-05	111,247.37	222,494.74	0.00E+00	2.47E+00	4.94E+00
Pu-238	2.6223E-04	111,247.37	222,494.74	0.00E+00	2.92E+01	5.83E+01
Pu-239	6.6739E-04	111,247.37	222,494.74	0.00E+00	7.42E+01	1.48E+02
Pu-240	8.6705E-05	111,247.37	222,494.74	0.00E+00	9.65E+00	1.93E+01
Pu-241	3.4759E-04	111,247.37	222,494.74	0.00E+00	3.87E+01	7.73E+01
Pu-242	1.9717E-09	111,247.37	222,494.74	0.00E+00	2.19E-04	4.39E-04
Ra-226	3.0000E-12	111,247.37	222,494.74	0.00E+00	3.34E-07	6.67E-07
Ra-228	8.3328E-12	111,247.37	222,494.74	0.00E+00	9.27E-07	1.85E-06
Ru-106	6.1464E-15	111,247.37	222,494.74	0.00E+00	6.84E-10	1.37E-09
Se-79	1.3221E-05	111,247.37	222,494.74	0.00E+00	1.47E+00	2.94E+00
Sn-126	1.1491E-05	111,247.37	222,494.74	0.00E+00	1.28E+00	2.56E+00
Sr-90	9.5541E-01	111,247.37	222,494.74	0.00E+00	1.06E+05	2.13E+05
Tc-99	4.6656E-04	111,247.37	222,494.74	0.00E+00	5.19E+01	1.04E+02
Th-229	1.9085E-11	111,247.37	222,494.74	0.00E+00	2.12E-06	4.25E-06
Th-230	2.1913E-10	111,247.37	222,494.74	0.00E+00	2.44E-05	4.88E-05
Th-232	8.3478E-12	111,247.37	222,494.74	0.00E+00	9.29E-07	1.86E-06
Tl-208	1.8752E-08	111,247.37	222,494.74	0.00E+00	2.09E-03	4.17E-03
U-232	5.0782E-08	111,247.37	222,494.74	0.00E+00	5.65E-03	1.13E-02
U-233	3.2596E-09	111,247.37	222,494.74	0.00E+00	3.63E-04	7.25E-04
U-234	3.9817E-07	111,247.37	222,494.74	0.00E+00	4.43E-02	8.86E-02
U-235	-2.7761E-06	111,247.37	0.00	8.43E-01	5.34E-01	8.43E-01
U-236	1.6190E-05	111,247.37	222,494.74	0.00E+00	1.80E+00	3.60E+00
U-238	-2.8547E-09	111,247.37	0.00	9.87E-03	9.55E-03	9.87E-03
Y-90	9.5557E-01	111,247.37	222,494.74	0.00E+00	1.06E+05	2.13E+05
Other Radionuclides					1.36E+05	2.71E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.160E+16
0.0250	2.411E+15
0.0375	2.090E+15
0.0575	2.248E+15
0.0850	1.358E+15
0.1250	8.811E+14
0.2250	1.170E+15
0.3750	5.105E+14
0.5750	8.500E+15
0.8500	8.392E+13
1.2500	1.911E+14
1.7500	2.161E+12
2.2500	1.095E+09
2.7500	1.492E+08
3.5000	1.303E+04
5.0000	5.380E+03
7.0000	5.943E+02
11.0000	6.670E+01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000016	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		111,247.37
Bounding:		222,494.74

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:	5.69	
Bounding:	11.37	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SM-1A
SNF ID #: 201
Fuel Units & Descr: 93 - ASSEMBLY
Heavy Metal Mass: BOL=79.775kg; EOL=65.751kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1971
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	13,248.12	26,496.23	0.00E+00	4.54E-04	9.08E-04
Am-241	1.1458E-04	13,248.12	26,496.23	0.00E+00	1.52E+00	3.04E+00
Am-242m	7.9468E-09	13,248.12	26,496.23	0.00E+00	1.05E-04	2.11E-04
Am-243	9.8386E-10	13,248.12	26,496.23	0.00E+00	1.30E-05	2.61E-05
C-14	2.2978E-04	13,248.12	26,496.23	0.00E+00	3.04E+00	6.09E+00
Cl-36	1.2261E-06	13,248.12	26,496.23	0.00E+00	1.62E-02	3.25E-02
Cm-243	1.7271E-10	13,248.12	26,496.23	0.00E+00	2.29E-06	4.58E-06
Cm-244	1.3058E-09	13,248.12	26,496.23	0.00E+00	1.73E-05	3.46E-05
Co-60	9.8636E-03	13,248.12	26,496.23	0.00E+00	1.31E+02	2.61E+02
Cs-134	1.9617E-08	13,248.12	26,496.23	0.00E+00	2.60E-04	5.20E-04
Cs-135	3.0316E-05	13,248.12	26,496.23	0.00E+00	4.02E-01	8.03E-01
Cs-137	1.0263E+00	13,248.12	26,496.23	0.00E+00	1.36E+04	2.72E+04
Eu-154	2.0017E-04	13,248.12	26,496.23	0.00E+00	2.65E+00	5.30E+00
Eu-155	8.5957E-05	13,248.12	26,496.23	0.00E+00	1.14E+00	2.28E+00
Fe-55	2.2646E-05	13,248.12	26,496.23	0.00E+00	3.00E-01	6.00E-01
H-3	1.0635E-03	13,248.12	26,496.23	0.00E+00	1.44E+01	2.87E+01
I-129	7.3195E-07	13,248.12	26,496.23	0.00E+00	9.70E-03	1.94E-02
Kr-85	1.5661E-02	13,248.12	26,496.23	0.00E+00	2.07E+02	4.15E+02
Np-237	1.1494E-06	13,248.12	26,496.23	0.00E+00	1.52E-02	3.05E-02
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
Tl-208	1.8752E-08	13,248.12	26,496.23	0.00E+00	2.48E-04	4.97E-04
U-232	5.0782E-08	13,248.12	26,496.23	0.00E+00	6.73E-04	1.35E-03
U-233	3.2596E-09	13,248.12	26,496.23	0.00E+00	4.32E-05	8.64E-05
U-234	3.9817E-07	13,248.12	26,496.23	0.00E+00	5.27E-03	1.05E-02
U-235	-2.7761E-06	13,248.12	0.00	1.60E-01	1.24E-01	1.60E-01
U-236	1.6190E-05	13,248.12	26,496.23	0.00E+00	2.14E-01	4.29E-01
U-238	-2.8547E-09	13,248.12	0.00	1.87E-03	1.84E-03	1.87E-03
Y-90	9.5557E-01	13,248.12	26,496.23	0.00E+00	1.27E+04	2.53E+04
Other Radionuclides					1.62E+04	3.23E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.382E+15
0.0250	2.871E+14
0.0375	2.489E+14
0.0575	2.678E+14
0.0850	1.617E+14
0.1250	1.049E+14
0.2250	1.394E+14
0.3750	6.080E+13
0.5750	1.012E+15
0.8500	9.994E+12
1.2500	2.276E+13
1.7500	2.573E+11
2.2500	1.304E+08
2.7500	1.777E+07
3.5000	1.558E+03
5.0000	6.431E+02
7.0000	7.104E+01
11.0000	7.974E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+02	3.09E+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 %:	93.01311673	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	408.77	13,248.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		26,496.23	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

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

[1]Fuel decay start date: 1958
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.2442E-08	28,414.84	28,414.84	0.00E+00	3.54E-04	3.54E-04
Am-241	4.0120E-03	28,414.84	28,414.84	0.00E+00	1.14E+02	1.14E+02
Am-242m	1.0749E-06	28,414.84	28,414.84	0.00E+00	3.05E-02	3.05E-02
Am-243	1.4692E-07	28,414.84	28,414.84	0.00E+00	4.17E-03	4.17E-03
C-14	1.2777E-04	28,414.84	28,414.84	0.00E+00	3.63E+00	3.63E+00
Cl-36	2.8120E-06	28,414.84	28,414.84	0.00E+00	7.99E-02	7.99E-02
Cm-243	4.1759E-08	28,414.84	28,414.84	0.00E+00	1.19E-03	1.19E-03
Cm-244	1.7098E-07	28,414.84	28,414.84	0.00E+00	4.86E-03	4.86E-03
Co-60	4.8241E-04	28,414.84	28,414.84	0.00E+00	1.37E+01	1.37E+01
Cs-134	1.5970E-10	28,414.84	28,414.84	0.00E+00	4.54E-06	4.54E-06
Cs-135	3.2195E-05	28,414.84	28,414.84	0.00E+00	9.15E-01	9.15E-01
Cs-137	6.8977E-01	28,414.84	28,414.84	0.00E+00	1.96E+04	1.96E+04
Eu-154	1.2238E-04	28,414.84	28,414.84	0.00E+00	3.48E+00	3.48E+00
Eu-155	6.7158E-06	28,414.84	28,414.84	0.00E+00	1.91E-01	1.91E-01
Fe-55	8.8165E-08	28,414.84	28,414.84	0.00E+00	2.51E-03	2.51E-03
H-3	3.8376E-04	28,414.84	28,414.84	0.00E+00	1.09E+01	1.09E+01
I-129	7.3684E-07	28,414.84	28,414.84	0.00E+00	2.09E-02	2.09E-02
Kr-85	5.2316E-03	28,414.84	28,414.84	0.00E+00	1.49E+02	1.49E+02
Np-237	1.3232E-06	28,414.84	28,414.84	0.00E+00	3.76E-02	3.76E-02
Pa-231	1.8722E-08	28,414.84	28,414.84	0.00E+00	5.32E-04	5.32E-04
Pb-210	1.2620E-12	28,414.84	28,414.84	0.00E+00	3.59E-08	3.59E-08
Pm-147	2.7714E-07	28,414.84	28,414.84	0.00E+00	7.87E-03	7.87E-03
Pu-238	6.4707E-04	28,414.84	28,414.84	0.00E+00	1.84E+01	1.84E+01
Pu-239	5.5203E-03	28,414.84	28,414.84	0.00E+00	1.57E+02	1.57E+02
Pu-240	2.1143E-03	28,414.84	28,414.84	0.00E+00	6.01E+01	6.01E+01
Pu-241	5.6872E-03	28,414.84	28,414.84	0.00E+00	1.62E+02	1.62E+02
Pu-242	2.3128E-07	28,414.84	28,414.84	0.00E+00	6.57E-03	6.57E-03
Ra-226	2.6466E-12	28,414.84	28,414.84	0.00E+00	7.52E-08	7.52E-08
Ra-228	2.5278E-10	28,414.84	28,414.84	0.00E+00	7.18E-06	7.18E-06
Ru-106	1.1377E-19	28,414.84	28,414.84	0.00E+00	3.23E-15	3.23E-15
Se-79	1.3009E-05	28,414.84	28,414.84	0.00E+00	3.70E-01	3.70E-01
Sn-126	1.2162E-05	28,414.84	28,414.84	0.00E+00	3.46E-01	3.46E-01
Sr-90	6.2511E-01	28,414.84	28,414.84	0.00E+00	1.78E+04	1.78E+04
Tc-99	4.4241E-04	28,414.84	28,414.84	0.00E+00	1.26E+01	1.26E+01
Th-229	9.4105E-10	28,414.84	28,414.84	0.00E+00	2.67E-05	2.67E-05
Th-230	1.7098E-10	28,414.84	28,414.84	0.00E+00	4.86E-06	4.86E-06
Th-232	2.5278E-10	28,414.84	28,414.84	0.00E+00	7.18E-06	7.18E-06
Tl-208	1.0305E-08	28,414.84	28,414.84	0.00E+00	2.93E-04	2.93E-04
U-232	2.7669E-08	28,414.84	28,414.84	0.00E+00	7.86E-04	7.86E-04
U-233	1.2239E-07	28,414.84	28,414.84	0.00E+00	3.48E-03	3.48E-03
U-234	3.1278E-07	28,414.84	28,414.84	0.00E+00	8.89E-03	8.89E-03
U-235	-2.6179E-06	28,414.84	0.00	2.57E-02	0.00E+00	2.57E-02
U-236	1.2696E-05	28,414.84	28,414.84	0.00E+00	3.61E-01	3.61E-01
U-238	-3.6331E-08	28,414.84	0.00	1.60E-02	1.50E-02	1.60E-02
Y-90	6.2541E-01	28,414.84	28,414.84	0.00E+00	1.78E+04	1.78E+04
Other Radionuclides					2.01E+04	2.01E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.715E+14
0.0250	2.017E+14
0.0375	1.759E+14
0.0575	1.896E+14
0.0850	1.136E+14
0.1250	7.365E+13
0.2250	9.784E+13
0.3750	4.267E+13
0.5750	7.289E+14
0.8500	7.012E+12
1.2500	3.401E+12
1.7500	1.804E+11
2.2500	2.504E+07
2.7500	1.034E+07
3.5000	3.460E+04
5.0000	1.458E+04
7.0000	1.643E+03
11.0000	1.867E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.26E+02	2.26E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		10 to 20.1

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28,414.84
Bounding:		28,414.84

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:	14.00	
Bounding:	14.00	

Estimated EOL HM/Given EOL HM: 1.78

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1981
Estimates as of: 2030
Template: (Worst Case)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	220.48	440.96	0.00E+00	5.09E-04	1.02E-03
Am-241	8.4448E+00	220.48	440.96	0.00E+00	1.86E+03	3.72E+03
Am-242m	1.6848E-02	220.48	440.96	0.00E+00	3.71E+00	7.43E+00
Am-243	1.6320E-02	220.48	440.96	0.00E+00	3.60E+00	7.20E+00
C-14	1.2090E-01	220.48	440.96	0.00E+00	2.67E+01	5.33E+01
Cl-36	2.2849E-03	220.48	440.96	0.00E+00	5.04E-01	1.01E+00
Cm-243	8.6624E-04	220.48	440.96	0.00E+00	1.91E-01	3.82E-01
Cm-244	1.6848E-01	220.48	440.96	0.00E+00	3.71E+01	7.43E+01
Co-60	2.8086E+01	220.48	440.96	0.00E+00	6.19E+03	1.24E+04
Cs-134	3.4148E-04	220.48	440.96	0.00E+00	7.53E-02	1.51E-01
Cs-135	4.3976E-04	220.48	440.96	0.00E+00	9.70E-02	1.94E-01
Cs-137	2.1049E+01	220.48	440.96	0.00E+00	4.64E+03	9.28E+03
Eu-154	1.2500E+00	220.48	440.96	0.00E+00	2.76E+02	5.51E+02
Eu-155	6.8986E-02	220.48	440.96	0.00E+00	1.52E+01	3.04E+01
Fe-55	2.9308E-01	220.48	440.96	0.00E+00	6.46E+01	1.29E+02
H-3	2.4311E-01	220.48	440.96	0.00E+00	5.36E+01	1.07E+02
I-129	1.0618E-05	220.48	440.96	0.00E+00	2.34E-03	4.68E-03
Kr-85	5.9882E-01	220.48	440.96	0.00E+00	1.32E+02	2.64E+02
Np-237	1.5668E-04	220.48	440.96	0.00E+00	3.45E-02	6.91E-02
Pa-231	2.8656E-06	220.48	440.96	0.00E+00	6.32E-04	1.26E-03
Pb-210	2.3918E-08	220.48	440.96	0.00E+00	5.27E-06	1.05E-05
Pm-147	1.6900E-02	220.48	440.96	0.00E+00	3.73E+00	7.45E+00
Pu-238	-8.6120E-01	220.48	0.00	5.40E+02	3.50E+02	5.40E+02
Pu-239	-4.8440E-02	220.48	0.00	6.53E+01	5.46E+01	6.53E+01
Pu-240	-3.0095E-01	220.48	0.00	8.34E+01	1.70E+01	8.34E+01
Pu-241	-1.0411E+02	220.48	0.00	2.15E+04	0.00E+00	2.15E+04
Pu-242	-1.1381E-04	220.48	0.00	3.61E-01	3.36E-01	3.61E-01
Ra-226	6.4400E-08	220.48	440.96	0.00E+00	1.42E-05	2.84E-05
Ra-228	5.9952E-07	220.48	440.96	0.00E+00	1.32E-04	2.64E-04
Ru-106	8.5526E-07	220.48	440.96	0.00E+00	1.89E-04	3.77E-04
Se-79	1.9181E-04	220.48	440.96	0.00E+00	4.23E-02	8.46E-02
Sn-126	1.6671E-04	220.48	440.96	0.00E+00	3.68E-02	7.35E-02
Sr-90	1.9799E+01	220.48	440.96	0.00E+00	4.37E+03	8.73E+03
Tc-99	6.7678E-03	220.48	440.96	0.00E+00	1.49E+00	2.98E+00
Th-229	1.7488E-06	220.48	440.96	0.00E+00	3.86E-04	7.71E-04
Th-230	5.8704E-06	220.48	440.96	0.00E+00	1.29E-03	2.59E-03
Th-232	6.0208E-07	220.48	440.96	0.00E+00	1.33E-04	2.65E-04
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.437E+14
0.0250	1.075E+14
0.0375	9.393E+13
0.0575	1.478E+14
0.0850	5.769E+13
0.1250	4.521E+13
0.2250	4.998E+13
0.3750	2.138E+13
0.5750	3.476E+14
0.8500	1.328E+13
1.2500	9.285E+14
1.7500	4.107E+11
2.2500	4.869E+09
2.7500	1.372E+09
3.5000	1.160E+06
5.0000	4.925E+05
7.0000	5.636E+04
11.0000	6.447E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.31E+02	4.58E+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/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:	78.235	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:	42.00	220.48
Bounding:		440.96

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:	1.57	5.25
Bounding:	3.14	

Estimated EOL HM/Given EOL HM: 35.20

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SODIUM LOOP SAFETY FAC.
SNF ID #: 367
Fuel Units & Descr: 12 - ROD
Heavy Metal Mass: BOL=6.256kg; EOL=7.332kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated Canister usage: 18"x10" 0.25

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	62.56	125.11	0.00E+00	1.44E-04	2.89E-04
Am-241	8.4448E+00	62.56	125.11	0.00E+00	5.28E+02	1.06E+03
Am-242m	1.6848E-02	62.56	125.11	0.00E+00	1.05E+00	2.11E+00
Am-243	1.6320E-02	62.56	125.11	0.00E+00	1.02E+00	2.04E+00
C-14	1.2090E-01	62.56	125.11	0.00E+00	7.56E+00	1.51E+01
Cl-36	2.2849E-03	62.56	125.11	0.00E+00	1.43E-01	2.86E-01
Cm-243	8.6624E-04	62.56	125.11	0.00E+00	5.42E-02	1.08E-01
Cm-244	1.6848E-01	62.56	125.11	0.00E+00	1.05E+01	2.11E+01
Co-60	2.8086E+01	62.56	125.11	0.00E+00	1.76E+03	3.51E+03
Cs-134	3.4148E-04	62.56	125.11	0.00E+00	2.14E-02	4.27E-02
Cs-135	4.3976E-04	62.56	125.11	0.00E+00	2.75E-02	5.50E-02
Cs-137	2.1049E+01	62.56	125.11	0.00E+00	1.32E+03	2.63E+03
Eu-154	1.2500E+00	62.56	125.11	0.00E+00	7.82E+01	1.56E+02
Eu-155	6.8986E-02	62.56	125.11	0.00E+00	4.32E+00	8.63E+00
Fe-55	2.9308E-01	62.56	125.11	0.00E+00	1.83E+01	3.67E+01
H-3	2.4311E-01	62.56	125.11	0.00E+00	1.52E+01	3.04E+01
I-129	1.0618E-05	62.56	125.11	0.00E+00	6.64E-04	1.33E-03
Kr-85	5.9882E-01	62.56	125.11	0.00E+00	3.75E+01	7.49E+01
Np-237	1.5668E-04	62.56	125.11	0.00E+00	9.80E-03	1.96E-02
Pa-231	2.8656E-06	62.56	125.11	0.00E+00	1.79E-04	3.59E-04
Pb-210	2.3918E-06	62.56	125.11	0.00E+00	1.50E-06	2.99E-06
Pm-147	1.6900E-02	62.56	125.11	0.00E+00	1.06E+00	2.11E+00
Pu-238	-8.6120E-01	62.56	0.00	8.04E+02	7.50E+02	8.04E+02
Pu-239	-4.8440E-02	62.56	0.00	9.73E+01	9.42E+01	9.73E+01
Pu-240	-3.0095E-01	62.56	0.00	1.24E+02	1.05E+02	1.24E+02
Pu-241	-1.0411E+02	62.56	0.00	3.20E+04	2.55E+04	3.20E+04
Pu-242	-1.1381E-04	62.56	0.00	5.38E-01	5.31E-01	5.38E-01
Ra-226	6.4400E-08	62.56	125.11	0.00E+00	4.03E-06	8.06E-06
Ra-228	5.9952E-07	62.56	125.11	0.00E+00	3.75E-05	7.50E-05
Ru-106	8.5526E-07	62.56	125.11	0.00E+00	5.35E-05	1.07E-04
Se-79	1.9181E-04	62.56	125.11	0.00E+00	1.20E-02	2.40E-02
Sn-126	1.6671E-04	62.56	125.11	0.00E+00	1.04E-02	2.09E-02
Sr-90	1.9799E+01	62.56	125.11	0.00E+00	1.24E+03	2.48E+03
Tc-99	6.7678E-03	62.56	125.11	0.00E+00	4.23E-01	8.47E-01
Th-229	1.7488E-06	62.56	125.11	0.00E+00	1.09E-04	2.19E-04
Th-230	5.8704E-06	62.56	125.11	0.00E+00	3.67E-04	7.34E-04
Th-232	6.0208E-07	62.56	125.11	0.00E+00	3.77E-05	7.53E-05
Tl-208	8.7573E-05	62.56	125.11	0.00E+00	5.48E-03	1.10E-02
U-232	2.3706E-04	62.56	125.11	0.00E+00	1.48E-02	2.97E-02
U-233	3.6128E-04	62.56	125.11	0.00E+00	2.26E-02	4.52E-02
U-234	1.2788E-02	62.56	125.11	0.00E+00	8.00E-01	1.60E+00
U-235	5.7486E-04	62.56	125.11	2.69E-03	3.87E-02	7.46E-02
U-236	2.3485E-04	62.56	125.11	0.00E+00	1.47E-02	2.94E-02
U-238	1.1581E-04	62.56	125.11	3.35E-04	7.58E-03	1.48E-02
Y-90	1.9804E+01	62.56	125.11	0.00E+00	1.24E+03	2.48E+03
Other Radionuclides					3.86E+03	7.72E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.595E+14
0.0250	3.051E+13
0.0375	2.666E+13
0.0575	4.194E+13
0.0850	1.637E+13
0.1250	1.283E+13
0.2250	1.418E+13
0.3750	6.065E+12
0.5750	9.862E+13
0.8500	3.769E+12
1.2500	2.634E+14
1.7500	1.165E+11
2.2500	1.382E+09
2.7500	3.895E+08
3.5000	4.249E+05
5.0000	1.801E+05
7.0000	2.056E+04
11.0000	2.350E+03

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	87.054	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:	62.56	-1,022.96
Bounding:		125.11

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:	0.30	-16.35
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 5.94

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SPEC (ORIME)
SNF ID #: 208
Fuel Units & Descr: 1 - FLAT PLATES IN CAN
Heavy Metal Mass: BOL=2.39kg; EOL=2.39kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1958
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	5.3460E-09	45.43	90.86	0.00E+00	2.43E-07	4.86E-07
Am-241	2.9433E-02	45.43	90.86	0.00E+00	1.34E+00	2.67E+00
Am-242m	7.2600E-06	45.43	90.86	0.00E+00	3.30E-04	6.60E-04
Am-243	6.3740E-06	45.43	90.86	0.00E+00	2.90E-04	5.79E-04
C-14	2.9460E-08	45.43	90.86	0.00E+00	1.34E-06	2.68E-06
Cl-36	5.9507E-35	45.43	90.86	0.00E+00	2.70E-33	5.41E-33
Cm-243	7.3933E-07	45.43	90.86	0.00E+00	3.36E-05	6.72E-05
Cm-244	1.9660E-05	45.43	90.86	0.00E+00	8.93E-04	1.79E-03
Co-60	4.3927E-08	45.43	90.86	0.00E+00	2.00E-06	3.99E-06
Cs-134	5.7507E-10	45.43	90.86	0.00E+00	2.61E-08	5.23E-08
Cs-135	4.8607E-06	45.43	90.86	0.00E+00	2.21E-04	4.42E-04
Cs-137	7.1533E-01	45.43	90.86	0.00E+00	3.25E+01	6.50E+01
Eu-154	5.5553E-04	45.43	90.86	0.00E+00	2.52E-02	5.05E-02
Eu-155	7.5800E-06	45.43	90.86	0.00E+00	3.44E-04	6.89E-04
Fe-55	8.7333E-09	45.43	90.86	0.00E+00	3.97E-07	7.94E-07
H-3	3.7313E-04	45.43	90.86	0.00E+00	1.70E-02	3.39E-02
I-129	7.1600E-07	45.43	90.86	0.00E+00	3.25E-05	6.51E-05
Kr-85	5.5793E-03	45.43	90.86	0.00E+00	2.53E-01	5.07E-01
Np-237	4.2207E-06	45.43	90.86	0.00E+00	1.92E-04	3.84E-04
Pa-231	8.3333E-09	45.43	90.86	0.00E+00	3.79E-07	7.57E-07
Pb-210	2.4613E-12	45.43	90.86	0.00E+00	1.12E-10	2.24E-10
Pm-147	3.1780E-07	45.43	90.86	0.00E+00	1.44E-05	2.89E-05
Pu-238	3.8753E-03	45.43	90.86	0.00E+00	1.76E-01	3.52E-01
Pu-239	1.0300E-02	45.43	90.86	0.00E+00	4.68E-01	9.36E-01
Pu-240	5.3920E-03	45.43	90.86	0.00E+00	2.45E-01	4.90E-01
Pu-241	4.3067E-02	45.43	90.86	0.00E+00	1.96E+00	3.91E+00
Pu-242	3.0713E-06	45.43	90.86	0.00E+00	1.40E-04	2.79E-04
Ra-226	5.8127E-12	45.43	90.86	0.00E+00	2.64E-10	5.28E-10
Ra-228	4.5447E-14	45.43	90.86	0.00E+00	2.06E-12	4.13E-12
Ru-106	3.0660E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.162E+12
0.0250	6.537E+11
0.0375	5.725E+11
0.0575	6.440E+11
0.0850	3.667E+11
0.1250	2.383E+11
0.2250	3.158E+11
0.3750	1.376E+11
0.5750	2.415E+12
0.8500	2.317E+10
1.2500	8.345E+09
1.7500	6.040E+08
2.2500	6.384E+04
2.7500	1.630E+04
3.5000	3.379E+02
5.0000	1.413E+02
7.0000	1.584E+01
11.0000	1.793E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.22E-01	8.44E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	ORGANIC	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	5.146443515	10 to 20

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on cladding and BOL heavy metal, heavy water is a conservative assumption for moderator, and it is fairly close on enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		45.43
Bounding:		90.86

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:	0.43	
Bounding:	0.87	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1959
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	4.5940E-08	1.89	3.78	0.00E+00	8.68E-08	1.74E-07
Am-241	1.1471E-04	1.89	3.78	0.00E+00	2.17E-04	4.33E-04
Am-242m	7.4210E-09	1.89	3.78	0.00E+00	1.40E-08	2.80E-08
Am-243	9.8236E-10	1.89	3.78	0.00E+00	1.86E-09	3.71E-09
C-14	2.2928E-04	1.89	3.78	0.00E+00	4.33E-04	8.66E-04
Cl-36	1.2260E-06	1.89	3.78	0.00E+00	2.32E-06	4.63E-06
Cm-243	1.2000E-10	1.89	3.78	0.00E+00	2.27E-10	4.53E-10
Cm-244	7.3577E-10	1.89	3.78	0.00E+00	1.39E-09	2.78E-09
Co-60	1.3732E-03	1.89	3.78	0.00E+00	2.59E-03	5.19E-03
Cs-134	1.2709E-10	1.89	3.78	0.00E+00	2.40E-10	4.80E-10
Cs-135	3.0316E-05	1.89	3.78	0.00E+00	5.73E-05	1.15E-04
Cs-137	7.2579E-01	1.89	3.78	0.00E+00	1.37E+00	2.74E+00
Eu-154	5.9750E-05	1.89	3.78	0.00E+00	1.13E-04	2.26E-04
Eu-155	1.0577E-05	1.89	3.78	0.00E+00	2.00E-05	4.00E-05
Fe-55	4.1631E-07	1.89	3.78	0.00E+00	7.87E-07	1.57E-06
H-3	4.6722E-04	1.89	3.78	0.00E+00	8.83E-04	1.77E-03
I-129	7.3195E-07	1.89	3.78	0.00E+00	1.38E-06	2.77E-06
Kr-85	5.9418E-03	1.89	3.78	0.00E+00	1.12E-02	2.25E-02
Np-237	1.1499E-06	1.89	3.78	0.00E+00	2.17E-06	4.35E-06
Pa-231	7.0899E-08	1.89	3.78	0.00E+00	1.34E-07	2.68E-07
Pb-210	2.2363E-12	1.89	3.78	0.00E+00	4.22E-12	8.45E-12
Pm-147	4.2296E-07	1.89	3.78	0.00E+00	7.99E-07	1.60E-06
Pu-238	2.3295E-04	1.89	3.78	0.00E+00	4.40E-04	8.80E-04
Pu-239	6.6722E-04	1.89	3.78	0.00E+00	1.26E-03	2.52E-03
Pu-240	8.6556E-05	1.89	3.78	0.00E+00	1.64E-04	3.27E-04
Pu-241	1.6889E-04	1.89	3.78	0.00E+00	3.19E-04	6.38E-04
Pu-242	1.9717E-09	1.89	3.78	0.00E+00	3.73E-09	7.45E-09
Ra-226	4.5740E-12	1.89	3.78	0.00E+00	8.64E-12	1.73E-11
Ra-228	8.3511E-12	1.89	3.78	0.00E+00	1.58E-11	3.16E-11
Ru-106	2.0516E-19	1.89	3.78	0.00E+00	3.88E-19	7.75E-19
Se-79	1.3220E-05	1.89	3.78	0.00E+00	2.50E-05	5.00E-05
Sn-126	1.1489E-05	1.89	3.78	0.00E+00	2.17E-05	4.34E-05
Sr-90	6.6872E-01	1.89	3.78	0.00E+00	1.26E+00	2.53E+00
Tc-99	4.6639E-04	1.89	3.78	0.00E+00	8.81E-04	1.76E-03
Th-229	2.3727E-11	1.89	3.78	0.00E+00	4.48E-11	8.97E-11
Th-230	2.7354E-10	1.89	3.78	0.00E+00	5.17E-10	1.03E-09
Th-232	8.3594E-12	1.89	3.78	0.00E+00	1.58E-11	3.16E-11
Tl-208	1.6228E-08	1.89	3.78	0.00E+00	3.07E-08	6.13E-08
U-232	4.3960E-08	1.89	3.78	0.00E+00	8.31E-08	1.66E-07
U-233	3.3344E-09	1.89	3.78	0.00E+00	6.30E-09	1.26E-08
U-234	4.0749E-07	1.89	3.78	0.00E+00	7.70E-07	1.54E-06
U-235	-2.7761E-06	1.89	0.00	1.19E-03	1.18E-03	1.19E-03
U-236	1.6190E-05	1.89	3.78	0.00E+00	3.06E-05	6.12E-05
U-238	-2.8547E-09	1.89	0.00	1.38E-05	1.38E-05	1.38E-05
Y-90	6.6889E-01	1.89	3.78	0.00E+00	1.26E+00	2.53E+00
Other Radionuclides					1.72E+00	3.43E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.379E+11
0.0250	2.866E+10
0.0375	2.490E+10
0.0575	2.672E+10
0.0850	1.614E+10
0.1250	1.047E+10
0.2250	1.393E+10
0.3750	6.067E+09
0.5750	1.021E+11
0.8500	9.912E+08
1.2500	7.174E+08
1.7500	2.560E+07
2.2500	4.822E+03
2.7500	2.160E+03
3.5000	3.302E-01
5.0000	1.372E-01
7.0000	1.527E-02
11.0000	1.721E-03

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1.89	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3.78	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TMI-2
SNF ID #: 228
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.032kg; EOL=0.032kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1979
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x10" 0.06

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	0.19	0.38	0.00E+00	2.04E-10	4.08E-10
Am-241	1.4751E-01	0.19	0.38	0.00E+00	2.81E-02	5.61E-02
Am-242m	2.6809E-04	0.19	0.38	0.00E+00	5.10E-05	1.02E-04
Am-243	6.2484E-04	0.19	0.38	0.00E+00	1.19E-04	2.38E-04
C-14	4.7820E-05	0.19	0.38	0.00E+00	9.09E-06	1.82E-05
Cl-36	8.0297E-07	0.19	0.38	0.00E+00	1.53E-07	3.05E-07
Cm-243	1.7426E-04	0.19	0.38	0.00E+00	3.31E-05	6.63E-05
Cm-244	2.7616E-02	0.19	0.38	0.00E+00	5.25E-03	1.05E-02
Co-60	3.5610E-04	0.19	0.38	0.00E+00	6.77E-05	1.35E-04
Cs-134	2.6260E-07	0.19	0.38	0.00E+00	4.99E-08	9.99E-08
Cs-135	1.4433E-05	0.19	0.38	0.00E+00	2.75E-06	5.49E-06
Cs-137	9.8870E-01	0.19	0.38	0.00E+00	1.88E-01	3.76E-01
Eu-154	6.0320E-03	0.19	0.38	0.00E+00	1.15E-03	2.29E-03
Eu-155	2.1770E-04	0.19	0.38	0.00E+00	4.14E-05	8.28E-05
Fe-55	7.9296E-07	0.19	0.38	0.00E+00	1.51E-07	3.02E-07
H-3	8.9486E-03	0.19	0.38	0.00E+00	1.70E-03	3.40E-03
I-129	9.8288E-07	0.19	0.38	0.00E+00	1.87E-07	3.74E-07
Kr-85	1.0707E-02	0.19	0.38	0.00E+00	2.04E-03	4.07E-03
Np-237	1.1927E-05	0.19	0.38	0.00E+00	2.27E-06	4.54E-06
Pa-231	1.4703E-09	0.19	0.38	0.00E+00	2.80E-10	5.59E-10
Pb-210	1.6828E-10	0.19	0.38	0.00E+00	3.20E-11	6.40E-11
Pm-147	6.9606E-06	0.19	0.38	0.00E+00	1.32E-06	2.65E-06
Pu-238	6.6263E-02	0.19	0.38	0.00E+00	1.26E-02	2.52E-02
Pu-239	1.1618E-02	0.19	0.38	0.00E+00	2.21E-03	4.42E-03
Pu-240	1.5142E-02	0.19	0.38	0.00E+00	2.88E-03	5.76E-03
Pu-241	4.3766E-01	0.19	0.38	0.00E+00	8.32E-02	1.66E-01
Pu-242	6.4260E-05	0.19	0.38	0.00E+00	1.22E-05	2.44E-05
Ra-226	3.8501E-10	0.19	0.38	0.00E+00	7.32E-11	1.46E-10
Ra-228	5.2955E-12	0.19	0.38	0.00E+00	1.01E-12	2.01E-12
Ru-106	2.0413E-14	0.19	0.38	0.00E+00	3.88E-15	7.76E-15
Se-79	1.2376E-05	0.19	0.38	0.00E+00	2.35E-06	4.71E-06
Sn-126	2.5210E-05	0.19	0.38	0.00E+00	4.79E-06	9.59E-06
Sr-90	6.4163E-01	0.19	0.38	0.00E+00	1.22E-01	2.44E-01
Tc-99	3.9357E-04	0.19	0.38	0.00E+00	7.49E-05	1.50E-04
Th-229	1.5644E-10	0.19	0.38	0.00E+00	2.98E-11	5.95E-11
Th-230	2.7972E-08	0.19	0.38	0.00E+00	5.32E-09	1.06E-08
Th-232	5.3036E-12	0.19	0.38	0.00E+00	1.01E-12	2.02E-12
Tl-208	1.5136E-07	0.19	0.38	0.00E+00	2.88E-08	5.76E-08
U-232	4.1005E-07	0.19	0.38	0.00E+00	7.80E-08	1.56E-07
U-233	2.5856E-08	0.19	0.38	0.00E+00	4.92E-09	9.84E-09
U-234	5.2665E-05	0.19	0.38	0.00E+00	1.00E-05	2.00E-05
U-235	-1.4487E-06	0.19	0.00	2.50E-06	2.22E-06	2.50E-06
U-236	7.5888E-06	0.19	0.38	0.00E+00	1.44E-06	2.89E-06
U-238	-2.6129E-07	0.19	0.00	1.04E-05	1.04E-05	1.04E-05
Y-90	6.4180E-01	0.19	0.38	0.00E+00	1.22E-01	2.44E-01
Other Radionuclides					1.81E-01	3.62E-01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.447E+10
0.0250	2.901E+09
0.0375	2.733E+09
0.0575	3.420E+09
0.0850	1.598E+09
0.1250	1.063E+09
0.2250	1.364E+09
0.3750	5.892E+08
0.5750	1.388E+10
0.8500	1.355E+08
1.2500	8.621E+07
1.7500	3.791E+06
2.2500	6.231E+02
2.7500	2.196E+03
3.5000	1.567E+02
5.0000	6.697E+01
7.0000	7.715E+00
11.0000	8.859E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.44E-03	6.88E-03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	3.588	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		0.19
Bounding:		0.38

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:	0.17	
Bounding:	0.34	

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: 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

[1]Fuel decay start date: 1979
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage:
18"x15"
341.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	274,985.09	549,970.18	0.00E+00	2.95E-04	5.90E-04
Am-241	1.4751E-01	274,985.09	549,970.18	0.00E+00	4.06E+04	8.11E+04
Am-242m	2.6809E-04	274,985.09	549,970.18	0.00E+00	7.37E+01	1.47E+02
Am-243	6.2484E-04	274,985.09	549,970.18	0.00E+00	1.72E+02	3.44E+02
C-14	4.7820E-05	274,985.09	549,970.18	0.00E+00	1.31E+01	2.63E+01
Cl-36	8.0297E-07	274,985.09	549,970.18	0.00E+00	2.21E-01	4.42E-01
Cm-243	1.7426E-04	274,985.09	549,970.18	0.00E+00	4.79E+01	9.58E+01
Cm-244	2.7616E-02	274,985.09	549,970.18	0.00E+00	7.59E+03	1.52E+04
Co-60	3.5610E-04	274,985.09	549,970.18	0.00E+00	9.79E+01	1.96E+02
Cs-134	2.6260E-07	274,985.09	549,970.18	0.00E+00	7.22E-02	1.44E-01
Cs-135	1.4433E-05	274,985.09	549,970.18	0.00E+00	3.97E+00	7.94E+00
Cs-137	9.8870E-01	274,985.09	549,970.18	0.00E+00	2.72E+05	5.44E+05
Eu-154	6.0320E-03	274,985.09	549,970.18	0.00E+00	1.66E+03	3.32E+03
Eu-155	2.1770E-04	274,985.09	549,970.18	0.00E+00	5.99E+01	1.20E+02
Fe-55	7.9296E-07	274,985.09	549,970.18	0.00E+00	2.18E-01	4.36E-01
H-3	8.9486E-03	274,985.09	549,970.18	0.00E+00	2.46E+03	4.92E+03
I-129	9.8288E-07	274,985.09	549,970.18	0.00E+00	2.70E-01	5.41E-01
Kr-85	1.0707E-02	274,985.09	549,970.18	0.00E+00	2.94E+03	5.89E+03
Np-237	1.1927E-05	274,985.09	549,970.18	0.00E+00	3.28E+00	6.56E+00
Pa-231	1.4703E-09	274,985.09	549,970.18	0.00E+00	4.04E-04	8.09E-04
Pb-210	1.6828E-10	274,985.09	549,970.18	0.00E+00	4.63E-05	9.25E-05
Pm-147	6.9606E-06	274,985.09	549,970.18	0.00E+00	1.91E+00	3.83E+00
Pu-238	6.6263E-02	274,985.09	549,970.18	0.00E+00	1.82E+04	3.64E+04
Pu-239	1.1618E-02	274,985.09	549,970.18	0.00E+00	3.19E+03	6.39E+03
Pu-240	1.5142E-02	274,985.09	549,970.18	0.00E+00	4.16E+03	8.33E+03
Pu-241	4.3766E-01	274,985.09	549,970.18	0.00E+00	1.20E+05	2.41E+05
Pu-242	6.4260E-05	274,985.09	549,970.18	0.00E+00	1.77E+01	3.53E+01
Ra-226	3.8501E-10	274,985.09	549,970.18	0.00E+00	1.06E-04	2.12E-04
Ra-228	5.2955E-12	274,985.09	549,970.18	0.00E+00	1.46E-06	2.91E-06
Ru-106	2.0413E-14	274,985.09	549,970.18	0.00E+00	5.61E-09	1.12E-08
Se-79	1.2376E-05	274,985.09	549,970.18	0.00E+00	3.40E+00	6.81E+00
Sn-126	2.5210E-05	274,985.09	549,970.18	0.00E+00	6.93E+00	1.39E+01
Sr-90	6.4163E-01	274,985.09	549,970.18	0.00E+00	1.76E+05	3.53E+05
Tc-99	3.9357E-04	274,985.09	549,970.18	0.00E+00	1.08E+02	2.16E+02
Th-229	1.5644E-10	274,985.09	549,970.18	0.00E+00	4.30E-05	8.60E-05
Th-230	2.7972E-08	274,985.09	549,970.18	0.00E+00	7.69E-03	1.54E-02
Th-232	5.3036E-12	274,985.09	549,970.18	0.00E+00	1.46E-06	2.92E-06
Tl-208	1.5136E-07	274,985.09	549,970.18	0.00E+00	4.16E-02	8.32E-02
U-232	4.1005E-07	274,985.09	549,970.18	0.00E+00	1.13E-01	2.26E-01
U-233	2.5856E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.093E+16
0.0250	4.194E+15
0.0375	3.952E+15
0.0575	4.945E+15
0.0850	2.311E+15
0.1250	1.537E+15
0.2250	1.973E+15
0.3750	8.519E+14
0.5750	2.006E+16
0.8500	1.959E+14
1.2500	1.247E+14
1.7500	5.480E+12
2.2500	9.010E+08
2.7500	3.175E+09
3.5000	2.268E+08
5.0000	9.686E+07
7.0000	1.116E+07
11.0000	1.281E+08

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.97E+03	9.95E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.539514873	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	1.06
Bounding:	0.19	1.12

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: 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

[1]Fuel decay start date: 1979
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	66.57	133.13	0.00E+00	7.14E-08	1.43E-07
Am-241	1.4751E-01	66.57	133.13	0.00E+00	9.82E+00	1.96E+01
Am-242m	2.6809E-04	66.57	133.13	0.00E+00	1.78E-02	3.57E-02
Am-243	6.2484E-04	66.57	133.13	0.00E+00	4.16E-02	8.32E-02
C-14	4.7820E-05	66.57	133.13	0.00E+00	3.18E-03	6.37E-03
Cl-36	8.0297E-07	66.57	133.13	0.00E+00	5.35E-05	1.07E-04
Cm-243	1.7426E-04	66.57	133.13	0.00E+00	1.16E-02	2.32E-02
Cm-244	2.7616E-02	66.57	133.13	0.00E+00	1.84E+00	3.68E+00
Co-60	3.5610E-04	66.57	133.13	0.00E+00	2.37E-02	4.74E-02
Cs-134	2.6260E-07	66.57	133.13	0.00E+00	1.75E-05	3.50E-05
Cs-135	1.4433E-05	66.57	133.13	0.00E+00	9.61E-04	1.92E-03
Cs-137	9.8870E-01	66.57	133.13	0.00E+00	6.58E+01	1.32E+02
Eu-154	6.0320E-03	66.57	133.13	0.00E+00	4.02E-01	8.03E-01
Eu-155	2.1770E-04	66.57	133.13	0.00E+00	1.45E-02	2.90E-02
Fe-55	7.9296E-07	66.57	133.13	0.00E+00	5.28E-05	1.06E-04
H-3	8.9486E-03	66.57	133.13	0.00E+00	5.96E-01	1.19E+00
I-129	9.8288E-07	66.57	133.13	0.00E+00	6.54E-05	1.31E-04
Kr-85	1.0707E-02	66.57	133.13	0.00E+00	7.13E-01	1.43E+00
Np-237	1.1927E-05	66.57	133.13	0.00E+00	7.94E-04	1.59E-03
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
Tl-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	6.21E-03	6.19E-03	6.21E-03
Y-90	6.4180E-01	66.57	133.13	0.00E+00	4.27E+01	8.54E+01
Other Radionuclides					6.34E+01	1.27E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.066E+12
0.0250	1.015E+12
0.0375	9.566E+11
0.0575	1.197E+12
0.0850	5.593E+11
0.1250	3.721E+11
0.2250	4.775E+11
0.3750	2.062E+11
0.5750	4.857E+12
0.8500	4.742E+10
1.2500	3.018E+10
1.7500	1.327E+09
2.2500	2.181E+05
2.7500	7.686E+05
3.5000	5.486E+04
5.0000	2.345E+04
7.0000	2.701E+03
11.0000	3.102E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.20E+00	2.41E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	60.58	66.57	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	113.81	133.13	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	1.10
Bounding:	0.20	1.17

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: TORY-IIA
SNF ID #: 230
Fuel Units & Descr: 146 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=48.647kg; EOL=48.647kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1962
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 65 years

Estimated Canister usage: HIC 3.65

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.9216E-09	896.18	1,792.36	0.00E+00	1.72E-06	3.44E-06
Am-241	1.0419E-02	896.18	1,792.36	0.00E+00	9.34E+00	1.87E+01
Am-242m	1.1154E-06	896.18	1,792.36	0.00E+00	1.00E-03	2.00E-03
Am-243	3.6944E-05	896.18	1,792.36	0.00E+00	3.31E-02	6.62E-02
C-14	2.6324E-08	896.18	1,792.36	0.00E+00	2.36E-05	4.72E-05
Cl-36	4.4435E-31	896.18	1,792.36	0.00E+00	3.98E-28	7.96E-28
Cm-243	1.9101E-06	896.18	1,792.36	0.00E+00	1.71E-03	3.42E-03
Cm-244	8.3232E-04	896.18	1,792.36	0.00E+00	7.46E-01	1.49E+00
Co-60	1.3135E-07	896.18	1,792.36	0.00E+00	1.18E-04	2.35E-04
Cs-134	2.8943E-09	896.18	1,792.36	0.00E+00	2.59E-06	5.19E-06
Cs-135	4.2564E-06	896.18	1,792.36	0.00E+00	3.81E-03	7.63E-03
Cs-137	7.2053E-01	896.18	1,792.36	0.00E+00	6.46E+02	1.29E+03
Eu-154	1.3852E-03	896.18	1,792.36	0.00E+00	1.24E+00	2.48E+00
Eu-155	2.6634E-05	896.18	1,792.36	0.00E+00	2.39E-02	4.77E-02
Fe-55	8.4265E-09	896.18	1,792.36	0.00E+00	7.55E-06	1.51E-05
H-3	3.7066E-04	896.18	1,792.36	0.00E+00	3.32E-01	6.64E-01
I-129	6.6403E-07	896.18	1,792.36	0.00E+00	5.95E-04	1.19E-03
Kr-85	5.9010E-03	896.18	1,792.36	0.00E+00	5.29E+00	1.06E+01
Np-237	3.1713E-05	896.18	1,792.36	0.00E+00	2.84E-02	5.68E-02
Pa-231	2.9878E-09	896.18	1,792.36	0.00E+00	2.68E-06	5.36E-06
Pb-210	3.0772E-10	896.18	1,792.36	0.00E+00	2.76E-07	5.52E-07
Pm-147	1.6883E-07	896.18	1,792.36	0.00E+00	1.51E-04	3.03E-04
Pu-238	1.0765E-01	896.18	1,792.36	0.00E+00	9.65E+01	1.93E+02
Pu-239	6.9441E-04	896.18	1,792.36	0.00E+00	6.22E-01	1.24E+00
Pu-240	3.8341E-04	896.18	1,792.36	0.00E+00	3.44E-01	6.87E-01
Pu-241	1.5419E-02	896.18	1,792.36	0.00E+00	1.38E+01	2.76E+01
Pu-242	3.0911E-06	896.18	1,792.36	0.00E+00	2.77E-03	5.54E-03
Ra-226	6.4642E-10	896.18	1,792.36	0.00E+00	5.79E-07	1.16E-06
Ra-228	5.8019E-14	896.18	1,792.36	0.00E+00	5.20E-11	1.04E-10
Ru-106	2.7278E-19	896.18	1,792.36	0.00E+00	2.44E-16	4.89E-16
Se-79	1.2333E-05	896.18	1,792.36	0.00E+00	1.11E-02	2.21E-02
Sn-126	1.0188E-05	896.18	1,792.36	0.00E+00	9.13E-03	1.83E-02
Sr-90	6.5371E-01	896.18	1,792.36	0.00E+00	5.86E+02	1.17E+03
Tc-99	3.8050E-04	896.18	1,792.36	0.00E+00	3.41E-01	6.82E-01
Th-229	4.4113E-11	896.18	1,792.36	0.00E+00	3.95E-08	7.91E-08
Th-230	4.1233E-06	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
Tl-208	3.2382E-08	896.18	1,792.36	0.00E+00	2.90E-05	5.80E-05
U-232	8.7728E-08	896.18	1,792.36	0.00E+00	7.86E-05	1.57E-04
U-233	1.1367E-08	896.18	1,792.36	0.00E+00	1.02E-05	2.04E-05
U-234	7.0717E-05	896.18	1,792.36	0.00E+00	6.34E-02	1.27E-01
U-235	-2.8661E-06	896.18	0.00	9.80E-02	9.54E-02	9.80E-02
U-236	1.6701E-05	896.18	1,792.36	0.00E+00	1.50E-02	2.99E-02
U-238	-9.4194E-09	896.18	0.00	1.12E-03	1.11E-03	1.12E-03
Y-90	6.5371E-01	896.18	1,792.36	0.00E+00	5.86E+02	1.17E+03
Other Radionuclides					6.23E+02	1.25E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.524E+13
0.0250	1.331E+13
0.0375	1.162E+13
0.0575	1.266E+13
0.0850	7.492E+12
0.1250	4.830E+12
0.2250	6.460E+12
0.3750	2.814E+12
0.5750	4.804E+13
0.8500	4.993E+11
1.2500	1.989E+11
1.7500	1.320E+10
2.2500	1.347E+08
2.7500	2.069E+06
3.5000	2.791E+04
5.0000	1.177E+04
7.0000	1.336E+03
11.0000	1.521E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.06E+01	2.13E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	BERYLLIUM	HEAVY WATER
Fuel Cladding:	NONE	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.175	40 to 100

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)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		896.18
Bounding:		1,792.36

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:	0.04	
Bounding:	0.08	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TORY-IIC
SNF ID #: 231
Fuel Units & Descr: 655 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=59.081kg; EOL=59.081kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 65 years

Estimated Canister usage:
18"x10'
13.10

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9216E-09	1,088.39	2,176.79	0.00E+00	2.09E-06	4.18E-06
Am-241	1.0419E-02	1,088.39	2,176.79	0.00E+00	1.13E+01	2.27E+01
Am-242m	1.1154E-06	1,088.39	2,176.79	0.00E+00	1.21E-03	2.43E-03
Am-243	3.6944E-05	1,088.39	2,176.79	0.00E+00	4.02E-02	8.04E-02
C-14	2.6324E-08	1,088.39	2,176.79	0.00E+00	2.87E-05	5.73E-05
Cl-36	4.4435E-31	1,088.39	2,176.79	0.00E+00	4.84E-28	9.67E-28
Cm-243	1.9101E-06	1,088.39	2,176.79	0.00E+00	2.08E-03	4.16E-03
Cm-244	8.3232E-04	1,088.39	2,176.79	0.00E+00	9.06E-01	1.81E+00
Co-60	1.3135E-07	1,088.39	2,176.79	0.00E+00	1.43E-04	2.86E-04
Cs-134	2.8943E-09	1,088.39	2,176.79	0.00E+00	3.15E-06	6.30E-06
Cs-135	4.2564E-06	1,088.39	2,176.79	0.00E+00	4.63E-03	9.27E-03
Cs-137	7.2053E-01	1,088.39	2,176.79	0.00E+00	7.84E+02	1.57E+03
Eu-154	1.3852E-03	1,088.39	2,176.79	0.00E+00	1.51E+00	3.02E+00
Eu-155	2.6634E-05	1,088.39	2,176.79	0.00E+00	2.90E-02	5.80E-02
Fe-55	8.4265E-09	1,088.39	2,176.79	0.00E+00	9.17E-06	1.83E-05
H-3	3.7066E-04	1,088.39	2,176.79	0.00E+00	4.03E-01	8.07E-01
I-129	6.6403E-07	1,088.39	2,176.79	0.00E+00	7.23E-04	1.45E-03
Kr-85	5.9010E-03	1,088.39	2,176.79	0.00E+00	6.42E+00	1.28E+01
Np-237	3.1713E-05	1,088.39	2,176.79	0.00E+00	3.45E-02	6.90E-02
Pa-231	2.9878E-09	1,088.39	2,176.79	0.00E+00	3.25E-06	6.50E-06
Pb-210	3.0772E-10	1,088.39	2,176.79	0.00E+00	3.35E-07	6.70E-07
Pm-147	1.6883E-07	1,088.39	2,176.79	0.00E+00	1.84E-04	3.68E-04
Pu-238	1.0765E-01	1,088.39	2,176.79	0.00E+00	1.17E+02	2.34E+02
Pu-239	6.9441E-04	1,088.39	2,176.79	0.00E+00	7.56E-01	1.51E+00
Pu-240	3.8341E-04	1,088.39	2,176.79	0.00E+00	4.17E-01	8.35E-01
Pu-241	1.5419E-02	1,088.39	2,176.79	0.00E+00	1.68E+01	3.36E+01
Pu-242	3.0911E-06	1,088.39	2,176.79	0.00E+00	3.36E-03	6.73E-03
Ra-226	6.4642E-10	1,088.39	2,176.79	0.00E+00	7.04E-07	1.41E-06
Ra-228	5.8019E-14	1,088.39	2,176.79	0.00E+00	6.31E-11	1.26E-10
Ru-106	2.7278E-19	1,088.39	2,176.79	0.00E+00	2.97E-16	5.94E-16
Se-79	1.2333E-05	1,088.39	2,176.79	0.00E+00	1.34E-02	2.68E-02
Sn-126	1.0188E-05	1,088.39	2,176.79	0.00E+00	1.11E-02	2.22E-02
Sr-90	6.5371E-01	1,088.39	2,176.79	0.00E+00	7.11E+02	1.42E+03
Tc-99	3.8050E-04	1,088.39	2,176.79	0.00E+00	4.14E-01	8.28E-01
Th-229	4.4113E-11	1,088.39	2,176.79	0.00E+00	4.80E-08	9.60E-08
Th-230	4.1233E-08	1,088.39	2,176.79	0.00E+00	4.49E-05	8.98E-05
Th-232	6.5978E-14	1,088.39	2,176.79	0.00E+00	7.18E-11	1.44E-10
Tl-208	3.2382E-08	1,088.39	2,176.79	0.00E+00	3.52E-05	7.05E-05
U-232	8.7728E-08	1,088.39	2,176.79	0.00E+00	9.55E-05	1.91E-04
U-233	1.1367E-08	1,088.39	2,176.79	0.00E+00	1.24E-05	2.47E-05
U-234	7.0717E-05	1,088.39	2,176.79	0.00E+00	7.70E-02	1.54E-01
U-235	-2.8661E-06	1,088.39	0.00	1.19E-01	1.16E-01	1.19E-01
U-236	1.6701E-05	1,088.39	2,176.79	0.00E+00	1.82E-02	3.64E-02
U-238	-9.4194E-09	1,088.39	0.00	1.36E-03	1.35E-03	1.36E-03
Y-90	6.5371E-01	1,088.39	2,176.79	0.00E+00	7.11E+02	1.42E+03
Other Radionuclides					7.57E+02	1.51E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.923E+13
0.0250	1.617E+13
0.0375	1.411E+13
0.0575	1.537E+13
0.0850	9.099E+12
0.1250	5.939E+12
0.2250	7.845E+12
0.3750	3.417E+12
0.5750	5.835E+13
0.8500	6.064E+11
1.2500	2.415E+11
1.7500	1.603E+10
2.2500	1.635E+06
2.7500	2.513E+06
3.5000	3.390E+04
5.0000	1.429E+04
7.0000	1.622E+03
11.0000	1.848E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.29E+01	2.58E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	BERYLLIUM	HEAVY WATER
Fuel Cladding:	NONE	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.147	40 to 100

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)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,088.39
Bounding:		2,176.79

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:	0.04	
Bounding:	0.08	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: N-Reactor (Graphite, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.2184E-10	-783.73	1,567.46	0.00E+00	3.31E-07	6.61E-07
Am-241	9.6379E-02	783.73	1,567.46	0.00E+00	7.55E+01	1.51E+02
Am-242m	5.8463E-05	783.73	1,567.46	0.00E+00	4.58E-02	9.16E-02
Am-243	4.6279E-05	783.73	1,567.46	0.00E+00	3.63E-02	7.25E-02
C-14	9.2026E-05	783.73	1,567.46	0.00E+00	7.21E-02	1.44E-01
Cl-36	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00
Cm-244	4.5445E-04	783.73	1,567.46	0.00E+00	3.56E-01	7.12E-01
Co-60	6.3707E-05	783.73	1,567.46	0.00E+00	4.99E-02	9.99E-02
Cs-134	1.4042E-05	783.73	1,567.46	0.00E+00	1.10E-02	2.20E-02
Cs-135	1.0066E-05	783.73	1,567.46	0.00E+00	7.89E-03	1.58E-02
Cs-137	1.1945E+00	783.73	1,567.46	0.00E+00	9.36E+02	1.87E+03
Eu-154	6.6451E-03	783.73	1,567.46	0.00E+00	5.21E+00	1.04E+01
Eu-155	2.9052E-04	783.73	1,567.46	0.00E+00	2.28E-01	4.55E-01
Fe-55	2.8807E-06	783.73	1,567.46	0.00E+00	2.26E-03	4.52E-03
H-3	2.1063E-03	783.73	1,567.46	0.00E+00	1.65E+00	3.30E+00
I-129	8.6006E-07	783.73	1,567.46	0.00E+00	6.74E-04	1.35E-03
Kr-85	2.6739E-02	783.73	1,567.46	0.00E+00	2.10E+01	4.19E+01
Np-237	8.5589E-06	783.73	1,567.46	0.00E+00	6.71E-03	1.34E-02
Pa-231	1.2500E-09	783.73	1,567.46	0.00E+00	9.80E-07	1.96E-06
Pb-210	2.3017E-11	783.73	1,567.46	0.00E+00	1.80E-06	3.61E-06
Pm-147	5.9856E-04	783.73	1,567.46	0.00E+00	4.69E-01	9.38E-01
Pu-238	2.0029E-02	783.73	1,567.46	0.00E+00	1.57E+01	3.14E+01
Pu-239	2.8836E-02	783.73	1,567.46	0.00E+00	2.26E+01	4.52E+01
Pu-240	2.2802E-02	783.73	1,567.46	0.00E+00	1.79E+01	3.57E+01
Pu-241	6.1020E-01	783.73	1,567.46	0.00E+00	4.78E+02	9.56E+02
Pu-242	1.4526E-05	783.73	1,567.46	0.00E+00	1.14E-02	2.28E-02
Ra-226	9.7701E-11	783.73	1,567.46	0.00E+00	7.66E-08	1.53E-07
Ra-228	1.1068E-14	783.73	1,567.46	0.00E+00	8.67E-12	1.73E-11
Ru-106	5.9224E-10	783.73	1,567.46	0.00E+00	4.64E-07	9.28E-07
Se-79	1.0899E-05	783.73	1,567.46	0.00E+00	8.54E-03	1.71E-02
Sn-126	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00
Sr-90	8.4899E-01	783.73	1,567.46	0.00E+00	6.65E+02	1.33E+03
Tc-99	3.6494E-04	783.73	1,567.46	0.00E+00	2.86E-01	5.72E-01
Th-229	1.2928E-12	783.73	1,567.46	0.00E+00	1.01E-09	2.03E-09
Th-230	1.6293E-08	783.73	1,567.46	0.00E+00	1.28E-05	2.55E-05
Th-232	1.6451E-14	783.73	1,567.46	0.00E+00	1.29E-11	2.58E-11
Tl-208	3.4382E-15	783.73	1,567.46	0.00E+00	2.69E-12	5.39E-12
U-232	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00
U-233	9.9425E-10	783.73	1,567.46	0.00E+00	7.79E-07	1.56E-06
U-234	6.5575E-05	783.73	1,567.46	0.00E+00	5.14E-02	1.03E-01
U-235	-1.2944E-06	783.73	0.00	3.13E-02	3.02E-02	3.13E-02
U-236	1.1951E-05	783.73	1,567.46	0.00E+00	9.37E-03	1.87E-02
U-238	-3.0619E-07	783.73	0.00	3.94E-04	1.54E-04	3.94E-04
Y-90	8.4928E-01	783.73	1,567.46	0.00E+00	6.66E+02	1.33E+03
Other Radionuclides					8.98E+02	1.80E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.616E+13
0.0250	1.557E+13
0.0375	1.440E+13
0.0575	1.643E+13
0.0850	8.643E+12
0.1250	5.740E+12
0.2250	7.415E+12
0.3750	3.209E+12
0.5750	6.922E+13
0.8500	7.032E+11
1.2500	3.836E+11
1.7500	1.945E+10
2.2500	1.571E+08
2.7500	3.668E+04
3.5000	3.243E+04
5.0000	1.369E+04
7.0000	1.551E+03
11.0000	1.766E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.34E+01	2.67E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	92.5	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:	30.19	783.73
Bounding:		1,567.46

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:	8.35	25.96
Bounding:	16.70	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR OSU
SNF ID #: 1039
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg; EOL=0.472kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2025
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	7.73	15.46	0.00E+00	6.59E-09	1.32E-08
Am-241	1.8331E-03	7.73	15.46	0.00E+00	1.42E-02	2.83E-02
Am-242m	1.4129E-06	7.73	15.46	0.00E+00	1.09E-05	2.19E-05
Am-243	1.4774E-07	7.73	15.46	0.00E+00	1.14E-06	2.28E-06
C-14	1.2871E-04	7.73	15.46	0.00E+00	9.95E-04	1.99E-03
Cl-36	2.8120E-06	7.73	15.46	0.00E+00	2.17E-05	4.35E-05
Cm-243	1.7940E-07	7.73	15.46	0.00E+00	1.39E-06	2.77E-06
Cm-244	1.6962E-06	7.73	15.46	0.00E+00	1.31E-05	2.62E-05
Co-60	1.2839E+00	7.73	15.46	0.00E+00	9.93E+00	1.99E+01
Cs-134	9.0541E-02	7.73	15.46	0.00E+00	7.00E-01	1.40E+00
Cs-135	3.2195E-05	7.73	15.46	0.00E+00	2.49E-04	4.98E-04
Cs-137	2.7564E+00	7.73	15.46	0.00E+00	2.13E+01	4.26E+01
Eu-154	1.5368E-02	7.73	15.46	0.00E+00	1.19E-01	2.38E-01
Eu-155	2.9293E-02	7.73	15.46	0.00E+00	2.27E-01	4.53E-01
Fe-55	7.7158E-01	7.73	15.46	0.00E+00	5.97E+00	1.19E+01
H-3	1.1111E-02	7.73	15.46	0.00E+00	8.59E-02	1.72E-01
I-129	7.3684E-07	7.73	15.46	0.00E+00	5.70E-06	1.14E-05
Kr-85	2.5263E-01	7.73	15.46	0.00E+00	1.95E+00	3.91E+00
Np-237	1.2427E-06	7.73	15.46	0.00E+00	9.61E-06	1.92E-05
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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.499E+12
0.0250	5.500E+11
0.0375	4.684E+11
0.0575	4.807E+11
0.0850	2.978E+11
0.1250	2.163E+11
0.2250	2.526E+11
0.3750	1.282E+11
0.5750	1.704E+12
0.8500	7.315E+10
1.2500	1.486E+12
1.7500	9.903E+08
2.2500	1.596E+09
2.7500	1.267E+07
3.5000	1.474E+06
5.0000	8.403E+00
7.0000	9.516E-01
11.0000	1.064E-01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.47	1.65
Bounding:	0.94	

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 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	3.73	7.47	0.00E+00	3.18E-09	6.36E-09
Am-241	1.8331E-03	3.73	7.47	0.00E+00	6.85E-03	1.37E-02
Am-242m	1.4129E-06	3.73	7.47	0.00E+00	5.28E-06	1.06E-05
Am-243	1.4774E-07	3.73	7.47	0.00E+00	5.52E-07	1.10E-06
C-14	1.2871E-04	3.73	7.47	0.00E+00	4.81E-04	9.61E-04
Cl-36	2.8120E-06	3.73	7.47	0.00E+00	1.05E-05	2.10E-05
Cm-243	1.7940E-07	3.73	7.47	0.00E+00	6.70E-07	1.34E-06
Cm-244	1.6962E-06	3.73	7.47	0.00E+00	6.33E-06	1.27E-05
Co-60	1.2839E+00	3.73	7.47	0.00E+00	4.79E+00	9.59E+00
Cs-134	9.0541E-02	3.73	7.47	0.00E+00	3.38E-01	6.76E-01
Cs-135	3.2195E-05	3.73	7.47	0.00E+00	1.20E-04	2.40E-04
Cs-137	2.7564E+00	3.73	7.47	0.00E+00	1.03E+01	2.06E+01
Eu-154	1.5368E-02	3.73	7.47	0.00E+00	5.74E-02	1.15E-01
Eu-155	2.9293E-02	3.73	7.47	0.00E+00	1.09E-01	2.19E-01
Fe-55	7.7158E-01	3.73	7.47	0.00E+00	2.88E+00	5.76E+00
H-3	1.1111E-02	3.73	7.47	0.00E+00	4.15E-02	8.30E-02
I-129	7.3684E-07	3.73	7.47	0.00E+00	2.75E-06	5.50E-06
Kr-85	2.5263E-01	3.73	7.47	0.00E+00	9.43E-01	1.89E+00
Np-237	1.2427E-06	3.73	7.47	0.00E+00	4.64E-06	9.28E-06
Pa-231	3.8511E-09	3.73	7.47	0.00E+00	1.44E-08	2.88E-08
Pb-210	7.3880E-15	3.73	7.47	0.00E+00	2.76E-14	5.52E-14
Pm-147	2.1023E+00	3.73	7.47	0.00E+00	7.85E+00	1.57E+01
Pu-238	1.0383E-03	3.73	7.47	0.00E+00	3.88E-03	7.76E-03
Pu-239	5.5293E-03	3.73	7.47	0.00E+00	2.07E-02	4.13E-02
Pu-240	2.1278E-03	3.73	7.47	0.00E+00	7.95E-03	1.59E-02
Pu-241	1.0195E-01	3.73	7.47	0.00E+00	3.81E-01	7.62E-01
Pu-242	2.3128E-07	3.73	7.47	0.00E+00	8.64E-07	1.73E-06
Ra-226	5.2782E-14	3.73	7.47	0.00E+00	1.97E-13	3.94E-13
Ra-228	1.9338E-10	3.73	7.47	0.00E+00	7.22E-10	1.44E-09
Ru-106	9.1684E-02	3.73	7.47	0.00E+00	3.42E-01	6.85E-01
Se-79	1.3018E-05	3.73	7.47	0.00E+00	4.86E-05	9.72E-05
Sn-126	1.2167E-05	3.73	7.47	0.00E+00	4.54E-05	9.09E-05
Sr-90	2.6045E+00	3.73	7.47	0.00E+00	9.73E+00	1.95E+01
Tc-99	4.4241E-04	3.73	7.47	0.00E+00	1.65E-03	3.30E-03
Th-229	1.3713E-10	3.73	7.47	0.00E+00	5.12E-10	1.02E-09
Th-230	1.8090E-11	3.73	7.47	0.00E+00	6.76E-11	1.35E-10
Th-232	2.5278E-10	3.73	7.47	0.00E+00	9.44E-10	1.89E-09
Tl-208	1.6947E-06	3.73	7.47	0.00E+00	6.33E-06	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-236	1.2693E-05	3.73	7.47	0.00E+00	4.74E-05	9.48E-05
U-238	-3.6331E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.207E+12
0.0250	2.656E+11
0.0375	2.262E+11
0.0575	2.322E+11
0.0850	1.438E+11
0.1250	1.045E+11
0.2250	1.220E+11
0.3750	6.193E+10
0.5750	8.233E+11
0.8500	3.533E+10
1.2500	7.175E+11
1.7500	4.783E+08
2.2500	7.710E+08
2.7500	6.118E+06
3.5000	7.120E+05
5.0000	4.153E+00
7.0000	4.704E-01
11.0000	5.361E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E-01	4.35E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3.73	2.86	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		7.47	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

[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 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.961E+06
0.0250	0.000E+00
0.0375	2.676E+03
0.0575	1.621E+03
0.0850	2.286E+05
0.1250	4.514E+05
0.2250	1.598E+06
0.3750	3.986E+03
0.5750	1.961E+02
0.8500	3.056E+01
1.2500	1.802E+00
1.7500	8.816E-01
2.2500	5.107E-01
2.7500	2.967E-01
3.5000	2.653E-01
5.0000	1.140E-01
7.0000	1.312E-02
11.0000	1.508E-03

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

[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 (ACPR 12/20) JAPAN
SNF ID #: 480
Fuel Units & Descr: 182 - ELEMENT
Heavy Metal Mass: BOL=48.357kg; EOL=48.23kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 1.64

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	455.87	911.73	0.00E+00	1.21E-06	2.41E-06
Am-241	3.1429E-03	455.87	911.73	0.00E+00	1.43E+00	2.87E+00
Am-242m	1.3195E-06	455.87	911.73	0.00E+00	6.02E-04	1.20E-03
Am-243	1.4753E-07	455.87	911.73	0.00E+00	6.73E-05	1.35E-04
C-14	1.2847E-04	455.87	911.73	0.00E+00	5.86E-02	1.17E-01
Cl-36	2.8120E-06	455.87	911.73	0.00E+00	1.28E-03	2.56E-03
Cm-243	1.2465E-07	455.87	911.73	0.00E+00	5.68E-05	1.14E-04
Cm-244	9.5564E-07	455.87	911.73	0.00E+00	4.36E-04	8.71E-04
Co-60	1.7880E-01	455.87	911.73	0.00E+00	8.15E+01	1.63E+02
Cs-134	5.8692E-04	455.87	911.73	0.00E+00	2.68E-01	5.35E-01
Cs-135	3.2195E-05	455.87	911.73	0.00E+00	1.47E-02	2.94E-02
Cs-137	1.9489E+00	455.87	911.73	0.00E+00	8.88E+02	1.78E+03
Eu-154	4.5895E-03	455.87	911.73	0.00E+00	2.09E+00	4.18E+00
Eu-155	3.6045E-03	455.87	911.73	0.00E+00	1.64E+00	3.29E+00
Fe-55	1.4185E-02	455.87	911.73	0.00E+00	6.47E+00	1.29E+01
H-3	4.7895E-03	455.87	911.73	0.00E+00	2.18E+00	4.37E+00
I-129	7.3684E-07	455.87	911.73	0.00E+00	3.36E-04	6.72E-04
Kr-85	9.5820E-02	455.87	911.73	0.00E+00	4.37E+01	8.74E+01
Np-237	1.2552E-06	455.87	911.73	0.00E+00	5.72E-04	1.14E-03
Pa-231	7.0406E-09	455.87	911.73	0.00E+00	3.21E-06	6.42E-06
Pb-210	5.8000E-14	455.87	911.73	0.00E+00	2.64E-11	5.29E-11
Pm-147	4.0075E-02	455.87	911.73	0.00E+00	1.83E+01	3.65E+01
Pu-238	9.2256E-04	455.87	911.73	0.00E+00	4.21E-01	8.41E-01
Pu-239	5.5278E-03	455.87	911.73	0.00E+00	2.52E+00	5.04E+00
Pu-240	2.1248E-03	455.87	911.73	0.00E+00	9.69E-01	1.94E+00
Pu-241	4.9549E-02	455.87	911.73	0.00E+00	2.26E+01	4.52E+01
Pu-242	2.3128E-07	455.87	911.73	0.00E+00	1.05E-04	2.11E-04
Ra-226	2.4526E-13	455.87	911.73	0.00E+00	1.12E-10	2.24E-10
Ra-228	2.4015E-10	455.87	911.73	0.00E+00	1.09E-07	2.19E-07
Ru-106	3.0602E-06	455.87	911.73	0.00E+00	1.40E-03	2.79E-03
Se-79	1.3015E-05	455.87	911.73	0.00E+00	5.93E-03	1.19E-02
Sn-126	1.2165E-05	455.87	911.73	0.00E+00	5.55E-03	1.11E-02
Sr-90	1.8226E+00	455.87	911.73	0.00E+00	8.31E+02	1.66E+03
Tc-99	4.4241E-04	455.87	911.73	0.00E+00	2.02E-01	4.03E-01
Th-229	3.0962E-10	455.87	911.73	0.00E+00	1.41E-07	2.82E-07
Th-230	4.2346E-11	455.87	911.73	0.00E+00	1.93E-08	3.86E-08
Th-232	2.5278E-10	455.87	911.73	0.00E+00	1.15E-07	2.30E-07
Tl-208	1.5820E-06	455.87	911.73	0.00E+00	7.21E-06	1.44E-05
U-232	4.2647E-08	455.87	911.73	0.00E+00	1.94E-05	3.89E-05
U-233	1.2211E-07	455.87	911.73	0.00E+00	5.57E-05	1.11E-04
U-234	1.9955E-07	455.87	911.73	0.00E+00	9.10E-05	1.82E-04
U-235	-2.6194E-06	455.87	0.00	2.08E-02	1.97E-02	2.08E-02
U-236	1.2693E-05	455.87	911.73	0.00E+00	5.79E-03	1.16E-02
U-238	-3.6331E-08	455.87	0.00	1.30E-02	1.30E-02	1.30E-02
Y-90	1.8241E+00	455.87	911.73	0.00E+00	8.32E+02	1.66E+03
Other Radionuclides					8.78E+02	1.76E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.137E+13
0.0250	1.902E+13
0.0375	1.648E+13
0.0575	1.773E+13
0.0850	1.070E+13
0.1250	6.994E+12
0.2250	9.188E+12
0.3750	4.027E+12
0.5750	6.623E+13
0.8500	7.465E+11
1.2500	1.237E+13
1.7500	1.918E+10
2.2500	6.606E+07
2.7500	7.279E+05
3.5000	4.095E+03
5.0000	5.037E+02
7.0000	5.695E+01
11.0000	6.483E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E+01	2.28E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.95031243	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	455.87	121.62	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		911.73	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.28	0.27
Bounding:	0.55	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (ACPR 12/20) PENN. STATE UNIV.
SNF ID #: 1002
Fuel Units & Descr: 46 - ELEMENT
Heavy Metal Mass: BOL=12.779kg; EOL=12.006kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.41

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	737.72	1,475.44	0.00E+00	6.28E-07	1.26E-06
Am-241	1.8331E-03	737.72	1,475.44	0.00E+00	1.35E+00	2.70E+00
Am-242m	1.4129E-06	737.72	1,475.44	0.00E+00	1.04E-03	2.08E-03
Am-243	1.4774E-07	737.72	1,475.44	0.00E+00	1.09E-04	2.18E-04
C-14	1.2871E-04	737.72	1,475.44	0.00E+00	9.49E-02	1.90E-01
Cl-36	2.8120E-06	737.72	1,475.44	0.00E+00	2.07E-03	4.15E-03
Cm-243	1.7940E-07	737.72	1,475.44	0.00E+00	1.32E-04	2.65E-04
Cm-244	1.6962E-06	737.72	1,475.44	0.00E+00	1.25E-03	2.50E-03
Co-60	1.2839E+00	737.72	1,475.44	0.00E+00	9.47E+02	1.89E+03
Cs-134	9.0541E-02	737.72	1,475.44	0.00E+00	6.68E+01	1.34E+02
Cs-135	3.2195E-05	737.72	1,475.44	0.00E+00	2.38E-02	4.75E-02
Cs-137	2.7564E+00	737.72	1,475.44	0.00E+00	2.03E+03	4.07E+03
Eu-154	1.5368E-02	737.72	1,475.44	0.00E+00	1.13E+01	2.27E+01
Eu-155	2.9293E-02	737.72	1,475.44	0.00E+00	2.16E+01	4.32E+01
Fe-55	7.7158E-01	737.72	1,475.44	0.00E+00	5.69E+02	1.14E+03
H-3	1.1111E-02	737.72	1,475.44	0.00E+00	8.20E+00	1.64E+01
I-129	7.3684E-07	737.72	1,475.44	0.00E+00	5.44E-04	1.09E-03
Kr-85	2.5263E-01	737.72	1,475.44	0.00E+00	1.86E+02	3.73E+02
Np-237	1.2427E-06	737.72	1,475.44	0.00E+00	9.17E-04	1.83E-03
Pa-231	3.8511E-09	737.72	1,475.44	0.00E+00	2.84E-06	5.68E-06
Pb-210	7.3880E-15	737.72	1,475.44	0.00E+00	5.45E-12	1.09E-11
Pm-147	2.1023E+00	737.72	1,475.44	0.00E+00	1.55E+03	3.10E+03
Pu-238	1.0383E-03	737.72	1,475.44	0.00E+00	7.66E-01	1.53E+00
Pu-239	5.5293E-03	737.72	1,475.44	0.00E+00	4.08E+00	8.16E+00
Pu-240	2.1278E-03	737.72	1,475.44	0.00E+00	1.57E+00	3.14E+00
Pu-241	1.0195E-01	737.72	1,475.44	0.00E+00	7.52E+01	1.50E+02
Pu-242	2.3128E-07	737.72	1,475.44	0.00E+00	1.71E-04	3.41E-04
Ra-226	5.2782E-14	737.72	1,475.44	0.00E+00	3.89E-11	7.79E-11
Ra-228	1.9338E-10	737.72	1,475.44	0.00E+00	1.43E-07	2.85E-07
Ru-106	9.1684E-02	737.72	1,475.44	0.00E+00	6.76E+01	1.35E+02
Se-79	1.3018E-05	737.72	1,475.44	0.00E+00	9.60E-03	1.92E-02
Sn-126	1.2167E-05	737.72	1,475.44	0.00E+00	8.98E-03	1.80E-02
Sr-90	2.6045E+00	737.72	1,475.44	0.00E+00	1.92E+03	3.84E+03
Tc-99	4.4241E-04	737.72	1,475.44	0.00E+00	3.26E-01	6.53E-01
Th-229	1.3713E-10	737.72	1,475.44	0.00E+00	1.01E-07	2.02E-07
Th-230	1.8090E-11	737.72	1,475.44	0.00E+00	1.33E-08	2.67E-08
Th-232	2.5278E-10	737.72	1,475.44	0.00E+00	1.86E-07	3.73E-07
Tl-208	1.6947E-08	737.72	1,475.44	0.00E+00	1.25E-05	2.50E-05
U-232	4.8737E-08	737.72	1,475.44	0.00E+00	3.60E-05	7.19E-05
U-233	1.2203E-07	737.72	1,475.44	0.00E+00	9.00E-05	1.80E-04
U-234	1.5925E-07	737.72	1,475.44	0.00E+00	1.17E-04	2.35E-04
U-235	-2.6194E-06	737.72	0.00	5.47E-03	3.54E-03	5.47E-03
U-236	1.2693E-05	737.72	1,475.44	0.00E+00	9.36E-03	1.87E-02
U-238	-3.6331E-08	737.72	0.00	3.44E-03	3.42E-03	3.44E-03
Y-90	2.6060E+00	737.72	1,475.44	0.00E+00	1.92E+03	3.85E+03
Other Radionuclides					2.66E+03	5.32E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.385E+14
0.0250	5.247E+13
0.0375	4.468E+13
0.0575	4.587E+13
0.0850	2.841E+13
0.1250	2.063E+13
0.2250	2.410E+13
0.3750	1.223E+13
0.5750	1.626E+14
0.8500	6.979E+12
1.2500	1.417E+14
1.7500	9.448E+10
2.2500	1.523E+11
2.7500	1.209E+09
3.5000	1.406E+08
5.0000	7.812E+02
7.0000	8.843E+01
11.0000	1.007E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.29E+01	8.59E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.79999842	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	240.93	737.72	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,475.44	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.69	3.06
Bounding:	3.39	

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 (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

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	3.5850E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.2899E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4747E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2839E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.1038E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	7.8917E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	9.2647E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	1.0940E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	1.7368E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	3.0677E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	1.7925E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	3.7444E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	3.6180E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	6.9368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2662E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	9.1654E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	1.3728E-13	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	1.0702E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	8.8692E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	5.5263E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.1233E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	3.8962E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	4.6752E-13	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	2.4827E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	9.8526E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3015E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.2165E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	1.6195E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	4.2451E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	6.1398E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	1.5098E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.0662E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2217E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	2.2391E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	1.18E-04	1.18E-04	1.18E-04
U-236	1.2695E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	7.42E-05	7.42E-05	7.42E-05
Y-90	1.6195E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.933E+08
0.0250	0.000E+00
0.0375	4.000E+03
0.0575	2.436E+03
0.0850	3.418E+06
0.1250	6.747E+05
0.2250	2.388E+08
0.3750	5.959E+03
0.5750	2.931E+02
0.8500	4.573E+01
1.2500	2.713E+00
1.7500	1.327E+00
2.2500	7.689E-01
2.7500	4.467E-01
3.5000	3.994E-01
5.0000	1.716E-01
7.0000	1.975E-02
11.0000	2.271E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.98E-08	4.98E-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 %:	19.88316824	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	243.42	486.85	0.00E+00	1.01E-06	2.02E-06
Am-241	3.5850E-03	243.42	486.85	0.00E+00	8.73E-01	1.75E+00
Am-242m	1.2899E-06	243.42	486.85	0.00E+00	3.14E-04	6.28E-04
Am-243	1.4747E-07	243.42	486.85	0.00E+00	3.59E-05	7.18E-05
C-14	1.2839E-04	243.42	486.85	0.00E+00	3.13E-02	6.25E-02
Cl-36	2.8120E-06	243.42	486.85	0.00E+00	6.85E-04	1.37E-03
Cm-243	1.1038E-07	243.42	486.85	0.00E+00	2.69E-05	5.37E-05
Cm-244	7.8917E-07	243.42	486.85	0.00E+00	1.92E-04	3.84E-04
Co-60	9.2647E-02	243.42	486.85	0.00E+00	2.26E+01	4.51E+01
Cs-134	1.0940E-04	243.42	486.85	0.00E+00	2.66E-02	5.33E-02
Cs-135	3.2195E-05	243.42	486.85	0.00E+00	7.84E-03	1.57E-02
Cs-137	1.7368E+00	243.42	486.85	0.00E+00	4.23E+02	8.46E+02
Eu-154	3.0677E-03	243.42	486.85	0.00E+00	7.47E-01	1.49E+00
Eu-155	1.7925E-03	243.42	486.85	0.00E+00	4.36E-01	8.73E-01
Fe-55	3.7444E-03	243.42	486.85	0.00E+00	9.11E-01	1.82E+00
H-3	3.6180E-03	243.42	486.85	0.00E+00	8.81E-01	1.76E+00
I-129	7.3684E-07	243.42	486.85	0.00E+00	1.79E-04	3.59E-04
Kr-85	6.9368E-02	243.42	486.85	0.00E+00	1.69E+01	3.38E+01
Np-237	1.2662E-06	243.42	486.85	0.00E+00	3.08E-04	6.16E-04
Pa-231	9.1654E-09	243.42	486.85	0.00E+00	2.23E-06	4.46E-06
Pb-210	1.3728E-13	243.42	486.85	0.00E+00	3.34E-11	6.68E-11
Pm-147	1.0702E-02	243.42	486.85	0.00E+00	2.61E+00	5.21E+00
Pu-238	8.8692E-04	243.42	486.85	0.00E+00	2.16E-01	4.32E-01
Pu-239	5.5263E-03	243.42	486.85	0.00E+00	1.35E+00	2.69E+00
Pu-240	2.1233E-03	243.42	486.85	0.00E+00	5.17E-01	1.03E+00
Pu-241	3.8962E-02	243.42	486.85	0.00E+00	9.48E+00	1.90E+01
Pu-242	2.3128E-07	243.42	486.85	0.00E+00	5.63E-05	1.13E-04
Ra-226	4.6752E-13	243.42	486.85	0.00E+00	1.14E-10	2.28E-10
Ra-228	2.4827E-10	243.42	486.85	0.00E+00	6.04E-08	1.21E-07
Ru-106	9.8526E-08	243.42	486.85	0.00E+00	2.40E-05	4.80E-05
Se-79	1.3015E-05	243.42	486.85	0.00E+00	3.17E-03	6.34E-03
Sn-126	1.2165E-05	243.42	486.85	0.00E+00	2.96E-03	5.92E-03
Sr-90	1.6195E+00	243.42	486.85	0.00E+00	3.94E+02	7.88E+02
Tc-99	4.4241E-04	243.42	486.85	0.00E+00	1.08E-01	2.15E-01
Th-229	4.2451E-10	243.42	486.85	0.00E+00	1.03E-07	2.07E-07
Th-230	6.1398E-11	243.42	486.85	0.00E+00	1.49E-08	2.99E-08
Th-232	2.5278E-10	243.42	486.85	0.00E+00	6.15E-08	1.23E-07
Tl-208	1.5098E-08	243.42	486.85	0.00E+00	3.68E-06	7.35E-06
U-232	4.0662E-08	243.42	486.85	0.00E+00	9.90E-06	1.98E-05
U-233	1.2217E-07	243.42	486.85	0.00E+00	2.97E-05	5.95E-05
U-234	2.2391E-07	243.42	486.85	0.00E+00	5.45E-05	1.09E-04
U-235	-2.6194E-06	243.42	0.00	6.32E-03	5.68E-03	6.32E-03
U-236	1.2695E-05	243.42	486.85	0.00E+00	3.09E-03	6.18E-03
U-238	-3.6331E-08	243.42	0.00	3.96E-03	3.95E-03	3.96E-03
Y-90	1.6195E+00	243.42	486.85	0.00E+00	3.94E+02	7.88E+02
Other Radionuclides					4.19E+02	8.38E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.321E+13
0.0250	8.984E+12
0.0375	7.794E+12
0.0575	8.394E+12
0.0850	5.060E+12
0.1250	3.301E+12
0.2250	4.351E+12
0.3750	1.900E+12
0.5750	3.150E+13
0.8500	3.382E+11
1.2500	3.473E+12
1.7500	8.803E+09
2.2500	1.856E+07
2.7500	3.139E+05
3.5000	6.707E+02
5.0000	2.617E+02
7.0000	2.955E+01
11.0000	3.361E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.17E+00	1.03E+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 %:	19.898	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	0.00	243.42	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		486.85	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

[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 (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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	13.46	26.92	0.00E+00	1.15E-08	2.29E-08
Am-241	1.8331E-03	13.46	26.92	0.00E+00	2.47E-02	4.93E-02
Am-242m	1.4129E-06	13.46	26.92	0.00E+00	1.90E-05	3.80E-05
Am-243	1.4774E-07	13.46	26.92	0.00E+00	1.99E-06	3.98E-06
C-14	1.2871E-04	13.46	26.92	0.00E+00	1.73E-03	3.46E-03
Cl-36	2.8120E-06	13.46	26.92	0.00E+00	3.78E-05	7.57E-05
Cm-243	1.7940E-07	13.46	26.92	0.00E+00	2.41E-06	4.83E-06
Cm-244	1.6962E-06	13.46	26.92	0.00E+00	2.28E-05	4.57E-05
Co-60	1.2839E+00	13.46	26.92	0.00E+00	1.73E+01	3.46E+01
Cs-134	9.0541E-02	13.46	26.92	0.00E+00	1.22E+00	2.44E+00
Cs-135	3.2195E-05	13.46	26.92	0.00E+00	4.33E-04	8.67E-04
Cs-137	2.7564E+00	13.46	26.92	0.00E+00	3.71E+01	7.42E+01
Eu-154	1.5368E-02	13.46	26.92	0.00E+00	2.07E-01	4.14E-01
Eu-155	2.9293E-02	13.46	26.92	0.00E+00	3.94E-01	7.89E-01
Fe-55	7.7158E-01	13.46	26.92	0.00E+00	1.04E+01	2.08E+01
H-3	1.1111E-02	13.46	26.92	0.00E+00	1.50E-01	2.99E-01
I-129	7.3684E-07	13.46	26.92	0.00E+00	9.92E-06	1.98E-05
Kr-85	2.5263E-01	13.46	26.92	0.00E+00	3.40E+00	6.80E+00
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
Sn-126	1.2167E-05	13.46	26.92	0.00E+00	1.64E-04	3.28E-04
Sr-90	2.6045E+00	13.46	26.92	0.00E+00	3.51E+01	7.01E+01
Tc-99	4.4241E-04	13.46	26.92	0.00E+00	5.95E-03	1.19E-02
Th-229	1.3713E-10	13.46	26.92	0.00E+00	1.85E-09	3.69E-09
Th-230	1.8090E-11	13.46	26.92	0.00E+00	2.43E-10	4.87E-10
Th-232	2.5278E-10	13.46	26.92	0.00E+00	3.40E-09	6.80E-09
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.351E+12
0.0250	9.574E+11
0.0375	8.153E+11
0.0575	8.368E+11
0.0850	5.184E+11
0.1250	3.765E+11
0.2250	4.398E+11
0.3750	2.232E+11
0.5750	2.967E+12
0.8500	1.273E+11
1.2500	2.586E+12
1.7500	1.724E+09
2.2500	2.779E+09
2.7500	2.205E+07
3.5000	2.566E+06
5.0000	1.423E+01
7.0000	1.611E+00
11.0000	1.835E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.83E-01	1.57E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	2.85	13.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		26.92	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	25.58	51.17	0.00E+00	1.06E-07	2.12E-07
Am-241	3.5850E-03	25.58	51.17	0.00E+00	9.17E-02	1.83E-01
Am-242m	1.2899E-06	25.58	51.17	0.00E+00	3.30E-05	6.60E-05
Am-243	1.4747E-07	25.58	51.17	0.00E+00	3.77E-06	7.55E-06
C-14	1.2839E-04	25.58	51.17	0.00E+00	3.28E-03	6.57E-03
Cl-36	2.8120E-06	25.58	51.17	0.00E+00	7.19E-05	1.44E-04
Cm-243	1.1038E-07	25.58	51.17	0.00E+00	2.82E-06	5.65E-06
Cm-244	7.8917E-07	25.58	51.17	0.00E+00	2.02E-05	4.04E-05
Co-60	9.2647E-02	25.58	51.17	0.00E+00	2.37E+00	4.74E+00
Cs-134	1.0940E-04	25.58	51.17	0.00E+00	2.80E-03	5.60E-03
Cs-135	3.2195E-05	25.58	51.17	0.00E+00	8.24E-04	1.65E-03
Cs-137	1.7368E+00	25.58	51.17	0.00E+00	4.44E+01	8.89E+01
Eu-154	3.0677E-03	25.58	51.17	0.00E+00	7.85E-02	1.57E-01
Eu-155	1.7925E-03	25.58	51.17	0.00E+00	4.59E-02	9.17E-02
Fe-55	3.7444E-03	25.58	51.17	0.00E+00	9.58E-02	1.92E-01
H-3	3.6180E-03	25.58	51.17	0.00E+00	9.26E-02	1.85E-01
I-129	7.3684E-07	25.58	51.17	0.00E+00	1.89E-05	3.77E-05
Kr-85	6.9368E-02	25.58	51.17	0.00E+00	1.77E+00	3.55E+00
Np-237	1.2662E-06	25.58	51.17	0.00E+00	3.24E-05	6.48E-05
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
Tl-208	1.5098E-08	25.58	51.17	0.00E+00	3.86E-07	7.73E-07
U-232	4.0662E-08	25.58	51.17	0.00E+00	1.04E-06	2.08E-06
U-233	1.2217E-07	25.58	51.17	0.00E+00	3.13E-06	6.25E-06
U-234	2.2391E-07	25.58	51.17	0.00E+00	5.73E-06	1.15E-05
U-235	-2.6194E-06	25.58	0.00	5.81E-04	5.14E-04	5.81E-04
U-236	1.2695E-05	25.58	51.17	0.00E+00	3.25E-04	6.50E-04
U-238	-3.6331E-08	25.58	0.00	1.06E-04	1.05E-04	1.06E-04
Y-90	1.6195E+00	25.58	51.17	0.00E+00	4.14E+01	8.29E+01
Other Radionuclides					4.40E+01	8.80E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.542E+12
0.0250	9.442E+11
0.0375	8.192E+11
0.0575	8.822E+11
0.0850	5.317E+11
0.1250	3.469E+11
0.2250	4.573E+11
0.3750	1.997E+11
0.5750	3.311E+12
0.8500	3.555E+10
1.2500	3.650E+11
1.7500	9.252E+08
2.2500	1.951E+06
2.7500	3.299E+04
3.5000	6.884E+01
5.0000	2.679E+01
7.0000	3.024E+00
11.0000	3.438E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.43E-01	1.09E+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 %:	46.09053498	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)[2]

	From SFD	Estimated
Nominal:	14.21	25.58
Bounding:		51.17

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:	1.29	1.80
Bounding:	2.57	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP LEU-I 20/20) MALAYSIA
SNF ID #: 497
Fuel Units & Descr: 94 - ELEMENT
Heavy Metal Mass: BOL=47.376kg; EOL=46.53kg
ROD Storage Site: INEEL

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

Estimated Canister usage: $18^{*}x10^{6}$: 0.85

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	807.60	1,615.20	0.00E+00	2.13E-06	4.27E-06
Am-241	3.1429E-03	807.60	1,615.20	0.00E+00	2.54E+00	5.08E+00
Am-242m	1.3195E-06	807.60	1,615.20	0.00E+00	1.07E-03	2.13E-03
Am-243	1.4753E-07	807.60	1,615.20	0.00E+00	1.19E-04	2.38E-04
C-14	1.2847E-04	807.60	1,615.20	0.00E+00	1.04E-01	2.07E-01
Cl-36	2.8120E-06	807.60	1,615.20	0.00E+00	2.27E-03	4.54E-03
Cm-243	1.2465E-07	807.60	1,615.20	0.00E+00	1.01E-04	2.01E-04
Cm-244	9.5564E-07	807.60	1,615.20	0.00E+00	7.72E-04	1.54E-03
Co-60	1.7880E-01	807.60	1,615.20	0.00E+00	1.44E+02	2.89E+02
Cs-134	5.8692E-04	807.60	1,615.20	0.00E+00	4.74E-01	9.48E-01
Cs-135	3.2195E-05	807.60	1,615.20	0.00E+00	2.60E-02	5.20E-02
Cs-137	1.9489E+00	807.60	1,615.20	0.00E+00	1.57E+03	3.15E+03
Eu-154	4.5895E-03	807.60	1,615.20	0.00E+00	3.71E+00	7.41E+00
Eu-155	3.6045E-03	807.60	1,615.20	0.00E+00	2.91E+00	5.82E+00
Fe-55	1.4185E-02	807.60	1,615.20	0.00E+00	1.15E+01	2.29E+01
H-3	4.7895E-03	807.60	1,615.20	0.00E+00	3.87E+00	7.74E+00
I-129	7.3684E-07	807.60	1,615.20	0.00E+00	5.95E-04	1.19E-03
Kr-85	9.5820E-02	807.60	1,615.20	0.00E+00	7.74E+01	1.55E+02
Np-237	1.2552E-06	807.60	1,615.20	0.00E+00	1.01E-03	2.03E-03
Pa-231	7.0406E-09	807.60	1,615.20	0.00E+00	5.69E-06	1.14E-05
Pb-210	5.8000E-14	807.60	1,615.20	0.00E+00	4.68E-11	9.37E-11
Pm-147	4.0075E-02	807.60	1,615.20	0.00E+00	3.24E+01	6.47E+01
Pu-238	9.2256E-04	807.60	1,615.20	0.00E+00	7.45E-01	1.49E+00
Pu-239	5.5278E-03	807.60	1,615.20	0.00E+00	4.46E+00	8.93E+00
Pu-240	2.1248E-03	807.60	1,615.20	0.00E+00	1.72E+00	3.43E+00
Pu-241	4.9549E-02	807.60	1,615.20	0.00E+00	4.00E+01	8.00E+01
Pu-242	2.3128E-07	807.60	1,615.20	0.00E+00	1.87E-04	3.74E-04
Ra-226	2.4526E-13	807.60	1,615.20	0.00E+00	1.98E-10	3.96E-10
Ra-228	2.4015E-10	807.60	1,615.20	0.00E+00	1.94E-07	3.88E-07
Ru-106	3.0602E-06	807.60	1,615.20	0.00E+00	2.47E-03	4.94E-03
Se-79	1.3015E-05	807.60	1,615.20	0.00E+00	1.05E-02	2.10E-02
Sn-126	1.2165E-05	807.60	1,615.20	0.00E+00	9.82E-03	1.96E-02
Sr-90	1.8226E+00	807.60	1,615.20	0.00E+00	1.47E+03	2.94E+03
Tc-99	4.4241E-04	807.60	1,615.20	0.00E+00	3.57E-01	7.15E-01
Th-229	3.0962E-10	807.60	1,615.20	0.00E+00	2.50E-07	5.00E-07
Th-230	4.2346E-11	807.60	1,615.20	0.00E+00	3.42E-08	6.84E-08
Th-232	2.5278E-10	807.60	1,615.20	0.00E+00	2.04E-07	4.08E-07
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.619E+14
0.0250	3.369E+13
0.0375	2.919E+13
0.0575	3.140E+13
0.0850	1.896E+13
0.1250	1.239E+13
0.2250	1.628E+13
0.3750	7.134E+12
0.5750	1.173E+14
0.8500	1.323E+12
1.2500	2.192E+13
1.7500	3.398E+10
2.2500	1.170E+08
2.7500	1.290E+06
3.5000	7.199E+03
5.0000	8.686E+02
7.0000	9.815E+01
11.0000	1.117E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.02E+01	4.04E+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 %:	20.03968254	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	446.61	807.60	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,615.20	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	2,381.55	4,763.11	0.00E+00	6.30E-06	1.26E-05
Am-241	3.1429E-03	2,381.55	4,763.11	0.00E+00	7.48E+00	1.50E+01
Am-242m	1.3195E-06	2,381.55	4,763.11	0.00E+00	3.14E-03	6.29E-03
Am-243	1.4753E-07	2,381.55	4,763.11	0.00E+00	3.51E-04	7.03E-04
C-14	1.2847E-04	2,381.55	4,763.11	0.00E+00	3.06E-01	6.12E-01
Cl-36	2.8120E-06	2,381.55	4,763.11	0.00E+00	6.70E-03	1.34E-02
Cm-243	1.2465E-07	2,381.55	4,763.11	0.00E+00	2.97E-04	5.94E-04
Cm-244	9.5564E-07	2,381.55	4,763.11	0.00E+00	2.28E-03	4.55E-03
Co-60	1.7880E-01	2,381.55	4,763.11	0.00E+00	4.26E+02	8.52E+02
Cs-134	5.8692E-04	2,381.55	4,763.11	0.00E+00	1.40E+00	2.80E+00
Cs-135	3.2195E-05	2,381.55	4,763.11	0.00E+00	7.67E-02	1.53E-01
Cs-137	1.9489E+00	2,381.55	4,763.11	0.00E+00	4.64E+03	9.28E+03
Eu-154	4.5895E-03	2,381.55	4,763.11	0.00E+00	1.09E+01	2.19E+01
Eu-155	3.6045E-03	2,381.55	4,763.11	0.00E+00	8.58E+00	1.72E+01
Fe-55	1.4185E-02	2,381.55	4,763.11	0.00E+00	3.38E+01	6.76E+01
H-3	4.7895E-03	2,381.55	4,763.11	0.00E+00	1.14E+01	2.28E+01
I-129	7.3684E-07	2,381.55	4,763.11	0.00E+00	1.75E-03	3.51E-03
Kr-85	9.5820E-02	2,381.55	4,763.11	0.00E+00	2.28E+02	4.56E+02
Np-237	1.2552E-06	2,381.55	4,763.11	0.00E+00	2.99E-03	5.98E-03
Pa-231	7.0406E-09	2,381.55	4,763.11	0.00E+00	1.68E-05	3.35E-05
Pb-210	5.8000E-14	2,381.55	4,763.11	0.00E+00	1.38E-10	2.76E-10
Pm-147	4.0075E-02	2,381.55	4,763.11	0.00E+00	9.54E+01	1.91E+02
Pu-238	9.2256E-04	2,381.55	4,763.11	0.00E+00	2.20E+00	4.39E+00
Pu-239	5.5278E-03	2,381.55	4,763.11	0.00E+00	1.32E+01	2.63E+01
Pu-240	2.1248E-03	2,381.55	4,763.11	0.00E+00	5.06E+00	1.01E+01
Pu-241	4.9549E-02	2,381.55	4,763.11	0.00E+00	1.18E+02	2.36E+02
Pu-242	2.3128E-07	2,381.55	4,763.11	0.00E+00	5.51E-04	1.10E-03
Ra-226	2.4526E-13	2,381.55	4,763.11	0.00E+00	5.84E-10	1.17E-09
Ra-228	2.4015E-10	2,381.55	4,763.11	0.00E+00	5.72E-07	1.14E-06
Ru-106	3.0602E-06	2,381.55	4,763.11	0.00E+00	7.29E-03	1.46E-02
Se-79	1.3015E-05	2,381.55	4,763.11	0.00E+00	3.10E-02	6.20E-02
Sn-126	1.2165E-05	2,381.55	4,763.11	0.00E+00	2.90E-02	5.79E-02
Sr-90	1.8226E+00	2,381.55	4,763.11	0.00E+00	4.34E+03	8.68E+03
Tc-99	4.4241E-04	2,381.55	4,763.11	0.00E+00	1.05E+00	2.11E+00
Th-229	3.0962E-10	2,381.55	4,763.11	0.00E+00	7.37E-07	1.47E-06
Th-230	4.2346E-11	2,381.55	4,763.11	0.00E+00	1.01E-07	2.02E-07
Th-232	2.5278E-10	2,381.55	4,763.11	0.00E+00	6.02E-07	1.20E-06
Tl-208	1.5820E-08	2,381.55	4,763.11	0.00E+00	3.77E-05	7.54E-05
U-232	4.2647E-08	2,381.55	4,763.11	0.00E+00	1.02E-04	2.03E-04
U-233	1.2211E-07	2,381.55	4,763.11	0.00E+00	2.91E-04	5.82E-04
U-234	1.9955E-07	2,381.55	4,763.11	0.00E+00	4.75E-04	9.50E-04
U-235	-2.6194E-06	2,381.55	0.00	7.86E-03	1.62E-03	7.86E-03
U-236	1.2693E-05	2,381.55	4,763.11	0.00E+00	3.02E-02	6.05E-02
U-238	-3.6331E-08	2,381.55	0.00	4.88E-03	4.79E-03	4.88E-03
Y-90	1.8241E+00	2,381.55	4,763.11	0.00E+00	4.34E+03	8.69E+03
Other Radionuclides					4.59E+03	9.17E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.773E+14
0.0250	9.936E+13
0.0375	8.608E+13
0.0575	9.260E+13
0.0850	5.590E+13
0.1250	3.654E+13
0.2250	4.800E+13
0.3750	2.104E+13
0.5750	3.460E+14
0.8500	3.900E+12
1.2500	6.463E+13
1.7500	1.002E+11
2.2500	3.451E+08
2.7500	3.803E+06
3.5000	2.105E+04
5.0000	2.486E+03
7.0000	2.807E+02
11.0000	3.194E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.96E+01	1.19E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.85	2.78
Bounding:	7.70	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP LEU-I) BANGLADESH
SNF ID #: 470
Fuel Units & Descr: 100 - ELEMENT
Heavy Metal Mass: BOL=50.4kg; EOL=46.06kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	4,143.00	8,285.99	0.00E+00	1.10E-05	2.19E-05
Am-241	3.1429E-03	4,143.00	8,285.99	0.00E+00	1.30E+01	2.60E+01
Am-242m	1.3195E-06	4,143.00	8,285.99	0.00E+00	5.47E-03	1.09E-02
Am-243	1.4753E-07	4,143.00	8,285.99	0.00E+00	6.11E-04	1.22E-03
C-14	1.2847E-04	4,143.00	8,285.99	0.00E+00	5.32E-01	1.06E+00
Cl-36	2.8120E-06	4,143.00	8,285.99	0.00E+00	1.17E-02	2.33E-02
Cm-243	1.2465E-07	4,143.00	8,285.99	0.00E+00	5.16E-04	1.03E-03
Cm-244	9.5564E-07	4,143.00	8,285.99	0.00E+00	3.96E-03	7.92E-03
Co-60	1.7880E-01	4,143.00	8,285.99	0.00E+00	7.41E+02	1.48E+03
Cs-134	5.8692E-04	4,143.00	8,285.99	0.00E+00	2.43E+00	4.86E+00
Cs-135	3.2195E-05	4,143.00	8,285.99	0.00E+00	1.33E-01	2.67E-01
Cs-137	1.9489E+00	4,143.00	8,285.99	0.00E+00	8.07E+03	1.61E+04
Eu-154	4.5895E-03	4,143.00	8,285.99	0.00E+00	1.90E+01	3.80E+01
Eu-155	3.6045E-03	4,143.00	8,285.99	0.00E+00	1.49E+01	2.99E+01
Fe-55	1.4185E-02	4,143.00	8,285.99	0.00E+00	5.88E+01	1.18E+02
H-3	4.7895E-03	4,143.00	8,285.99	0.00E+00	1.98E+01	3.97E+01
I-129	7.3684E-07	4,143.00	8,285.99	0.00E+00	3.05E-03	6.11E-03
Kr-85	9.5820E-02	4,143.00	8,285.99	0.00E+00	3.97E+02	7.94E+02
Np-237	1.2552E-06	4,143.00	8,285.99	0.00E+00	5.20E-03	1.04E-02
Pa-231	7.0406E-09	4,143.00	8,285.99	0.00E+00	2.92E-05	5.83E-05
Pb-210	5.8000E-14	4,143.00	8,285.99	0.00E+00	2.40E-10	4.81E-10
Pm-147	4.0075E-02	4,143.00	8,285.99	0.00E+00	1.66E+02	3.32E+02
Pu-238	9.2256E-04	4,143.00	8,285.99	0.00E+00	3.82E+00	7.64E+00
Pu-239	5.5278E-03	4,143.00	8,285.99	0.00E+00	2.29E+01	4.58E+01
Pu-240	2.1248E-03	4,143.00	8,285.99	0.00E+00	8.80E+00	1.76E+01
Pu-241	4.9549E-02	4,143.00	8,285.99	0.00E+00	2.05E+02	4.11E+02
Pu-242	2.3128E-07	4,143.00	8,285.99	0.00E+00	9.58E-04	1.92E-03
Ra-226	2.4526E-13	4,143.00	8,285.99	0.00E+00	1.02E-09	2.03E-09
Ra-228	2.4015E-10	4,143.00	8,285.99	0.00E+00	9.95E-07	1.99E-06
Ru-106	3.0602E-06	4,143.00	8,285.99	0.00E+00	1.27E-02	2.54E-02
Se-79	1.3015E-05	4,143.00	8,285.99	0.00E+00	5.39E-02	1.08E-01
Sn-126	1.2165E-05	4,143.00	8,285.99	0.00E+00	5.04E-02	1.01E-01
Sr-90	1.8226E+00	4,143.00	8,285.99	0.00E+00	7.55E+03	1.51E+04
Tc-99	4.4241E-04	4,143.00	8,285.99	0.00E+00	1.83E+00	3.67E+00
Th-229	3.0962E-10	4,143.00	8,285.99	0.00E+00	1.28E-06	2.57E-06
Th-230	4.2346E-11	4,143.00	8,285.99	0.00E+00	1.75E-07	3.51E-07
Th-232	2.5278E-10	4,143.00	8,285.99	0.00E+00	1.05E-06	2.09E-06
Tl-208	1.5820E-06	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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.304E+14
0.0250	1.729E+14
0.0375	1.497E+14
0.0575	1.611E+14
0.0850	9.725E+13
0.1250	6.356E+13
0.2250	8.350E+13
0.3750	3.660E+13
0.5750	6.019E+14
0.8500	6.785E+12
1.2500	1.124E+14
1.7500	1.743E+11
2.2500	6.004E+08
2.7500	6.615E+08
3.5000	3.665E+04
5.0000	4.338E+03
7.0000	4.897E+02
11.0000	5.572E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.04E+02	2.07E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	475.12	4,143.00	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		8,285.99	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP LEU-II 20/30) PHILIPPINES
SNF ID #: 499
Fuel Units & Descr: 128 - ELEMENT
Heavy Metal Mass: BOL=105.472kg; EOL=105.344kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	994.28	1,988.57	0.00E+00	2.63E-06	5.26E-06
Am-241	3.1429E-03	994.28	1,988.57	0.00E+00	3.12E+00	6.25E+00
Am-242m	1.3195E-06	994.28	1,988.57	0.00E+00	1.31E-03	2.62E-03
Am-243	1.4753E-07	994.28	1,988.57	0.00E+00	1.47E-04	2.93E-04
C-14	1.2847E-04	994.28	1,988.57	0.00E+00	1.28E-01	2.55E-01
Cl-36	2.8120E-06	994.28	1,988.57	0.00E+00	2.80E-03	5.59E-03
Cm-243	1.2465E-07	994.28	1,988.57	0.00E+00	1.24E-04	2.48E-04
Cm-244	9.5564E-07	994.28	1,988.57	0.00E+00	9.50E-04	1.90E-03
Co-60	1.7880E-01	994.28	1,988.57	0.00E+00	1.78E+02	3.56E+02
Cs-134	5.8692E-04	994.28	1,988.57	0.00E+00	5.84E-01	1.17E+00
Cs-135	3.2195E-05	994.28	1,988.57	0.00E+00	3.20E-02	6.40E-02
Cs-137	1.9489E+00	994.28	1,988.57	0.00E+00	1.94E+03	3.88E+03
Eu-154	4.5895E-03	994.28	1,988.57	0.00E+00	4.56E+00	9.13E+00
Eu-155	3.6045E-03	994.28	1,988.57	0.00E+00	3.58E+00	7.17E+00
Fe-55	1.4185E-02	994.28	1,988.57	0.00E+00	1.41E+01	2.82E+01
H-3	4.7895E-03	994.28	1,988.57	0.00E+00	4.76E+00	9.52E+00
I-129	7.3684E-07	994.28	1,988.57	0.00E+00	7.33E-04	1.47E-03
Kr-85	9.5820E-02	994.28	1,988.57	0.00E+00	9.53E+01	1.91E+02
Np-237	1.2552E-06	994.28	1,988.57	0.00E+00	1.25E-03	2.50E-03
Pa-231	7.0406E-09	994.28	1,988.57	0.00E+00	7.00E-06	1.40E-05
Pb-210	5.8000E-14	994.28	1,988.57	0.00E+00	5.77E-11	1.15E-10
Pm-147	4.0075E-02	994.28	1,988.57	0.00E+00	3.98E+01	7.97E+01
Pu-238	9.2256E-04	994.28	1,988.57	0.00E+00	9.17E-01	1.83E+00
Pu-239	5.5278E-03	994.28	1,988.57	0.00E+00	5.50E+00	1.10E+01
Pu-240	2.1248E-03	994.28	1,988.57	0.00E+00	2.11E+00	4.23E+00
Pu-241	4.9549E-02	994.28	1,988.57	0.00E+00	4.93E+01	9.85E+01
Pu-242	2.3128E-07	994.28	1,988.57	0.00E+00	2.30E-04	4.60E-04
Ra-226	2.4526E-13	994.28	1,988.57	0.00E+00	2.44E-10	4.88E-10
Ra-228	2.4015E-10	994.28	1,988.57	0.00E+00	2.39E-07	4.78E-07
Ru-106	3.0602E-06	994.28	1,988.57	0.00E+00	3.04E-03	6.09E-03
Se-79	1.3015E-05	994.28	1,988.57	0.00E+00	1.29E-02	2.59E-02
Sn-126	1.2165E-05	994.28	1,988.57	0.00E+00	1.21E-02	2.42E-02
Sr-90	1.8226E+00	994.28	1,988.57	0.00E+00	1.81E+03	3.62E+03
Tc-99	4.4241E-04	994.28	1,988.57	0.00E+00	4.40E-01	8.80E-01
Th-229	3.0962E-10	994.28	1,988.57	0.00E+00	3.08E-07	6.16E-07
Th-230	4.2346E-11	994.28	1,988.57	0.00E+00	4.21E-08	8.42E-08
Th-232	2.5278E-10	994.28	1,988.57	0.00E+00	2.51E-07	5.03E-07
Tl-208	1.5820E-08	994.28	1,988.57	0.00E+00	1.57E-05	3.15E-05
U-232	4.2647E-08	994.28	1,988.57	0.00E+00	4.24E-05	8.48E-05
U-233	1.2211E-07	994.28	1,988.57	0.00E+00	1.21E-04	2.43E-04
U-234	1.9955E-07	994.28	1,988.57	0.00E+00	1.98E-04	3.97E-04
U-235	-2.6194E-06	994.28	0.00	4.56E-02	4.30E-02	4.56E-02
U-236	1.2693E-05	994.28	1,988.57	0.00E+00	1.26E-02	2.52E-02
U-238	-3.6331E-08	994.28	0.00	2.84E-02	2.83E-02	2.84E-02
Y-90	1.8241E+00	994.28	1,988.57	0.00E+00	1.81E+03	3.63E+03
Other Radionuclides					1.91E+03	3.83E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.993E+14
0.0250	4.148E+13
0.0375	3.594E+13
0.0575	3.866E+13
0.0850	2.334E+13
0.1250	1.525E+13
0.2250	2.004E+13
0.3750	8.784E+12
0.5750	1.445E+14
0.8500	1.628E+12
1.2500	2.698E+13
1.7500	4.183E+10
2.2500	1.441E+08
2.7500	1.588E+06
3.5000	8.931E+03
5.0000	1.099E+03
7.0000	1.242E+02
11.0000	1.414E+01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.02427184	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP LEU-II 20/30) TAIWAN
SNF ID #: 498
Fuel Units & Descr: 144 - ELEMENT
Heavy Metal Mass: BOL=118.656kg; EOL=118.512kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 1.30

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	1,118.57	2,237.14	0.00E+00	2.96E-06	5.91E-06
Am-241	3.1429E-03	1,118.57	2,237.14	0.00E+00	3.52E+00	7.03E+00
Am-242m	1.3195E-06	1,118.57	2,237.14	0.00E+00	1.48E-03	2.95E-03
Am-243	1.4753E-07	1,118.57	2,237.14	0.00E+00	1.65E-04	3.30E-04
C-14	1.2847E-04	1,118.57	2,237.14	0.00E+00	1.44E-01	2.87E-01
Cl-36	2.8120E-06	1,118.57	2,237.14	0.00E+00	3.15E-03	6.29E-03
Cm-243	1.2465E-07	1,118.57	2,237.14	0.00E+00	1.39E-04	2.79E-04
Cm-244	9.5564E-07	1,118.57	2,237.14	0.00E+00	1.07E-03	2.14E-03
Co-60	1.7880E-01	1,118.57	2,237.14	0.00E+00	2.00E+02	4.00E+02
Cs-134	5.8692E-04	1,118.57	2,237.14	0.00E+00	6.57E-01	1.31E+00
Cs-135	3.2195E-05	1,118.57	2,237.14	0.00E+00	3.60E-02	7.20E-02
Cs-137	1.9489E+00	1,118.57	2,237.14	0.00E+00	2.18E+03	4.36E+03
Eu-154	4.5895E-03	1,118.57	2,237.14	0.00E+00	5.13E+00	1.03E+01
Eu-155	3.6045E-03	1,118.57	2,237.14	0.00E+00	4.03E+00	8.06E+00
Fe-55	1.4185E-02	1,118.57	2,237.14	0.00E+00	1.59E+01	3.17E+01
H-3	4.7895E-03	1,118.57	2,237.14	0.00E+00	5.36E+00	1.07E+01
I-129	7.3684E-07	1,118.57	2,237.14	0.00E+00	8.24E-04	1.65E-03
Kr-85	9.5820E-02	1,118.57	2,237.14	0.00E+00	1.07E+02	2.14E+02
Np-237	1.2552E-06	1,118.57	2,237.14	0.00E+00	1.40E-03	2.81E-03
Pa-231	7.0406E-09	1,118.57	2,237.14	0.00E+00	7.88E-06	1.58E-05
Pb-210	5.8000E-14	1,118.57	2,237.14	0.00E+00	6.49E-11	1.30E-10
Pm-147	4.0075E-02	1,118.57	2,237.14	0.00E+00	4.48E+01	8.97E+01
Pu-238	9.2256E-04	1,118.57	2,237.14	0.00E+00	1.03E+00	2.06E+00
Pu-239	5.5278E-03	1,118.57	2,237.14	0.00E+00	6.18E+00	1.24E+01
Pu-240	2.1248E-03	1,118.57	2,237.14	0.00E+00	2.38E+00	4.75E+00
Pu-241	4.9549E-02	1,118.57	2,237.14	0.00E+00	5.54E+01	1.11E+02
Pu-242	2.3128E-07	1,118.57	2,237.14	0.00E+00	2.59E-04	5.17E-04
Ra-226	2.4526E-13	1,118.57	2,237.14	0.00E+00	2.74E-10	5.49E-10
Ra-228	2.4015E-10	1,118.57	2,237.14	0.00E+00	2.69E-07	5.37E-07
Ru-106	3.0602E-06	1,118.57	2,237.14	0.00E+00	3.42E-03	6.85E-03
Se-79	1.3015E-05	1,118.57	2,237.14	0.00E+00	1.46E-02	2.91E-02
Sn-126	1.2165E-05	1,118.57	2,237.14	0.00E+00	1.36E-02	2.72E-02
Sr-90	1.8226E+00	1,118.57	2,237.14	0.00E+00	2.04E+03	4.08E+03
Tc-99	4.4241E-04	1,118.57	2,237.14	0.00E+00	4.95E-01	9.90E-01
Th-229	3.0962E-10	1,118.57	2,237.14	0.00E+00	3.46E-07	6.93E-07
Th-230	4.2346E-11	1,118.57	2,237.14	0.00E+00	4.74E-08	9.47E-08
Th-232	2.5278E-10	1,118.57	2,237.14	0.00E+00	2.83E-07	5.66E-07
Tl-208	1.5820E-08	1,118.57	2,237.14	0.00E+00	1.77E-05	3.54E-05
U-232	4.2647E-08	1,118.57	2,237.14	0.00E+00	4.77E-05	9.54E-05
U-233	1.2211E-07	1,118.57	2,237.14	0.00E+00	1.37E-04	2.73E-04
U-234	1.9955E-07	1,118.57	2,237.14	0.00E+00	2.23E-04	4.46E-04
U-235	-2.6194E-06	1,118.57	0.00	5.13E-02	4.84E-02	5.13E-02
U-236	1.2693E-05	1,118.57	2,237.14	0.00E+00	1.42E-02	2.84E-02
U-238	-3.6331E-08	1,118.57	0.00	3.19E-02	3.19E-02	3.19E-02
Y-90	1.8241E+00	1,118.57	2,237.14	0.00E+00	2.04E+03	4.08E+03
Other Radionuclides					2.15E+03	4.31E+03

Gamma Sources

Photon Energy Group Avg. MeV	Total Photons/sec (bounding)
0.0150	2.242E+14
0.0250	4.667E+13
0.0375	4.043E+13
0.0575	4.349E+13
0.0850	2.626E+13
0.1250	1.716E+13
0.2250	2.255E+13
0.3750	9.882E+12
0.5750	1.625E+14
0.8500	1.832E+12
1.2500	3.035E+13
1.7500	4.706E+10
2.2500	1.621E+08
2.7500	1.786E+06
3.5000	1.005E+04
5.0000	1.236E+03
7.0000	1.397E+02
11.0000	1.591E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.80E+01	5.60E+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 %:	20.024	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP)
SNF ID #: 729
Fuel Units & Descr: 111 - ELEMENT
Heavy Metal Mass: BOL=21.534kg; EOL=16.35kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template 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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.8488E-10	4,926.69	9,853.39	0.00E+00	1.40E-06	2.81E-06
Am-241	7.5767E-03	4,926.69	9,853.39	0.00E+00	3.73E+01	7.47E+01
Am-242m	2.4459E-05	4,926.69	9,853.39	0.00E+00	1.21E-01	2.41E-01
Am-243	3.0983E-05	4,926.69	9,853.39	0.00E+00	1.53E-01	3.05E-01
C-14	1.2590E-04	4,926.69	9,853.39	0.00E+00	6.20E-01	1.24E+00
Cl-36	2.6624E-06	4,926.69	9,853.39	0.00E+00	1.31E-02	2.62E-02
Cm-243	3.8244E-05	4,926.69	9,853.39	0.00E+00	1.88E-01	3.77E-01
Cm-244	4.1010E-03	4,926.69	9,853.39	0.00E+00	2.02E+01	4.04E+01
Co-60	1.2410E+00	4,926.69	9,853.39	0.00E+00	6.11E+03	1.22E+04
Cs-134	6.5454E-01	4,926.69	9,853.39	0.00E+00	3.22E+03	6.45E+03
Cs-135	1.9753E-05	4,926.69	9,853.39	0.00E+00	9.73E-02	1.95E-01
Cs-137	2.7375E+00	4,926.69	9,853.39	0.00E+00	1.35E+04	2.70E+04
Eu-154	1.2324E-01	4,926.69	9,853.39	0.00E+00	6.07E+02	1.21E+03
Eu-155	5.3037E-02	4,926.69	9,853.39	0.00E+00	2.61E+02	5.23E+02
Fe-55	7.9555E-01	4,926.69	9,853.39	0.00E+00	3.92E+03	7.84E+03
H-3	1.0531E-02	4,926.69	9,853.39	0.00E+00	5.19E+01	1.04E+02
I-129	7.1287E-07	4,926.69	9,853.39	0.00E+00	3.51E-03	7.02E-03
Kr-85	2.4955E-01	4,926.69	9,853.39	0.00E+00	1.23E+03	2.46E+03
Np-237	1.2121E-05	4,926.69	9,853.39	0.00E+00	5.97E-02	1.19E-01
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
Tl-208	1.4313E-07	4,926.69	9,853.39	0.00E+00	7.05E-04	1.41E-03
U-232	4.1927E-07	4,926.69	9,853.39	0.00E+00	2.07E-03	4.13E-03
U-233	6.8491E-08	4,926.69	9,853.39	0.00E+00	3.37E-04	6.75E-04
U-234	2.0189E-06	4,926.69	9,853.39	0.00E+00	9.95E-03	1.99E-02
U-235	-2.6572E-06	4,926.69	0.00	3.26E-02	1.95E-02	3.26E-02
U-236	1.3575E-05	4,926.69	9,853.39	0.00E+00	6.69E-02	1.34E-01
U-238	-2.2698E-08	4,926.69	0.00	2.17E-03	2.06E-03	2.17E-03
Y-90	2.5646E+00	4,926.69	9,853.39	0.00E+00	1.26E+04	2.53E+04
Other Radionuclides					1.75E+04	3.51E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.590E+15
0.0250	3.489E+14
0.0375	3.086E+14
0.0575	3.060E+14
0.0850	1.917E+14
0.1250	1.539E+14
0.2250	1.629E+14
0.3750	8.127E+13
0.5750	1.345E+15
0.8500	2.468E+14
1.2500	9.478E+14
1.7500	1.268E+12
2.2500	9.937E+11
2.7500	9.009E+09
3.5000	1.060E+09
5.0000	2.540E+05
7.0000	2.923E+04
11.0000	3.354E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.23E+02	6.45E+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 %:	70.03211513	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	4,697.97	4,926.69	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		9,853.39	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.67	1.06
Bounding:	1.35	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) ANL-W
SNF ID #: 354
Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=1.068kg; EOL=0.979kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.5469E-09	84.97	169.94	0.00E+00	1.31E-07	2.63E-07
Am-241	1.6326E-02	84.97	169.94	0.00E+00	1.39E+00	2.77E+00
Am-242m	2.1332E-05	84.97	169.94	0.00E+00	1.81E-03	3.63E-03
Am-243	3.0893E-05	84.97	169.94	0.00E+00	2.62E-03	5.25E-03
C-14	1.2544E-04	84.97	169.94	0.00E+00	1.07E-02	2.13E-02
Cl-36	2.6624E-06	84.97	169.94	0.00E+00	2.26E-04	4.52E-04
Cm-243	1.8446E-05	84.97	169.94	0.00E+00	1.57E-03	3.13E-03
Cm-244	1.3020E-03	84.97	169.94	0.00E+00	1.11E-01	2.21E-01
Co-60	2.4053E-02	84.97	169.94	0.00E+00	2.04E+00	4.09E+00
Cs-134	2.7480E-05	84.97	169.94	0.00E+00	2.33E-03	4.67E-03
Cs-135	1.9738E-05	84.97	169.94	0.00E+00	1.68E-03	3.35E-03
Cs-137	1.3692E+00	84.97	169.94	0.00E+00	1.16E+02	2.33E+02
Eu-154	1.1001E-02	84.97	169.94	0.00E+00	9.35E-01	1.87E+00
Eu-155	8.0292E-04	84.97	169.94	0.00E+00	6.82E-02	1.36E-01
Fe-55	2.6894E-04	84.97	169.94	0.00E+00	2.29E-02	4.57E-02
H-3	1.9573E-03	84.97	169.94	0.00E+00	1.66E-01	3.33E-01
I-129	7.1287E-07	84.97	169.94	0.00E+00	6.06E-05	1.21E-04
Kr-85	3.5914E-02	84.97	169.94	0.00E+00	3.05E+00	6.10E+00
Np-237	1.2294E-05	84.97	169.94	0.00E+00	1.04E-03	2.09E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.175E+13
0.0250	2.431E+12
0.0375	2.128E+12
0.0575	2.305E+12
0.0850	1.368E+12
0.1250	9.141E+11
0.2250	1.182E+12
0.3750	5.136E+11
0.5750	8.664E+12
0.8500	1.163E+11
1.2500	3.665E+11
1.7500	3.235E+09
2.2500	1.845E+06
2.7500	7.688E+05
3.5000	3.506E+03
5.0000	1.491E+03
7.0000	1.709E+02
11.0000	1.957E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.50E+08	3.00E+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 %:	70.2247191	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	77.67	84.97	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	43.79	169.94	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	1.09
Bounding:	0.47	3.88

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) ANL-W (NRAD)
SNF ID #: 884
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=10.858kg; EOL=10.602kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.5469E-09	263.21	445.18	0.00E+00	4.07E-07	6.89E-07
Am-241	1.6326E-02	263.21	445.18	0.00E+00	4.30E+00	7.27E+00
Am-242m	2.1332E-05	263.21	445.18	0.00E+00	5.61E-03	9.50E-03
Am-243	3.0893E-05	263.21	445.18	0.00E+00	8.13E-03	1.38E-02
C-14	1.2544E-04	263.21	445.18	0.00E+00	3.30E-02	5.58E-02
Cl-36	2.6624E-06	263.21	445.18	0.00E+00	7.01E-04	1.19E-03
Cm-243	1.8446E-05	263.21	445.18	0.00E+00	4.86E-03	8.21E-03
Cm-244	1.3020E-03	263.21	445.18	0.00E+00	3.43E-01	5.80E-01
Co-60	2.4053E-02	263.21	445.18	0.00E+00	6.33E+00	1.07E+01
Cs-134	2.7480E-05	263.21	445.18	0.00E+00	7.23E-03	1.22E-02
Cs-135	1.9738E-05	263.21	445.18	0.00E+00	5.20E-03	8.79E-03
Cs-137	1.3692E+00	263.21	445.18	0.00E+00	3.60E+02	6.10E+02
Eu-154	1.1001E-02	263.21	445.18	0.00E+00	2.90E+00	4.90E+00
Eu-155	8.0292E-04	263.21	445.18	0.00E+00	2.11E-01	3.57E-01
Fe-55	2.6894E-04	263.21	445.18	0.00E+00	7.08E-02	1.20E-01
H-3	1.9573E-03	263.21	445.18	0.00E+00	5.15E-01	8.71E-01
I-129	7.1287E-07	263.21	445.18	0.00E+00	1.88E-04	3.17E-04
Kr-85	3.5914E-02	263.21	445.18	0.00E+00	9.45E+00	1.60E+01
Np-237	1.2294E-05	263.21	445.18	0.00E+00	3.24E-03	5.47E-03
Pa-231	2.6383E-09	263.21	445.18	0.00E+00	6.94E-07	1.17E-06
Pb-210	4.4648E-12	263.21	445.18	0.00E+00	1.18E-09	1.99E-09
Pm-147	4.1025E-04	263.21	445.18	0.00E+00	1.08E-01	1.83E-01
Pu-238	4.3265E-02	263.21	445.18	0.00E+00	1.14E+01	1.93E+01
Pu-239	1.4044E-03	263.21	445.18	0.00E+00	3.70E-01	6.25E-01
Pu-240	1.1563E-03	263.21	445.18	0.00E+00	3.04E-01	5.15E-01
Pu-241	1.0156E-01	263.21	445.18	0.00E+00	2.67E+01	4.52E+01
Pu-242	4.9910E-06	263.21	445.18	0.00E+00	1.31E-03	2.22E-03
Ra-226	1.4301E-11	263.21	445.18	0.00E+00	3.76E-09	6.37E-09
Ra-228	2.3767E-11	263.21	445.18	0.00E+00	6.26E-09	1.06E-08
Ru-106	1.1521E-10	263.21	445.18	0.00E+00	3.03E-08	5.13E-08
Se-79	1.2828E-05	263.21	445.18	0.00E+00	3.38E-03	5.71E-03
Sn-126	1.2088E-05	263.21	445.18	0.00E+00	3.18E-03	5.38E-03
Sr-90	1.2560E+00	263.21	445.18	0.00E+00	3.31E+02	5.59E+02
Tc-99	4.0319E-04	263.21	445.18	0.00E+00	1.06E-01	1.79E-01
Th-229	3.3915E-10	263.21	445.18	0.00E+00	8.93E-08	1.51E-07
Th-230	1.8175E-09	263.21	445.18	0.00E+00	4.78E-07	8.09E-07
Th-232	2.3873E-11	263.21	445.18	0.00E+00	6.28E-09	1.06E-08
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.078E+13
0.0250	6.367E+12
0.0375	5.574E+12
0.0575	6.038E+12
0.0850	3.585E+12
0.1250	2.395E+12
0.2250	3.097E+12
0.3750	1.345E+12
0.5750	2.270E+13
0.8500	3.047E+11
1.2500	9.602E+11
1.7500	8.473E+09
2.2500	4.834E+06
2.7500	2.014E+06
3.5000	9.189E+03
5.0000	3.909E+03
7.0000	4.481E+02
11.0000	5.130E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.65E+00	7.87E+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 %:	70.2247191	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	263.21	243.50	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	445.18	487.00	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) AUSTRIA
SNF ID #: 492
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=1.96kg; EOL=1.95kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	7.1933E-10	47.51	95.02	0.00E+00	3.42E-08	6.84E-08
Am-241	1.3109E-02	47.51	95.02	0.00E+00	6.23E-01	1.25E+00
Am-242m	2.2835E-05	47.51	95.02	0.00E+00	1.08E-03	2.17E-03
Am-243	3.0938E-05	47.51	95.02	0.00E+00	1.47E-03	2.94E-03
C-14	1.2566E-04	47.51	95.02	0.00E+00	5.97E-03	1.19E-02
Cl-36	2.6624E-06	47.51	95.02	0.00E+00	1.26E-04	2.53E-04
Cm-243	2.6563E-05	47.51	95.02	0.00E+00	1.26E-03	2.52E-03
Cm-244	2.3106E-03	47.51	95.02	0.00E+00	1.10E-01	2.20E-01
Co-60	1.7273E-01	47.51	95.02	0.00E+00	8.21E+00	1.64E+01
Cs-134	4.2408E-03	47.51	95.02	0.00E+00	2.01E-01	4.03E-01
Cs-135	1.9753E-05	47.51	95.02	0.00E+00	9.39E-04	1.88E-03
Cs-137	1.9363E+00	47.51	95.02	0.00E+00	9.20E+01	1.84E+02
Eu-154	3.6816E-02	47.51	95.02	0.00E+00	1.75E+00	3.50E+00
Eu-155	6.5259E-03	47.51	95.02	0.00E+00	3.10E-01	6.20E-01
Fe-55	1.4627E-02	47.51	95.02	0.00E+00	6.95E-01	1.39E+00
H-3	4.5400E-03	47.51	95.02	0.00E+00	2.16E-01	4.31E-01
I-129	7.1287E-07	47.51	95.02	0.00E+00	3.39E-05	6.77E-05
Kr-85	9.4663E-02	47.51	95.02	0.00E+00	4.50E+00	9.00E+00
Np-237	1.2172E-05	47.51	95.02	0.00E+00	5.78E-04	1.16E-03
Pa-231	1.6912E-09	47.51	95.02	0.00E+00	8.04E-08	1.61E-07
Pb-210	4.4242E-13	47.51	95.02	0.00E+00	2.10E-11	4.20E-11
Pm-147	2.1527E-02	47.51	95.02	0.00E+00	1.02E+00	2.05E+00
Pu-238	4.8707E-02	47.51	95.02	0.00E+00	2.31E+00	4.63E+00
Pu-239	1.4050E-03	47.51	95.02	0.00E+00	6.68E-02	1.34E-01
Pu-240	1.1559E-03	47.51	95.02	0.00E+00	5.49E-02	1.10E-01
Pu-241	2.0896E-01	47.51	95.02	0.00E+00	9.93E+00	1.99E+01
Pu-242	4.9910E-06	47.51	95.02	0.00E+00	2.37E-04	4.74E-04
Ra-226	2.2279E-12	47.51	95.02	0.00E+00	1.06E-10	2.12E-10
Ra-228	2.2655E-11	47.51	95.02	0.00E+00	1.08E-09	2.15E-09
Ru-106	3.4516E-06	47.51	95.02	0.00E+00	1.64E-04	3.28E-04
Se-79	1.2829E-05	47.51	95.02	0.00E+00	6.10E-04	1.22E-03
Sn-126	1.2088E-05	47.51	95.02	0.00E+00	5.74E-04	1.15E-03
Sr-90	1.7949E+00	47.51	95.02	0.00E+00	8.53E+01	1.71E+02
Tc-99	4.0319E-04	47.51	95.02	0.00E+00	1.92E-02	3.83E-02
Th-229	1.7468E-10	47.51	95.02	0.00E+00	8.30E-09	1.66E-08
Th-230	5.3984E-10	47.51	95.02	0.00E+00	2.56E-08	5.13E-08
Th-232	2.3857E-11	47.51	95.02	0.00E+00	1.13E-09	2.27E-09
Tl-208	1.4546E-07	47.51	95.02	0.00E+00	6.91E-06	1.38E-05
U-232	3.9687E-07	47.51	95.02	0.00E+00	1.89E-05	3.77E-05
U-233	6.9272E-08	47.51	95.02	0.00E+00	3.29E-06	6.58E-06
U-234	4.1311E-06	47.51	95.02	0.00E+00	1.96E-04	3.93E-04
U-235	-2.6572E-06	47.51	0.00	2.96E-03	2.83E-03	2.96E-03
U-236	1.3576E-05	47.51	95.02	0.00E+00	6.45E-04	1.29E-03
U-238	-2.2698E-08	47.51	0.00	1.98E-04	1.97E-04	1.98E-04
Y-90	1.7949E+00	47.51	95.02	0.00E+00	8.53E+01	1.71E+02
Other Radionuclides					9.02E+01	1.80E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.433E+12
0.0250	1.956E+12
0.0375	1.724E+12
0.0575	1.840E+12
0.0850	1.103E+12
0.1250	7.652E+11
0.2250	9.521E+11
0.3750	4.140E+11
0.5750	6.881E+12
0.8500	1.413E+11
1.2500	1.306E+12
1.7500	3.757E+09
2.2500	6.664E+08
2.7500	5.116E+05
3.5000	3.665E+03
5.0000	1.417E+03
7.0000	1.628E+02
11.0000	1.867E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.27E+00	2.55E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	47.51	9.50	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		95.02	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.07	0.20
Bounding:	0.14	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	339.87	679.74	0.00E+00	9.68E-08	1.94E-07
Am-241	7.5767E-03	339.87	679.74	0.00E+00	2.58E+00	5.15E+00
Am-242m	2.4459E-05	339.87	679.74	0.00E+00	8.31E-03	1.66E-02
Am-243	3.0983E-05	339.87	679.74	0.00E+00	1.05E-02	2.11E-02
C-14	1.2590E-04	339.87	679.74	0.00E+00	4.28E-02	8.56E-02
Cl-36	2.6624E-06	339.87	679.74	0.00E+00	9.05E-04	1.81E-03
Cm-243	3.8244E-05	339.87	679.74	0.00E+00	1.30E-02	2.60E-02
Cm-244	4.1010E-03	339.87	679.74	0.00E+00	1.39E+00	2.79E+00
Co-60	1.2410E+00	339.87	679.74	0.00E+00	4.22E+02	8.44E+02
Cs-134	6.5454E-01	339.87	679.74	0.00E+00	2.22E+02	4.45E+02
Cs-135	1.9753E-05	339.87	679.74	0.00E+00	6.71E-03	1.34E-02
Cs-137	2.7375E+00	339.87	679.74	0.00E+00	9.30E+02	1.86E+03
Eu-154	1.2324E-01	339.87	679.74	0.00E+00	4.19E+01	8.38E+01
Eu-155	5.3037E-02	339.87	679.74	0.00E+00	1.80E+01	3.61E+01
Fe-55	7.9555E-01	339.87	679.74	0.00E+00	2.70E+02	5.41E+02
H-3	1.0531E-02	339.87	679.74	0.00E+00	3.58E+00	7.16E+00
I-129	7.1287E-07	339.87	679.74	0.00E+00	2.42E-04	4.85E-04
Kr-85	2.4955E-01	339.87	679.74	0.00E+00	8.48E+01	1.70E+02
Np-237	1.2121E-05	339.87	679.74	0.00E+00	4.12E-03	8.24E-03
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
Tl-208	1.4313E-07	339.87	679.74	0.00E+00	4.86E-05	9.73E-05
U-232	4.1927E-07	339.87	679.74	0.00E+00	1.42E-04	2.85E-04
U-233	6.8491E-08	339.87	679.74	0.00E+00	2.33E-05	4.66E-05
U-234	2.0189E-06	339.87	679.74	0.00E+00	6.86E-04	1.37E-03
U-235	-2.6572E-06	339.87	0.00	1.46E-03	5.57E-04	1.46E-03
U-236	1.3575E-05	339.87	679.74	0.00E+00	4.61E-03	9.23E-03
U-238	-2.2698E-08	339.87	0.00	9.71E-05	8.94E-05	9.71E-05
Y-90	2.5646E+00	339.87	679.74	0.00E+00	8.72E+02	1.74E+03
Other Radionuclides					1.21E+03	2.42E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.097E+14
0.0250	2.407E+13
0.0375	2.129E+13
0.0575	2.125E+13
0.0850	1.322E+13
0.1250	1.062E+13
0.2250	1.124E+13
0.3750	5.606E+12
0.5750	9.279E+13
0.8500	1.702E+13
1.2500	6.538E+13
1.7500	8.745E+10
2.2500	6.855E+10
2.7500	6.215E+08
3.5000	7.314E+07
5.0000	1.752E+04
7.0000	2.016E+03
11.0000	2.314E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.23E+01	4.46E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	327.42	339.87	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		679.74	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.04	1.04
Bounding:	2.08	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2025
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	21.67	43.34	0.00E+00	6.17E-09	1.23E-08
Am-241	7.5767E-03	21.67	43.34	0.00E+00	1.64E-01	3.28E-01
Am-242m	2.4459E-05	21.67	43.34	0.00E+00	5.30E-04	1.06E-03
Am-243	3.0983E-05	21.67	43.34	0.00E+00	6.71E-04	1.34E-03
C-14	1.2590E-04	21.67	43.34	0.00E+00	2.73E-03	5.46E-03
Cl-36	2.6624E-06	21.67	43.34	0.00E+00	5.77E-05	1.15E-04
Cm-243	3.8244E-05	21.67	43.34	0.00E+00	8.29E-04	1.66E-03
Cm-244	4.1010E-03	21.67	43.34	0.00E+00	8.89E-02	1.78E-01
Co-60	1.2410E+00	21.67	43.34	0.00E+00	2.69E+01	5.38E+01
Cs-134	6.5454E-01	21.67	43.34	0.00E+00	1.42E+01	2.84E+01
Cs-135	1.9753E-05	21.67	43.34	0.00E+00	4.28E-04	8.56E-04
Cs-137	2.7375E+00	21.67	43.34	0.00E+00	5.93E+01	1.19E+02
Eu-154	1.2324E-01	21.67	43.34	0.00E+00	2.67E+00	5.34E+00
Eu-155	5.3037E-02	21.67	43.34	0.00E+00	1.15E+00	2.30E+00
Fe-55	7.9555E-01	21.67	43.34	0.00E+00	1.72E+01	3.45E+01
H-3	1.0531E-02	21.67	43.34	0.00E+00	2.28E-01	4.56E-01
I-129	7.1287E-07	21.67	43.34	0.00E+00	1.54E-05	3.09E-05
Kr-85	2.4955E-01	21.67	43.34	0.00E+00	5.41E+00	1.08E+01
Np-237	1.2121E-05	21.67	43.34	0.00E+00	2.63E-04	5.25E-04
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
Tl-208	1.4313E-07	21.67	43.34	0.00E+00	3.10E-06	6.20E-06
U-232	4.1927E-07	21.67	43.34	0.00E+00	9.09E-06	1.82E-05
U-233	6.8491E-08	21.67	43.34	0.00E+00	1.48E-06	2.97E-06
U-234	2.0189E-06	21.67	43.34	0.00E+00	4.37E-05	8.75E-05
U-235	-2.6572E-06	21.67	0.00	9.67E-04	9.09E-04	9.67E-04
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.993E+12
0.0250	1.534E+12
0.0375	1.357E+12
0.0575	1.355E+12
0.0850	8.430E+11
0.1250	6.769E+11
0.2250	7.164E+11
0.3750	3.575E+11
0.5750	5.916E+12
0.8500	1.085E+12
1.2500	4.169E+12
1.7500	5.576E+09
2.2500	4.371E+09
2.7500	3.962E+07
3.5000	4.663E+06
5.0000	1.117E+03
7.0000	1.286E+02
11.0000	1.475E+01

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

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.9	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	3.59
Bounding:	0.20	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name:	TRIGA (FLIP) FFCR SO. KOREA	[1]Fuel decay start date:	1997
SNF ID #:	733	Estimates as of:	2030
Fuel Units & Descr:	4 - ELEMENT	Template:	TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
Heavy Metal Mass:	BOL=0.638kg; EOL=0.561kg	[2]Template Burnup(MWd):	66.52
ROD Storage Site:	INEEL	Template BOL Heavy Metal Mass (MT):	0.000196
		Template Decay Time:	25 years

Estimated Canister usage: 16"x10' 0.05

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0386E-09	73.37	146.74	0.00E+00	7.62E-06	1.52E-07
Am-241	1.4973E-02	73.37	146.74	0.00E+00	1.10E+00	2.20E+00
Am-242m	2.2324E-05	73.37	146.74	0.00E+00	1.64E-03	3.28E-03
Am-243	3.0923E-05	73.37	146.74	0.00E+00	2.27E-03	4.54E-03
C-14	1.2559E-04	73.37	146.74	0.00E+00	9.21E-03	1.84E-02
Cl-36	2.6624E-06	73.37	146.74	0.00E+00	1.95E-04	3.91E-04
Cm-243	2.3527E-05	73.37	146.74	0.00E+00	1.73E-03	3.45E-03
Cm-244	1.9092E-03	73.37	146.74	0.00E+00	1.40E-01	2.80E-01
Co-60	8.9552E-02	73.37	146.74	0.00E+00	6.57E+00	1.31E+01
Cs-134	7.9074E-04	73.37	146.74	0.00E+00	5.80E-02	1.16E-01
Cs-135	1.9753E-05	73.37	146.74	0.00E+00	1.45E-03	2.90E-03
Cs-137	1.7243E+00	73.37	146.74	0.00E+00	1.27E+02	2.53E+02
Eu-154	2.4609E-02	73.37	146.74	0.00E+00	1.81E+00	3.61E+00
Eu-155	3.2456E-03	73.37	146.74	0.00E+00	2.38E-01	4.76E-01
Fe-55	3.8605E-03	73.37	146.74	0.00E+00	2.83E-01	5.67E-01
H-3	3.4305E-03	73.37	146.74	0.00E+00	2.52E-01	5.03E-01
I-129	7.1287E-07	73.37	146.74	0.00E+00	5.23E-05	1.05E-04
Kr-85	6.8536E-02	73.37	146.74	0.00E+00	5.03E+00	1.01E+01
Np-237	1.2219E-05	73.37	146.74	0.00E+00	8.97E-04	1.79E-03
Pa-231	2.0701E-09	73.37	146.74	0.00E+00	1.52E-07	3.04E-07
Pb-210	1.3279E-12	73.37	146.74	0.00E+00	9.74E-11	1.95E-10
Pm-147	5.7517E-03	73.37	146.74	0.00E+00	4.22E-01	8.44E-01
Pu-238	4.6828E-02	73.37	146.74	0.00E+00	3.44E+00	6.87E+00
Pu-239	1.4048E-03	73.37	146.74	0.00E+00	1.03E-01	2.06E-01
Pu-240	1.1563E-03	73.37	146.74	0.00E+00	8.48E-02	1.70E-01
Pu-241	1.6431E-01	73.37	146.74	0.00E+00	1.21E+01	2.41E+01
Pu-242	4.9910E-06	73.37	146.74	0.00E+00	3.66E-04	7.32E-04
Ra-226	5.4390E-12	73.37	146.74	0.00E+00	3.99E-10	7.98E-10
Ra-228	2.3437E-11	73.37	146.74	0.00E+00	1.72E-09	3.44E-09
Ru-106	1.1115E-07	73.37	146.74	0.00E+00	8.16E-06	1.63E-05
Se-79	1.2829E-05	73.37	146.74	0.00E+00	9.41E-04	1.88E-03
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
Tl-208	1.3982E-07	73.37	146.74	0.00E+00	1.03E-05	2.05E-05
U-232	3.7943E-07	73.37	146.74	0.00E+00	2.78E-05	5.57E-05
U-233	6.9814E-08	73.37	146.74	0.00E+00	5.12E-06	1.02E-05
U-234	5.4059E-06	73.37	146.74	0.00E+00	3.97E-04	7.93E-04
U-235	-2.6572E-06	73.37	0.00	9.65E-04	7.70E-04	9.65E-04
U-236	1.3576E-05	73.37	146.74	0.00E+00	9.96E-04	1.99E-03
U-238	-2.2698E-08	73.37	0.00	6.44E-05	6.27E-05	6.44E-05
Y-90	1.5935E+00	73.37	146.74	0.00E+00	1.17E+02	2.34E+02
Other Radionuclides					1.24E+02	2.49E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.290E+13
0.0250	2.671E+12
0.0375	2.347E+12
0.0575	2.522E+12
0.0850	1.505E+12
0.1250	1.028E+12
0.2250	1.300E+12
0.3750	5.645E+11
0.5750	9.436E+12
0.8500	1.586E+11
1.2500	1.073E+12
1.7500	4.457E+09
2.2500	5.421E+06
2.7500	7.413E+05
3.5000	4.312E+03
5.0000	1.830E+03
7.0000	2.101E+02
11.0000	2.408E+01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.98432602	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	30.07	73.37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		146.74	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) MEXICO
SNF ID #: 493
Fuel Units & Descr: 35 - ELEMENT
Heavy Metal Mass: BOL=6.86kg; EOL=6.825kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	7.1933E-10	64.67	129.34	0.00E+00	4.65E-08	9.30E-08
Am-241	1.3109E-02	64.67	129.34	0.00E+00	8.48E-01	1.70E+00
Am-242m	2.2835E-05	64.67	129.34	0.00E+00	1.48E-03	2.95E-03
Am-243	3.0938E-05	64.67	129.34	0.00E+00	2.00E-03	4.00E-03
C-14	1.2566E-04	64.67	129.34	0.00E+00	8.13E-03	1.63E-02
Cl-36	2.6624E-06	64.67	129.34	0.00E+00	1.72E-04	3.44E-04
Cm-243	2.6563E-05	64.67	129.34	0.00E+00	1.72E-03	3.44E-03
Cm-244	2.3106E-03	64.67	129.34	0.00E+00	1.49E-01	2.99E-01
Co-60	1.7273E-01	64.67	129.34	0.00E+00	1.12E+01	2.23E+01
Cs-134	4.2408E-03	64.67	129.34	0.00E+00	2.74E-01	5.49E-01
Cs-135	1.9753E-05	64.67	129.34	0.00E+00	1.28E-03	2.55E-03
Cs-137	1.9363E+00	64.67	129.34	0.00E+00	1.25E+02	2.50E+02
Eu-154	3.6816E-02	64.67	129.34	0.00E+00	2.38E+00	4.76E+00
Eu-155	6.5259E-03	64.67	129.34	0.00E+00	4.22E-01	8.44E-01
Fe-55	1.4627E-02	64.67	129.34	0.00E+00	9.46E-01	1.89E+00
H-3	4.5400E-03	64.67	129.34	0.00E+00	2.94E-01	5.87E-01
I-129	7.1287E-07	64.67	129.34	0.00E+00	4.61E-05	9.22E-05
Kr-85	9.4663E-02	64.67	129.34	0.00E+00	6.12E+00	1.22E+01
Np-237	1.2172E-05	64.67	129.34	0.00E+00	7.87E-04	1.57E-03
Pa-231	1.6912E-09	64.67	129.34	0.00E+00	1.09E-07	2.19E-07
Pb-210	4.4242E-13	64.67	129.34	0.00E+00	2.86E-11	5.72E-11
Pm-147	2.1527E-02	64.67	129.34	0.00E+00	1.39E+00	2.78E+00
Pu-238	4.8707E-02	64.67	129.34	0.00E+00	3.15E+00	6.30E+00
Pu-239	1.4050E-03	64.67	129.34	0.00E+00	9.09E-02	1.82E-01
Pu-240	1.1559E-03	64.67	129.34	0.00E+00	7.48E-02	1.50E-01
Pu-241	2.0896E-01	64.67	129.34	0.00E+00	1.35E+01	2.70E+01
Pu-242	4.9910E-06	64.67	129.34	0.00E+00	3.23E-04	6.46E-04
Ra-226	2.2279E-12	64.67	129.34	0.00E+00	1.44E-10	2.88E-10
Ra-228	2.2655E-11	64.67	129.34	0.00E+00	1.47E-09	2.93E-09
Ru-106	3.4516E-06	64.67	129.34	0.00E+00	2.23E-04	4.46E-04
Se-79	1.2829E-05	64.67	129.34	0.00E+00	8.30E-04	1.66E-03
Sn-126	1.2088E-05	64.67	129.34	0.00E+00	7.82E-04	1.56E-03
Sr-90	1.7949E+00	64.67	129.34	0.00E+00	1.16E+02	2.32E+02
Tc-99	4.0319E-04	64.67	129.34	0.00E+00	2.61E-02	5.21E-02
Th-229	1.7468E-10	64.67	129.34	0.00E+00	1.13E-08	2.26E-08
Th-230	5.3984E-10	64.67	129.34	0.00E+00	3.49E-08	6.98E-08
Th-232	2.3857E-11	64.67	129.34	0.00E+00	1.54E-09	3.09E-09
Tl-208	1.4546E-07	64.67	129.34	0.00E+00	9.41E-06	1.88E-05
U-232	3.9687E-07	64.67	129.34	0.00E+00	2.57E-05	5.13E-05
U-233	6.9272E-08	64.67	129.34	0.00E+00	4.48E-06	8.96E-06
U-234	4.1311E-06	64.67	129.34	0.00E+00	2.67E-04	5.34E-04
U-235	-2.6572E-06	64.67	0.00	1.04E-02	1.02E-02	1.04E-02
U-236	1.3576E-05	64.67	129.34	0.00E+00	8.78E-04	1.76E-03
U-238	-2.2698E-08	64.67	0.00	6.94E-04	6.93E-04	6.94E-04
Y-90	1.7949E+00	64.67	129.34	0.00E+00	1.16E+02	2.32E+02
Other Radionuclides					1.23E+02	2.46E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.284E+13
0.0250	2.662E+12
0.0375	2.347E+12
0.0575	2.505E+12
0.0850	1.501E+12
0.1250	1.042E+12
0.2250	1.296E+12
0.3750	5.635E+11
0.5750	9.365E+12
0.8500	1.923E+11
1.2500	1.777E+12
1.7500	5.113E+09
2.2500	9.070E+06
2.7500	6.963E+05
3.5000	4.990E+03
5.0000	1.930E+03
7.0000	2.217E+02
11.0000	2.542E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.74E+00	3.47E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	64.67	33.26	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		129.34	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2025
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	1,356.06	2,712.12	0.00E+00	3.86E-07	7.73E-07
Am-241	7.5767E-03	1,356.06	2,712.12	0.00E+00	1.03E+01	2.05E+01
Am-242m	2.4459E-05	1,356.06	2,712.12	0.00E+00	3.32E-02	6.63E-02
Am-243	3.0983E-05	1,356.06	2,712.12	0.00E+00	4.20E-02	8.40E-02
C-14	1.2590E-04	1,356.06	2,712.12	0.00E+00	1.71E-01	3.41E-01
Cl-36	2.6624E-06	1,356.06	2,712.12	0.00E+00	3.61E-03	7.22E-03
Cm-243	3.8244E-05	1,356.06	2,712.12	0.00E+00	5.19E-02	1.04E-01
Cm-244	4.1010E-03	1,356.06	2,712.12	0.00E+00	5.56E+00	1.11E+01
Co-60	1.2410E+00	1,356.06	2,712.12	0.00E+00	1.68E+03	3.37E+03
Cs-134	6.5454E-01	1,356.06	2,712.12	0.00E+00	8.88E+02	1.78E+03
Cs-135	1.9753E-05	1,356.06	2,712.12	0.00E+00	2.68E-02	5.36E-02
Cs-137	2.7375E+00	1,356.06	2,712.12	0.00E+00	3.71E+03	7.42E+03
Eu-154	1.2324E-01	1,356.06	2,712.12	0.00E+00	1.67E+02	3.34E+02
Eu-155	5.3037E-02	1,356.06	2,712.12	0.00E+00	7.19E+01	1.44E+02
Fe-55	7.9555E-01	1,356.06	2,712.12	0.00E+00	1.08E+03	2.16E+03
H-3	1.0531E-02	1,356.06	2,712.12	0.00E+00	1.43E+01	2.86E+01
I-129	7.1287E-07	1,356.06	2,712.12	0.00E+00	9.67E-04	1.93E-03
Kr-85	2.4955E-01	1,356.06	2,712.12	0.00E+00	3.38E+02	6.77E+02
Np-237	1.2121E-05	1,356.06	2,712.12	0.00E+00	1.64E-02	3.29E-02
Pa-231	1.1230E-09	1,356.06	2,712.12	0.00E+00	1.52E-06	3.05E-06
Pb-210	6.1636E-14	1,356.06	2,712.12	0.00E+00	8.36E-11	1.67E-10
Pm-147	1.1302E+00	1,356.06	2,712.12	0.00E+00	1.53E+03	3.07E+03
Pu-238	5.4826E-02	1,356.06	2,712.12	0.00E+00	7.43E+01	1.49E+02
Pu-239	1.4056E-03	1,356.06	2,712.12	0.00E+00	1.91E+00	3.81E+00
Pu-240	1.1536E-03	1,356.06	2,712.12	0.00E+00	1.56E+00	3.13E+00
Pu-241	4.2995E-01	1,356.06	2,712.12	0.00E+00	5.83E+02	1.17E+03
Pu-242	4.9910E-06	1,356.06	2,712.12	0.00E+00	6.77E-03	1.35E-02
Ra-226	2.4008E-13	1,356.06	2,712.12	0.00E+00	3.26E-10	6.51E-10
Ra-228	1.8220E-11	1,356.06	2,712.12	0.00E+00	2.47E-08	4.94E-08
Ru-106	1.0343E-01	1,356.06	2,712.12	0.00E+00	1.40E+02	2.81E+02
Se-79	1.2832E-05	1,356.06	2,712.12	0.00E+00	1.74E-02	3.48E-02
Sn-126	1.2090E-05	1,356.06	2,712.12	0.00E+00	1.64E-02	3.28E-02
Sr-90	2.5646E+00	1,356.06	2,712.12	0.00E+00	3.48E+03	6.96E+03
Tc-99	4.0319E-04	1,356.06	2,712.12	0.00E+00	5.47E-01	1.09E+00
Th-229	7.7375E-11	1,356.06	2,712.12	0.00E+00	1.05E-07	2.10E-07
Th-230	1.2211E-10	1,356.06	2,712.12	0.00E+00	1.66E-07	3.31E-07
Th-232	2.3842E-11	1,356.06	2,712.12	0.00E+00	3.23E-08	6.47E-08
Tl-208	1.4313E-07	1,356.06	2,712.12	0.00E+00	1.94E-04	3.88E-04
U-232	4.1927E-07	1,356.06	2,712.12	0.00E+00	5.69E-04	1.14E-03
U-233	6.8491E-08	1,356.06	2,712.12	0.00E+00	9.29E-05	1.86E-04
U-234	2.0189E-06	1,356.06	2,712.12	0.00E+00	2.74E-03	5.48E-03
U-235	-2.6572E-06	1,356.06	0.00	2.58E-02	2.22E-02	2.58E-02
U-236	1.3575E-05	1,356.06	2,712.12	0.00E+00	1.84E-02	3.68E-02
U-238	-2.2698E-08	1,356.06	0.00	1.73E-03	1.69E-03	1.73E-03
Y-90	2.5646E+00	1,356.06	2,712.12	0.00E+00	3.48E+03	6.96E+03
Other Radionuclides					4.83E+03	9.66E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.376E+14
0.0250	9.603E+13
0.0375	8.494E+13
0.0575	8.478E+13
0.0850	5.275E+13
0.1250	4.236E+13
0.2250	4.483E+13
0.3750	2.237E+13
0.5750	3.702E+14
0.8500	6.792E+13
1.2500	2.609E+14
1.7500	3.489E+11
2.2500	2.735E+11
2.7500	2.480E+09
3.5000	2.918E+08
5.0000	6.991E+04
7.0000	8.045E+03
11.0000	9.233E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+01	1.78E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	482.25	1,356.06	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,712.12	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) SLOVENIA
SNF ID #: 495
Fuel Units & Descr: 26 - ELEMENT
Heavy Metal Mass: BOL=4.987kg; EOL=4.69kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 25 years

Estimated Canister usage: $18^{\circ}x10^{\circ}$ 0.23

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0386E-09	281.70	563.41	0.00E+00	2.93E-07	5.85E-07
Am-241	1.4973E-02	281.70	563.41	0.00E+00	4.22E+00	8.44E+00
Am-242m	2.2324E-05	281.70	563.41	0.00E+00	6.29E-03	1.26E-02
Am-243	3.0923E-05	281.70	563.41	0.00E+00	8.71E-03	1.74E-02
C-14	1.2559E-04	281.70	563.41	0.00E+00	3.54E-02	7.08E-02
Cl-36	2.6624E-06	281.70	563.41	0.00E+00	7.50E-04	1.50E-03
Cm-243	2.3527E-05	281.70	563.41	0.00E+00	6.63E-03	1.33E-02
Cm-244	1.9092E-03	281.70	563.41	0.00E+00	5.38E-01	1.08E+00
Co-60	8.9552E-02	281.70	563.41	0.00E+00	2.52E+01	5.05E+01
Cs-134	7.9074E-04	281.70	563.41	0.00E+00	2.23E-01	4.46E-01
Cs-135	1.9753E-05	281.70	563.41	0.00E+00	5.56E-03	1.11E-02
Cs-137	1.7243E+00	281.70	563.41	0.00E+00	4.86E+02	9.71E+02
Eu-154	2.4609E-02	281.70	563.41	0.00E+00	6.93E+00	1.39E+01
Eu-155	3.2456E-03	281.70	563.41	0.00E+00	9.14E-01	1.83E+00
Fe-55	3.8605E-03	281.70	563.41	0.00E+00	1.09E+00	2.18E+00
H-3	3.4305E-03	281.70	563.41	0.00E+00	9.66E-01	1.93E+00
I-129	7.1287E-07	281.70	563.41	0.00E+00	2.01E-04	4.02E-04
Kr-85	6.8536E-02	281.70	563.41	0.00E+00	1.93E+01	3.86E+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
Tl-208	1.3982E-07	281.70	563.41	0.00E+00	3.94E-05	7.88E-05
U-232	3.7943E-07	281.70	563.41	0.00E+00	1.07E-04	2.14E-04
U-233	6.9814E-08	281.70	563.41	0.00E+00	1.97E-05	3.93E-05
U-234	5.4059E-08	281.70	563.41	0.00E+00	1.52E-03	3.05E-03
U-235	-2.6572E-08	281.70	0.00	7.54E-03	6.79E-03	7.54E-03
U-236	1.3576E-05	281.70	563.41	0.00E+00	3.82E-03	7.65E-03
U-238	-2.2698E-08	281.70	0.00	5.03E-04	4.97E-04	5.03E-04
Y-90	1.5935E+00	281.70	563.41	0.00E+00	4.49E+02	8.98E+02
Other Radionuclides					4.77E+02	9.54E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.952E+13
0.0250	1.025E+13
0.0375	9.011E+12
0.0575	9.682E+12
0.0850	5.780E+12
0.1250	3.946E+12
0.2250	4.993E+12
0.3750	2.167E+12
0.5750	3.623E+13
0.8500	6.088E+11
1.2500	4.121E+12
1.7500	1.711E+10
2.2500	2.081E+07
2.7500	2.846E+06
3.5000	1.656E+04
5.0000	7.027E+03
7.0000	8.068E+02
11.0000	9.247E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.46E+00	1.29E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.96306689	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	94.02	281.70	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		563.41	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) SO. KOREA
SNF ID #: 494
Fuel Units & Descr: 114 - ELEMENT
Heavy Metal Mass: BOL=21.66kg; EOL=19.106kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0386E-09	2,426.99	4,853.99	0.00E+00	2.52E-06	5.04E-06
Am-241	1.4973E-02	2,426.99	4,853.99	0.00E+00	3.63E+01	7.27E+01
Am-242m	2.2324E-05	2,426.99	4,853.99	0.00E+00	5.42E-02	1.08E-01
Am-243	3.0923E-05	2,426.99	4,853.99	0.00E+00	7.50E-02	1.50E-01
C-14	1.2559E-04	2,426.99	4,853.99	0.00E+00	3.05E-01	6.10E-01
Cl-36	2.6624E-06	2,426.99	4,853.99	0.00E+00	6.46E-03	1.29E-02
Cm-243	2.3527E-05	2,426.99	4,853.99	0.00E+00	5.71E-02	1.14E-01
Cm-244	1.9092E-03	2,426.99	4,853.99	0.00E+00	4.63E+00	9.27E+00
Co-60	8.9552E-02	2,426.99	4,853.99	0.00E+00	2.17E+02	4.35E+02
Cs-134	7.9074E-04	2,426.99	4,853.99	0.00E+00	1.92E+00	3.84E+00
Cs-135	1.9753E-05	2,426.99	4,853.99	0.00E+00	4.79E-02	9.59E-02
Cs-137	1.7243E+00	2,426.99	4,853.99	0.00E+00	4.18E+03	8.37E+03
Eu-154	2.4609E-02	2,426.99	4,853.99	0.00E+00	5.97E+01	1.19E+02
Eu-155	3.2456E-03	2,426.99	4,853.99	0.00E+00	7.88E+00	1.58E+01
Fe-55	3.8605E-03	2,426.99	4,853.99	0.00E+00	9.37E+00	1.87E+01
H-3	3.4305E-03	2,426.99	4,853.99	0.00E+00	8.33E+00	1.67E+01
I-129	7.1287E-07	2,426.99	4,853.99	0.00E+00	1.73E-03	3.46E-03
Kr-85	6.8536E-02	2,426.99	4,853.99	0.00E+00	1.66E+02	3.33E+02
Np-237	1.2219E-05	2,426.99	4,853.99	0.00E+00	2.97E-02	5.93E-02
Pa-231	2.0701E-09	2,426.99	4,853.99	0.00E+00	5.02E-06	1.00E-05
Pb-210	1.3279E-12	2,426.99	4,853.99	0.00E+00	3.22E-09	6.45E-09
Pm-147	5.7517E-03	2,426.99	4,853.99	0.00E+00	1.40E+01	2.79E+01
Pu-238	4.6828E-02	2,426.99	4,853.99	0.00E+00	1.14E+02	2.27E+02
Pu-239	1.4048E-03	2,426.99	4,853.99	0.00E+00	3.41E+00	6.82E+00
Pu-240	1.1563E-03	2,426.99	4,853.99	0.00E+00	2.81E+00	5.61E+00
Pu-241	1.6431E-01	2,426.99	4,853.99	0.00E+00	3.99E+02	7.98E+02
Pu-242	4.9910E-06	2,426.99	4,853.99	0.00E+00	1.21E-02	2.42E-02
Ra-226	5.4390E-12	2,426.99	4,853.99	0.00E+00	1.32E-08	2.64E-08
Ra-228	2.3437E-11	2,426.99	4,853.99	0.00E+00	5.69E-08	1.14E-07
Ru-106	1.1115E-07	2,426.99	4,853.99	0.00E+00	2.70E-04	5.40E-04
Se-79	1.2829E-05	2,426.99	4,853.99	0.00E+00	3.11E-02	6.23E-02
Sn-126	1.2088E-05	2,426.99	4,853.99	0.00E+00	2.93E-02	5.87E-02
Sr-90	1.5935E+00	2,426.99	4,853.99	0.00E+00	3.87E+03	7.73E+03
Tc-99	4.0319E-04	2,426.99	4,853.99	0.00E+00	9.79E-01	1.96E+00
Th-229	2.4023E-10	2,426.99	4,853.99	0.00E+00	5.83E-07	1.17E-06
Th-230	9.6948E-10	2,426.99	4,853.99	0.00E+00	2.35E-06	4.71E-06
Th-232	2.3857E-11	2,426.99	4,853.99	0.00E+00	5.79E-08	1.16E-07
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.267E+14
0.0250	8.834E+13
0.0375	7.764E+13
0.0575	8.341E+13
0.0850	4.979E+13
0.1250	3.400E+13
0.2250	4.302E+13
0.3750	1.867E+13
0.5750	3.121E+14
0.8500	5.245E+12
1.2500	3.551E+13
1.7500	1.474E+11
2.2500	1.793E+08
2.7500	2.452E+07
3.5000	1.426E+05
5.0000	6.054E+04
7.0000	6.951E+03
11.0000	7.966E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.87E+01	1.11E+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 %:	70	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	816.76	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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.33	2.97
Bounding:	0.66	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) TEXAS A&M
SNF ID #: 239
Fuel Units & Descr: 7 - ELEMENT
Heavy Metal Mass: BOL=1.372kg; EOL=1.182kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1976
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 50 years

Estimated Canister usage: $18^{m}x10^{5}$ 0.06

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0776E-09	180.29	360.59	0.00E+00	3.75E-07	7.49E-07
Am-241	1.6777E-02	180.29	360.59	0.00E+00	3.02E+00	6.05E+00
Am-242m	1.9919E-05	180.29	360.59	0.00E+00	3.59E-03	7.18E-03
Am-243	3.0848E-05	180.29	360.59	0.00E+00	5.56E-03	1.11E-02
C-14	1.2521E-04	180.29	360.59	0.00E+00	2.26E-02	4.51E-02
Cl-36	2.6624E-06	180.29	360.59	0.00E+00	4.80E-04	9.60E-04
Cm-243	1.2813E-05	180.29	360.59	0.00E+00	2.31E-03	4.62E-03
Cm-244	7.3361E-04	180.29	360.59	0.00E+00	1.32E-01	2.65E-01
Co-60	3.3494E-03	180.29	360.59	0.00E+00	6.04E-01	1.21E+00
Cs-134	1.7799E-07	180.29	360.59	0.00E+00	3.21E-05	6.42E-05
Cs-135	1.9738E-05	180.29	360.59	0.00E+00	3.56E-03	7.12E-03
Cs-137	9.6843E-01	180.29	360.59	0.00E+00	1.75E+02	3.49E+02
Eu-154	3.2877E-03	180.29	360.59	0.00E+00	5.93E-01	1.19E+00
Eu-155	9.8812E-05	180.29	360.59	0.00E+00	1.78E-02	3.56E-02
Fe-55	4.9444E-06	180.29	360.59	0.00E+00	8.91E-04	1.78E-03
H-3	8.4381E-04	180.29	360.59	0.00E+00	1.52E-01	3.04E-01
I-129	7.1287E-07	180.29	360.59	0.00E+00	1.29E-04	2.57E-04
Kr-85	1.3624E-02	180.29	360.59	0.00E+00	2.46E+00	4.91E+00
Np-237	1.2375E-05	180.29	360.59	0.00E+00	2.23E-03	4.46E-03
Pa-231	3.2066E-09	180.29	360.59	0.00E+00	5.78E-07	1.16E-06
Pb-210	1.0925E-11	180.29	360.59	0.00E+00	1.97E-09	3.94E-09
Pm-147	7.8187E-06	180.29	360.59	0.00E+00	1.41E-03	2.82E-03
Pu-238	3.8440E-02	180.29	360.59	0.00E+00	6.93E+00	1.39E+01
Pu-239	1.4038E-03	180.29	360.59	0.00E+00	2.53E-01	5.06E-01
Pu-240	1.1560E-03	180.29	360.59	0.00E+00	2.08E-01	4.17E-01
Pu-241	4.9354E-02	180.29	360.59	0.00E+00	8.90E+00	1.78E+01
Pu-242	4.9910E-06	180.29	360.59	0.00E+00	9.00E-04	1.80E-03
Ra-226	2.9330E-11	180.29	360.59	0.00E+00	5.29E-09	1.06E-08
Ra-228	2.3857E-11	180.29	360.59	0.00E+00	4.30E-09	8.60E-09
Ru-106	3.8455E-15	180.29	360.59	0.00E+00	6.93E-13	1.39E-12
Se-79	1.2826E-05	180.29	360.59	0.00E+00	2.31E-03	4.62E-03
Sn-126	1.2087E-05	180.29	360.59	0.00E+00	2.18E-03	4.36E-03
Sr-90	8.7913E-01	180.29	360.59	0.00E+00	1.59E+02	3.17E+02
Tc-99	4.0304E-04	180.29	360.59	0.00E+00	7.27E-02	1.45E-01
Th-229	4.3912E-10	180.29	360.59	0.00E+00	7.92E-08	1.58E-07
Th-230	2.8879E-09	180.29	360.59	0.00E+00	5.21E-07	1.04E-06
Th-232	2.3888E-11	180.29	360.59	0.00E+00	4.31E-09	8.61E-09
Tl-208	1.1027E-07	180.29	360.59	0.00E+00	1.99E-05	3.98E-05
U-232	2.9871E-07	180.29	360.59	0.00E+00	5.39E-05	1.08E-04
U-233	7.1407E-08	180.29	360.59	0.00E+00	1.29E-05	2.57E-05
U-234	8.6801E-06	180.29	360.59	0.00E+00	1.56E-03	3.13E-03
U-235	-2.6572E-06	180.29	0.00	2.07E-03	1.59E-03	2.07E-03
U-236	1.3576E-05	180.29	360.59	0.00E+00	2.45E-03	4.90E-03
U-238	-2.2698E-08	180.29	0.00	1.39E-04	1.35E-04	1.39E-04
Y-90	8.7928E-01	180.29	360.59	0.00E+00	1.59E+02	3.17E+02
Other Radionuclides					1.74E+02	3.49E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.746E+13
0.0250	3.606E+12
0.0375	3.150E+12
0.0575	3.442E+12
0.0850	2.028E+12
0.1250	1.332E+12
0.2250	1.750E+12
0.3750	7.617E+11
0.5750	1.299E+13
0.8500	1.445E+11
1.2500	1.534E+11
1.7500	3.873E+09
2.2500	8.320E+05
2.7500	1.403E+06
3.5000	4.505E+03
5.0000	1.911E+03
7.0000	2.183E+02
11.0000	2.495E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.28E+00	4.55E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	4.65
Bounding:	0.77	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) TEXAS A&M
SNF ID #: 241
Fuel Units & Descr: 96 - ELEMENT
Heavy Metal Mass: BOL=16.819kg; EOL=14.63kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.8488E-10	2,080.28	4,160.56	0.00E+00	5.93E-07	1.19E-06
Am-241	7.5767E-03	2,080.28	4,160.56	0.00E+00	1.58E+01	3.15E+01
Am-242m	2.4459E-05	2,080.28	4,160.56	0.00E+00	5.09E-02	1.02E-01
Am-243	3.0983E-05	2,080.28	4,160.56	0.00E+00	6.45E-02	1.29E-01
C-14	1.2590E-04	2,080.28	4,160.56	0.00E+00	2.62E-01	5.24E-01
Cl-36	2.6624E-06	2,080.28	4,160.56	0.00E+00	5.54E-03	1.11E-02
Cm-243	3.8244E-05	2,080.28	4,160.56	0.00E+00	7.96E-02	1.59E-01
Cm-244	4.1010E-03	2,080.28	4,160.56	0.00E+00	8.53E+00	1.71E+01
Co-60	1.2410E+00	2,080.28	4,160.56	0.00E+00	2.58E+03	5.16E+03
Cs-134	6.5454E-01	2,080.28	4,160.56	0.00E+00	1.36E+03	2.72E+03
Cs-135	1.9753E-05	2,080.28	4,160.56	0.00E+00	4.11E-02	8.22E-02
Cs-137	2.7375E+00	2,080.28	4,160.56	0.00E+00	5.69E+03	1.14E+04
Eu-154	1.2324E-01	2,080.28	4,160.56	0.00E+00	2.56E+02	5.13E+02
Eu-155	5.3037E-02	2,080.28	4,160.56	0.00E+00	1.10E+02	2.21E+02
Fe-55	7.9555E-01	2,080.28	4,160.56	0.00E+00	1.65E+03	3.31E+03
H-3	1.0531E-02	2,080.28	4,160.56	0.00E+00	2.19E+01	4.38E+01
I-129	7.1287E-07	2,080.28	4,160.56	0.00E+00	1.48E-03	2.97E-03
Kr-85	2.4955E-01	2,080.28	4,160.56	0.00E+00	5.19E+02	1.04E+03
Np-237	1.2121E-05	2,080.28	4,160.56	0.00E+00	2.52E-02	5.04E-02
Pa-231	1.1230E-09	2,080.28	4,160.56	0.00E+00	2.34E-06	4.67E-06
Pb-210	6.1636E-14	2,080.28	4,160.56	0.00E+00	1.28E-10	2.56E-10
Pm-147	1.1302E+00	2,080.28	4,160.56	0.00E+00	2.35E+03	4.70E+03
Pu-238	5.4826E-02	2,080.28	4,160.56	0.00E+00	1.14E+02	2.28E+02
Pu-239	1.4056E-03	2,080.28	4,160.56	0.00E+00	2.92E+00	5.85E+00
Pu-240	1.1536E-03	2,080.28	4,160.56	0.00E+00	2.40E+00	4.80E+00
Pu-241	4.2995E-01	2,080.28	4,160.56	0.00E+00	8.94E+02	1.79E+03
Pu-242	4.9910E-06	2,080.28	4,160.56	0.00E+00	1.04E-02	2.08E-02
Ra-226	2.4008E-13	2,080.28	4,160.56	0.00E+00	4.99E-10	9.99E-10
Ra-228	1.8220E-11	2,080.28	4,160.56	0.00E+00	3.79E-08	7.58E-08
Ru-106	1.0343E-01	2,080.28	4,160.56	0.00E+00	2.15E+02	4.30E+02
Se-79	1.2832E-05	2,080.28	4,160.56	0.00E+00	2.67E-02	5.34E-02
Sn-126	1.2090E-05	2,080.28	4,160.56	0.00E+00	2.51E-02	5.03E-02
Sr-90	2.5646E+00	2,080.28	4,160.56	0.00E+00	5.34E+03	1.07E+04
Tc-99	4.0319E-04	2,080.28	4,160.56	0.00E+00	8.39E-01	1.68E+00
Th-229	7.7375E-11	2,080.28	4,160.56	0.00E+00	1.61E-07	3.22E-07
Th-230	1.2211E-10	2,080.28	4,160.56	0.00E+00	2.54E-07	5.08E-07
Th-232	2.3842E-11	2,080.28	4,160.56	0.00E+00	4.96E-08	9.92E-08
Tl-208	1.4313E-07	2,080.28	4,160.56	0.00E+00	2.98E-04	5.96E-04
U-232	4.1927E-07	2,080.28	4,160.56	0.00E+00	8.72E-04	1.74E-03
U-233	6.8491E-08	2,080.28	4,160.56	0.00E+00	1.42E-04	2.85E-04
U-234	2.0189E-06	2,080.28	4,160.56	0.00E+00	4.20E-03	8.40E-03
U-235	-2.6572E-06	2,080.28	0.00	2.54E-02	1.99E-02	2.54E-02
U-236	1.3575E-05	2,080.28	4,160.56	0.00E+00	2.82E-02	5.65E-02
U-238	-2.2698E-08	2,080.28	0.00	1.70E-03	1.65E-03	1.70E-03
Y-90	2.5646E+00	2,080.28	4,160.56	0.00E+00	5.34E+03	1.07E+04
Other Radionuclides					7.41E+03	1.48E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.713E+14
0.0250	1.473E+14
0.0375	1.303E+14
0.0575	1.301E+14
0.0850	8.093E+13
0.1250	6.498E+13
0.2250	6.877E+13
0.3750	3.432E+13
0.5750	5.680E+14
0.8500	1.042E+14
1.2500	4.002E+14
1.7500	5.353E+11
2.2500	4.196E+11
2.7500	3.804E+09
3.5000	4.477E+08
5.0000	1.072E+05
7.0000	1.234E+04
11.0000	1.416E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+02	2.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	70.00179205	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	2.62
Bounding:	0.73	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	63.68	127.36	0.00E+00	1.81E-08	3.63E-08
Am-241	7.5767E-03	63.68	127.36	0.00E+00	4.82E-01	9.65E-01
Am-242m	2.4459E-05	63.68	127.36	0.00E+00	1.56E-03	3.11E-03
Am-243	3.0983E-05	63.68	127.36	0.00E+00	1.97E-03	3.95E-03
C-14	1.2590E-04	63.68	127.36	0.00E+00	8.02E-03	1.60E-02
Cl-36	2.6624E-06	63.68	127.36	0.00E+00	1.70E-04	3.39E-04
Cm-243	3.8244E-05	63.68	127.36	0.00E+00	2.44E-03	4.87E-03
Cm-244	4.1010E-03	63.68	127.36	0.00E+00	2.61E-01	5.22E-01
Co-60	1.2410E+00	63.68	127.36	0.00E+00	7.90E+01	1.58E+02
Cs-134	6.5454E-01	63.68	127.36	0.00E+00	4.17E+01	8.34E+01
Cs-135	1.9753E-05	63.68	127.36	0.00E+00	1.26E-03	2.52E-03
Cs-137	2.7375E+00	63.68	127.36	0.00E+00	1.74E+02	3.49E+02
Eu-154	1.2324E-01	63.68	127.36	0.00E+00	7.85E+00	1.57E+01
Eu-155	5.3037E-02	63.68	127.36	0.00E+00	3.38E+00	6.75E+00
Fe-55	7.9555E-01	63.68	127.36	0.00E+00	5.07E+01	1.01E+02
H-3	1.0531E-02	63.68	127.36	0.00E+00	6.71E-01	1.34E+00
I-129	7.1287E-07	63.68	127.36	0.00E+00	4.54E-05	9.08E-05
Kr-85	2.4955E-01	63.68	127.36	0.00E+00	1.59E+01	3.18E+01
Np-237	1.2121E-05	63.68	127.36	0.00E+00	7.72E-04	1.54E-03
Pa-231	1.1230E-09	63.68	127.36	0.00E+00	7.15E-08	1.43E-07
Pb-210	6.1636E-14	63.68	127.36	0.00E+00	3.92E-12	7.85E-12
Pm-147	1.1302E+00	63.68	127.36	0.00E+00	7.20E+01	1.44E+02
Pu-238	5.4826E-02	63.68	127.36	0.00E+00	3.49E+00	6.98E+00
Pu-239	1.4056E-03	63.68	127.36	0.00E+00	8.95E-02	1.79E-01
Pu-240	1.1536E-03	63.68	127.36	0.00E+00	7.35E-02	1.47E-01
Pu-241	4.2995E-01	63.68	127.36	0.00E+00	2.74E+01	5.48E+01
Pu-242	4.9910E-06	63.68	127.36	0.00E+00	3.18E-04	6.36E-04
Ra-226	2.4008E-13	63.68	127.36	0.00E+00	1.53E-11	3.06E-11
Ra-228	1.8220E-11	63.68	127.36	0.00E+00	1.16E-09	2.32E-09
Ru-106	1.0343E-01	63.68	127.36	0.00E+00	6.59E+00	1.32E+01
Se-79	1.2832E-05	63.68	127.36	0.00E+00	8.17E-04	1.63E-03
Sn-126	1.2090E-05	63.68	127.36	0.00E+00	7.70E-04	1.54E-03
Sr-90	2.5646E+00	63.68	127.36	0.00E+00	1.63E+02	3.27E+02
Tc-99	4.0319E-04	63.68	127.36	0.00E+00	2.57E-02	5.13E-02
Th-229	7.7375E-11	63.68	127.36	0.00E+00	4.93E-09	9.85E-09
Th-230	1.2211E-10	63.68	127.36	0.00E+00	7.78E-09	1.56E-08
Th-232	2.3842E-11	63.68	127.36	0.00E+00	1.52E-09	3.04E-09
Tl-208	1.4313E-07	63.68	127.36	0.00E+00	9.11E-06	1.82E-05
U-232	4.1927E-07	63.68	127.36	0.00E+00	2.67E-05	5.34E-05
U-233	6.8491E-08	63.68	127.36	0.00E+00	4.36E-06	8.72E-06
U-234	2.0189E-06	63.68	127.36	0.00E+00	1.29E-04	2.57E-04
U-235	-2.6572E-06	63.68	0.00	1.33E-03	1.16E-03	1.33E-03
U-236	1.3575E-05	63.68	127.36	0.00E+00	8.64E-04	1.73E-03
U-238	-2.2698E-08	63.68	0.00	8.87E-05	8.73E-05	8.87E-05
Y-90	2.5646E+00	63.68	127.36	0.00E+00	1.63E+02	3.27E+02
Other Radionuclides					2.27E+02	4.54E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.055E+13
0.0250	4.509E+12
0.0375	3.989E+12
0.0575	3.981E+12
0.0850	2.477E+12
0.1250	1.989E+12
0.2250	2.105E+12
0.3750	1.050E+12
0.5750	1.739E+13
0.8500	3.189E+12
1.2500	1.225E+13
1.7500	1.639E+10
2.2500	1.284E+10
2.7500	1.164E+08
3.5000	1.370E+07
5.0000	3.283E+03
7.0000	3.778E+02
11.0000	4.336E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.18E+00	8.35E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.96587031	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	24.86	63.68	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		127.36	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.21	2.56
Bounding:	0.43	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	59.32	118.64	0.00E+00	1.69E-08	3.38E-08
Am-241	7.5767E-03	59.32	118.64	0.00E+00	4.49E-01	8.99E-01
Am-242m	2.4459E-05	59.32	118.64	0.00E+00	1.45E-03	2.90E-03
Am-243	3.0983E-05	59.32	118.64	0.00E+00	1.84E-03	3.68E-03
C-14	1.2590E-04	59.32	118.64	0.00E+00	7.47E-03	1.49E-02
Cl-36	2.6624E-06	59.32	118.64	0.00E+00	1.58E-04	3.16E-04
Cm-243	3.8244E-05	59.32	118.64	0.00E+00	2.27E-03	4.54E-03
Cm-244	4.1010E-03	59.32	118.64	0.00E+00	2.43E-01	4.87E-01
Co-60	1.2410E+00	59.32	118.64	0.00E+00	7.36E+01	1.47E+02
Cs-134	6.5454E-01	59.32	118.64	0.00E+00	3.88E+01	7.77E+01
Cs-135	1.9753E-05	59.32	118.64	0.00E+00	1.17E-03	2.34E-03
Cs-137	2.7375E+00	59.32	118.64	0.00E+00	1.62E+02	3.25E+02
Eu-154	1.2324E-01	59.32	118.64	0.00E+00	7.31E+00	1.46E+01
Eu-155	5.3037E-02	59.32	118.64	0.00E+00	3.15E+00	6.29E+00
Fe-55	7.9555E-01	59.32	118.64	0.00E+00	4.72E+01	9.44E+01
H-3	1.0531E-02	59.32	118.64	0.00E+00	6.25E-01	1.25E+00
I-129	7.1287E-07	59.32	118.64	0.00E+00	4.23E-05	8.46E-05
Kr-85	2.4955E-01	59.32	118.64	0.00E+00	1.48E+01	2.96E+01
Np-237	1.2121E-05	59.32	118.64	0.00E+00	7.19E-04	1.44E-03
Pa-231	1.1230E-09	59.32	118.64	0.00E+00	6.66E-08	1.33E-07
Pb-210	6.1636E-14	59.32	118.64	0.00E+00	3.66E-12	7.31E-12
Pm-147	1.1302E+00	59.32	118.64	0.00E+00	6.70E+01	1.34E+02
Pu-238	5.4826E-02	59.32	118.64	0.00E+00	3.25E+00	6.50E+00
Pu-239	1.4056E-03	59.32	118.64	0.00E+00	8.34E-02	1.67E-01
Pu-240	1.1536E-03	59.32	118.64	0.00E+00	6.84E-02	1.37E-01
Pu-241	4.2995E-01	59.32	118.64	0.00E+00	2.55E+01	5.10E+01
Pu-242	4.9910E-06	59.32	118.64	0.00E+00	2.96E-04	5.92E-04
Ra-226	2.4008E-13	59.32	118.64	0.00E+00	1.42E-11	2.85E-11
Ra-228	1.8220E-11	59.32	118.64	0.00E+00	1.08E-09	2.16E-09
Ru-106	1.0343E-01	59.32	118.64	0.00E+00	6.14E+00	1.23E+01
Se-79	1.2832E-05	59.32	118.64	0.00E+00	7.61E-04	1.52E-03
Sn-126	1.2090E-05	59.32	118.64	0.00E+00	7.17E-04	1.43E-03
Sr-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02
Tc-99	4.0319E-04	59.32	118.64	0.00E+00	2.39E-02	4.78E-02
Th-229	7.7375E-11	59.32	118.64	0.00E+00	4.59E-09	9.18E-09
Th-230	1.2211E-10	59.32	118.64	0.00E+00	7.24E-09	1.45E-08
Th-232	2.3842E-11	59.32	118.64	0.00E+00	1.41E-09	2.83E-09
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.914E+13
0.0250	4.201E+12
0.0375	3.716E+12
0.0575	3.709E+12
0.0850	2.308E+12
0.1250	1.853E+12
0.2250	1.961E+12
0.3750	9.786E+11
0.5750	1.620E+13
0.8500	2.971E+12
1.2500	1.141E+13
1.7500	1.526E+10
2.2500	1.196E+10
2.7500	1.065E+08
3.5000	1.277E+07
5.0000	3.059E+03
7.0000	3.520E+02
11.0000	4.039E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.89E+00	7.78E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) UNIV OF WISCONSIN
SNF ID #: 242
Fuel Units & Descr: 92 - ELEMENT
Heavy Metal Mass: BOL=18.032kg; EOL=15.53kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	2,378.33	4,756.66	0.00E+00	6.78E-07	1.36E-06
Am-241	7.5767E-03	2,378.33	4,756.66	0.00E+00	1.80E+01	3.60E+01
Am-242m	2.4459E-05	2,378.33	4,756.66	0.00E+00	5.82E-02	1.16E-01
Am-243	3.0983E-05	2,378.33	4,756.66	0.00E+00	7.37E-02	1.47E-01
C-14	1.2590E-04	2,378.33	4,756.66	0.00E+00	2.99E-01	5.99E-01
Cl-36	2.6624E-06	2,378.33	4,756.66	0.00E+00	6.33E-03	1.27E-02
Cm-243	3.8244E-05	2,378.33	4,756.66	0.00E+00	9.10E-02	1.82E-01
Cm-244	4.1010E-03	2,378.33	4,756.66	0.00E+00	9.75E+00	1.95E+01
Co-60	1.2410E+00	2,378.33	4,756.66	0.00E+00	2.95E+03	5.90E+03
Cs-134	6.5454E-01	2,378.33	4,756.66	0.00E+00	1.56E+03	3.11E+03
Cs-135	1.9753E-05	2,378.33	4,756.66	0.00E+00	4.70E-02	9.40E-02
Cs-137	2.7375E+00	2,378.33	4,756.66	0.00E+00	6.51E+03	1.30E+04
Eu-154	1.2324E-01	2,378.33	4,756.66	0.00E+00	2.93E+02	5.86E+02
Eu-155	5.3037E-02	2,378.33	4,756.66	0.00E+00	1.26E+02	2.52E+02
Fe-55	7.9555E-01	2,378.33	4,756.66	0.00E+00	1.89E+03	3.78E+03
H-3	1.0531E-02	2,378.33	4,756.66	0.00E+00	2.50E+01	5.01E+01
I-129	7.1287E-07	2,378.33	4,756.66	0.00E+00	1.70E-03	3.39E-03
Kr-85	2.4955E-01	2,378.33	4,756.66	0.00E+00	5.94E+02	1.19E+03
Np-237	1.2121E-05	2,378.33	4,756.66	0.00E+00	2.88E-02	5.77E-02
Pa-231	1.1230E-09	2,378.33	4,756.66	0.00E+00	2.67E-06	5.34E-06
Pb-210	6.1636E-14	2,378.33	4,756.66	0.00E+00	1.47E-10	2.93E-10
Pm-147	1.1302E+00	2,378.33	4,756.66	0.00E+00	2.69E+03	5.38E+03
Pu-238	5.4826E-02	2,378.33	4,756.66	0.00E+00	1.30E+02	2.61E+02
Pu-239	1.4056E-03	2,378.33	4,756.66	0.00E+00	3.34E+00	6.69E+00
Pu-240	1.1536E-03	2,378.33	4,756.66	0.00E+00	2.74E+00	5.49E+00
Pu-241	4.2995E-01	2,378.33	4,756.66	0.00E+00	1.02E+03	2.05E+03
Pu-242	4.9910E-06	2,378.33	4,756.66	0.00E+00	1.19E-02	2.37E-02
Ra-226	2.4008E-13	2,378.33	4,756.66	0.00E+00	5.71E-10	1.14E-09
Ra-228	1.8220E-11	2,378.33	4,756.66	0.00E+00	4.33E-08	8.67E-08
Ru-106	1.0343E-01	2,378.33	4,756.66	0.00E+00	2.46E+02	4.92E+02
Se-79	1.2832E-05	2,378.33	4,756.66	0.00E+00	3.05E-02	6.10E-02
Sn-126	1.2090E-05	2,378.33	4,756.66	0.00E+00	2.88E-02	5.75E-02
Sr-90	2.5646E+00	2,378.33	4,756.66	0.00E+00	6.10E+03	1.22E+04
Tc-99	4.0319E-04	2,378.33	4,756.66	0.00E+00	9.59E-01	1.92E+00
Th-229	7.7375E-11	2,378.33	4,756.66	0.00E+00	1.84E-07	3.68E-07
Th-230	1.2211E-10	2,378.33	4,756.66	0.00E+00	2.90E-07	5.81E-07
Th-232	2.3842E-11	2,378.33	4,756.66	0.00E+00	5.67E-08	1.13E-07
Tl-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-08	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-236	1.3575E-05	2,378.33	4,756.66	0.00E+00	3.23E-02	6.46E-02
U-238	-2.2698E-08	2,378.33	0.00	1.82E-03	1.77E-03	1.82E-03
Y-90	2.5646E+00	2,378.33	4,756.66	0.00E+00	6.10E+03	1.22E+04
Other Radionuclides					8.47E+03	1.69E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.675E+14
0.0250	1.684E+14
0.0375	1.490E+14
0.0575	1.487E+14
0.0850	9.252E+13
0.1250	7.429E+13
0.2250	7.863E+13
0.3750	3.923E+13
0.5750	6.493E+14
0.8500	1.191E+14
1.2500	4.575E+14
1.7500	6.120E+11
2.2500	4.797E+11
2.7500	4.349E+09
3.5000	5.118E+08
5.0000	1.226E+06
7.0000	1.411E+04
11.0000	1.619E+03

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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	509.98	2,378.33	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,756.66	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.8488E-10	1,897.80	3,795.60	0.00E+00	5.41E-07	1.08E-06
Am-241	7.5767E-03	1,897.80	3,795.60	0.00E+00	1.44E+01	2.88E+01
Am-242m	2.4459E-05	1,897.80	3,795.60	0.00E+00	4.64E-02	9.28E-02
Am-243	3.0983E-05	1,897.80	3,795.60	0.00E+00	5.88E-02	1.18E-01
C-14	1.2590E-04	1,897.80	3,795.60	0.00E+00	2.39E-01	4.78E-01
Cl-36	2.6624E-06	1,897.80	3,795.60	0.00E+00	5.05E-03	1.01E-02
Cm-243	3.8244E-05	1,897.80	3,795.60	0.00E+00	7.26E-02	1.45E-01
Cm-244	4.1010E-03	1,897.80	3,795.60	0.00E+00	7.78E+00	1.56E+01
Co-60	1.2410E+00	1,897.80	3,795.60	0.00E+00	2.36E+03	4.71E+03
Cs-134	6.5454E-01	1,897.80	3,795.60	0.00E+00	1.24E+03	2.48E+03
Cs-135	1.9753E-05	1,897.80	3,795.60	0.00E+00	3.75E-02	7.50E-02
Cs-137	2.7375E+00	1,897.80	3,795.60	0.00E+00	5.20E+03	1.04E+04
Eu-154	1.2324E-01	1,897.80	3,795.60	0.00E+00	2.34E+02	4.68E+02
Eu-155	5.3037E-02	1,897.80	3,795.60	0.00E+00	1.01E+02	2.01E+02
Fe-55	7.9555E-01	1,897.80	3,795.60	0.00E+00	1.51E+03	3.02E+03
H-3	1.0531E-02	1,897.80	3,795.60	0.00E+00	2.00E+01	4.00E+01
I-129	7.1287E-07	1,897.80	3,795.60	0.00E+00	1.35E-03	2.71E-03
Kr-85	2.4955E-01	1,897.80	3,795.60	0.00E+00	4.74E+02	9.47E+02
Np-237	1.2121E-05	1,897.80	3,795.60	0.00E+00	2.30E-02	4.60E-02
Pa-231	1.1230E-09	1,897.80	3,795.60	0.00E+00	2.13E-06	4.26E-06
Pb-210	6.1636E-14	1,897.80	3,795.60	0.00E+00	1.17E-10	2.34E-10
Pm-147	1.1302E+00	1,897.80	3,795.60	0.00E+00	2.14E+03	4.29E+03
Pu-238	5.4826E-02	1,897.80	3,795.60	0.00E+00	1.04E+02	2.08E+02
Pu-239	1.4056E-03	1,897.80	3,795.60	0.00E+00	2.67E+00	5.34E+00
Pu-240	1.1536E-03	1,897.80	3,795.60	0.00E+00	2.19E+00	4.38E+00
Pu-241	4.2995E-01	1,897.80	3,795.60	0.00E+00	8.16E+02	1.63E+03
Pu-242	4.9910E-06	1,897.80	3,795.60	0.00E+00	9.47E-03	1.89E-02
Ra-226	2.4008E-13	1,897.80	3,795.60	0.00E+00	4.56E-10	9.11E-10
Ra-228	1.8220E-11	1,897.80	3,795.60	0.00E+00	3.46E-08	6.92E-08
Ru-106	1.0343E-01	1,897.80	3,795.60	0.00E+00	1.96E+02	3.93E+02
Se-79	1.2832E-05	1,897.80	3,795.60	0.00E+00	2.44E-02	4.87E-02
Sn-126	1.2090E-05	1,897.80	3,795.60	0.00E+00	2.29E-02	4.59E-02
Sr-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03
Tc-99	4.0319E-04	1,897.80	3,795.60	0.00E+00	7.65E-01	1.53E+00
Th-229	7.7375E-11	1,897.80	3,795.60	0.00E+00	1.47E-07	2.94E-07
Th-230	1.2211E-10	1,897.80	3,795.60	0.00E+00	2.32E-07	4.63E-07
Th-232	2.3842E-11	1,897.80	3,795.60	0.00E+00	4.52E-08	9.05E-08
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.124E+14
0.0250	1.344E+14
0.0375	1.189E+14
0.0575	1.186E+14
0.0850	7.383E+13
0.1250	5.928E+13
0.2250	6.274E+13
0.3750	3.131E+13
0.5750	5.181E+14
0.8500	9.505E+13
1.2500	3.651E+14
1.7500	4.883E+11
2.2500	3.828E+11
2.7500	3.470E+09
3.5000	4.084E+08
5.0000	9.784E+04
7.0000	1.126E+04
11.0000	1.292E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.24E+02	2.49E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	432.36	1,897.80	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,795.60	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

[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 (HIGH POWER) (HEU)
SNF ID #: 998
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.117kg; EOL=0.117kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1970
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0776E-09	2.22	4.44	0.00E+00	4.61E-09	9.23E-09
Am-241	1.6777E-02	2.22	4.44	0.00E+00	3.72E-02	7.45E-02
Am-242m	1.9919E-05	2.22	4.44	0.00E+00	4.42E-05	8.84E-05
Am-243	3.0848E-05	2.22	4.44	0.00E+00	6.85E-05	1.37E-04
C-14	1.2521E-04	2.22	4.44	0.00E+00	2.78E-04	5.56E-04
Cl-36	2.6624E-06	2.22	4.44	0.00E+00	5.91E-06	1.18E-05
Cm-243	1.2813E-05	2.22	4.44	0.00E+00	2.84E-05	5.69E-05
Cm-244	7.3361E-04	2.22	4.44	0.00E+00	1.63E-03	3.26E-03
Co-60	3.3494E-03	2.22	4.44	0.00E+00	7.44E-03	1.49E-02
Cs-134	1.7799E-07	2.22	4.44	0.00E+00	3.95E-07	7.90E-07
Cs-135	1.9738E-05	2.22	4.44	0.00E+00	4.38E-05	8.76E-05
Cs-137	9.6843E-01	2.22	4.44	0.00E+00	2.15E+00	4.30E+00
Eu-154	3.2877E-03	2.22	4.44	0.00E+00	7.30E-03	1.46E-02
Eu-155	9.8812E-05	2.22	4.44	0.00E+00	2.19E-04	4.39E-04
Fe-55	4.9444E-06	2.22	4.44	0.00E+00	1.10E-05	2.20E-05
H-3	8.4381E-04	2.22	4.44	0.00E+00	1.87E-03	3.75E-03
I-129	7.1287E-07	2.22	4.44	0.00E+00	1.58E-06	3.17E-06
Kr-85	1.3624E-02	2.22	4.44	0.00E+00	3.02E-02	6.05E-02
Np-237	1.2375E-05	2.22	4.44	0.00E+00	2.75E-05	5.50E-05
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-106	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	1.2087E-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
Tl-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-06	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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.150E+11
0.0250	4.441E+10
0.0375	3.879E+10
0.0575	4.239E+10
0.0850	2.498E+10
0.1250	1.640E+10
0.2250	2.155E+10
0.3750	9.379E+09
0.5750	1.600E+11
0.8500	1.779E+09
1.2500	1.889E+09
1.7500	4.770E+07
2.2500	1.025E+04
2.7500	1.727E+04
3.5000	5.549E+01
5.0000	2.353E+01
7.0000	2.688E+00
11.0000	3.073E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.80E-02	5.61E-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:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.152	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2.22
Bounding:		4.44

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:	0.11	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 302
Fuel Units & Descr: 611 - ELEMENT
Heavy Metal Mass: BOL=27.067kg; EOL=13.992kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1978
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0776E-09	12,427.12	24,854.25	0.00E+00	2.58E-05	5.16E-05
Am-241	1.6777E-02	12,427.12	24,854.25	0.00E+00	2.08E+02	4.17E+02
Am-242m	1.9919E-05	12,427.12	24,854.25	0.00E+00	2.48E-01	4.95E-01
Am-243	3.0848E-05	12,427.12	24,854.25	0.00E+00	3.83E-01	7.67E-01
C-14	1.2521E-04	12,427.12	24,854.25	0.00E+00	1.56E+00	3.11E+00
Cl-36	2.6624E-06	12,427.12	24,854.25	0.00E+00	3.31E-02	6.62E-02
Cm-243	1.2813E-05	12,427.12	24,854.25	0.00E+00	1.59E-01	3.18E-01
Cm-244	7.3361E-04	12,427.12	24,854.25	0.00E+00	9.12E+00	1.82E+01
Co-60	3.3494E-03	12,427.12	24,854.25	0.00E+00	4.16E+01	8.32E+01
Cs-134	1.7799E-07	12,427.12	24,854.25	0.00E+00	2.21E-03	4.42E-03
Cs-135	1.9738E-05	12,427.12	24,854.25	0.00E+00	2.45E-01	4.91E-01
Cs-137	9.6843E-01	12,427.12	24,854.25	0.00E+00	1.20E+04	2.41E+04
Eu-154	3.2877E-03	12,427.12	24,854.25	0.00E+00	4.09E+01	8.17E+01
Eu-155	9.8812E-05	12,427.12	24,854.25	0.00E+00	1.23E+00	2.46E+00
Fe-55	4.9444E-06	12,427.12	24,854.25	0.00E+00	6.14E-02	1.23E-01
H-3	8.4381E-04	12,427.12	24,854.25	0.00E+00	1.05E+01	2.10E+01
I-129	7.1287E-07	12,427.12	24,854.25	0.00E+00	8.86E-03	1.77E-02
Kr-85	1.3624E-02	12,427.12	24,854.25	0.00E+00	1.69E+02	3.39E+02
Np-237	1.2375E-05	12,427.12	24,854.25	0.00E+00	1.54E-01	3.08E-01
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	1.09E+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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.203E+15
0.0250	2.486E+14
0.0375	2.171E+14
0.0575	2.373E+14
0.0850	1.398E+14
0.1250	9.179E+13
0.2250	1.206E+14
0.3750	5.250E+13
0.5750	8.955E+14
0.8500	9.957E+12
1.2500	1.057E+13
1.7500	2.670E+11
2.2500	5.735E+07
2.7500	9.668E+07
3.5000	3.105E+05
5.0000	1.317E+05
7.0000	1.504E+04
11.0000	1.719E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.57E+02	3.14E+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:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12,427.12
Bounding:		24,854.25

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:	1.35	
Bounding:	2.71	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 930
Fuel Units & Descr: 267 - ELEMENT
Heavy Metal Mass: BOL=11.828kg; EOL=5.58kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 25 years

Estimated Canister usage: $18^{*}x10^{6}$ 2.41

II. Estimates

Radionuclide	m Ci/MWd From Template	x_a Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_a Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0386E-09	5,938.04	11,241.67	0.00E+00	6.17E-06	1.17E-05
Am-241	1.4973E-02	5,938.04	11,241.67	0.00E+00	8.89E+01	1.68E+02
Am-242m	2.2324E-05	5,938.04	11,241.67	0.00E+00	1.33E-01	2.51E-01
Am-243	3.0923E-05	5,938.04	11,241.67	0.00E+00	1.84E-01	3.48E-01
C-14	1.2559E-04	5,938.04	11,241.67	0.00E+00	7.46E-01	1.41E+00
Cl-36	2.6624E-06	5,938.04	11,241.67	0.00E+00	1.58E-02	2.99E-02
Cm-243	2.3527E-05	5,938.04	11,241.67	0.00E+00	1.40E-01	2.64E-01
Cm-244	1.9092E-03	5,938.04	11,241.67	0.00E+00	1.13E+01	2.15E+01
Co-60	8.9552E-02	5,938.04	11,241.67	0.00E+00	5.32E+02	1.01E+03
Cs-134	7.9074E-04	5,938.04	11,241.67	0.00E+00	4.70E+00	8.89E+00
Cs-135	1.9753E-05	5,938.04	11,241.67	0.00E+00	1.17E-01	2.22E-01
Cs-137	1.7243E+00	5,938.04	11,241.67	0.00E+00	1.02E+04	1.94E+04
Eu-154	2.4609E-02	5,938.04	11,241.67	0.00E+00	1.46E+02	2.77E+02
Eu-155	3.2456E-03	5,938.04	11,241.67	0.00E+00	1.93E+01	3.65E+01
Fe-55	3.8605E-03	5,938.04	11,241.67	0.00E+00	2.29E+01	4.34E+01
H-3	3.4305E-03	5,938.04	11,241.67	0.00E+00	2.04E+01	3.86E+01
I-129	7.1287E-07	5,938.04	11,241.67	0.00E+00	4.23E-03	8.01E-03
Kr-85	6.8536E-02	5,938.04	11,241.67	0.00E+00	4.07E+02	7.70E+02
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-06	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	9.46E+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-06	2.70E-06
Th-230	9.6948E-10	5,938.04	11,241.67	0.00E+00	5.76E-06	1.09E-05
Th-232	2.3857E-11	5,938.04	11,241.67	0.00E+00	1.42E-07	2.68E-07
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.881E+14
0.0250	2.046E+14
0.0375	1.798E+14
0.0575	1.932E+14
0.0850	1.153E+14
0.1250	7.874E+13
0.2250	9.962E+13
0.3750	4.324E+13
0.5750	7.229E+14
0.8500	1.215E+13
1.2500	8.223E+13
1.7500	3.414E+11
2.2500	4.153E+08
2.7500	5.879E+07
3.5000	3.303E+05
5.0000	1.402E+05
7.0000	1.610E+04
11.0000	1.845E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+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:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14636964	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,938.04
Bounding:		11,241.67

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:	1.48	
Bounding:	2.80	

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 20/20 FFCR MNRC
SNF ID #: 737
Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=2.462kg; EOL=2.462kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	1.05E-03	1.05E-03	1.05E-03
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	6.64E-04	6.64E-04	6.64E-04
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.607E+07
0.0250	0.000E+00
0.0375	3.553E+04
0.0575	2.174E+04
0.0850	3.036E+06
0.1250	5.994E+06
0.2250	2.121E+07
0.3750	5.293E+04
0.5750	2.604E+03
0.8500	4.065E+02
1.2500	2.427E+01
1.7500	1.188E+01
2.2500	6.879E+00
2.7500	3.997E+00
3.5000	3.573E+00
5.0000	1.535E+00
7.0000	1.767E-01
11.0000	2.032E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.44E-05	4.44E-05
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 %:	19.76779631	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 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 30/20 FFCR MNRC
SNF ID #: 1055
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.675kg; EOL=0.675kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	2.88E-04	2.88E-04	2.88E-04
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	1.82E-04	1.82E-04	1.82E-04
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.138E+06
0.0250	0.000E+00
0.0375	9.726E+03
0.0575	5.957E+03
0.0850	8.309E+05
0.1250	1.641E+06
0.2250	5.806E+06
0.3750	1.449E+04
0.5750	7.127E+02
0.8500	1.113E+02
1.2500	6.652E+00
1.7500	3.255E+00
2.2500	1.885E+00
2.7500	1.095E+00
3.5000	9.793E-01
5.0000	4.207E-01
7.0000	4.843E-02
11.0000	5.568E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E-06	1.22E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74748006	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

[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 8.5/20 FFCR
SNF ID #: 1003
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=1.604kg; EOL=1.541kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07
Am-241	1.8331E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-05	1.70E-04
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.55E-02
Cl-36	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05
Cm-244	1.6962E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04
Co-60	1.2839E+00	60.14	120.28	0.00E+00	7.72E+01	1.54E+02
Cs-134	9.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01
Cs-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03
Cs-137	2.7564E+00	60.14	120.28	0.00E+00	1.66E+02	3.32E+02
Eu-154	1.5368E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.76E+00	3.52E+00
Fe-55	7.7158E-01	60.14	120.28	0.00E+00	4.64E+01	9.28E+01
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.68E-01	1.34E+00
I-129	7.3684E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05
Kr-85	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+13
0.0250	4.278E+12
0.0375	3.643E+12
0.0575	3.739E+12
0.0850	2.316E+12
0.1250	1.682E+12
0.2250	1.965E+12
0.3750	9.972E+11
0.5750	1.326E+13
0.8500	5.690E+11
1.2500	1.155E+13
1.7500	7.702E+09
2.2500	1.241E+10
2.7500	9.852E+07
3.5000	1.147E+07
5.0000	6.404E+01
7.0000	7.250E+00
11.0000	8.259E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.80E+00	7.00E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.26433915	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	54.71	60.14	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		120.28	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

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

[1]Fuel decay start date: 2019
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3731E-09	9.20	18.40	0.00E+00	1.26E-08	2.53E-08
Am-241	2.3865E-03	9.20	18.40	0.00E+00	2.20E-02	4.39E-02
Am-242m	1.3812E-06	9.20	18.40	0.00E+00	1.27E-05	2.54E-05
Am-243	1.4767E-07	9.20	18.40	0.00E+00	1.36E-06	2.72E-06
C-14	1.2863E-04	9.20	18.40	0.00E+00	1.18E-03	2.37E-03
Cl-36	2.8120E-06	9.20	18.40	0.00E+00	2.59E-05	5.17E-05
Cm-243	1.5895E-07	9.20	18.40	0.00E+00	1.46E-06	2.92E-06
Cm-244	1.4008E-06	9.20	18.40	0.00E+00	1.29E-05	2.58E-05
Co-60	6.6541E-01	9.20	18.40	0.00E+00	6.12E+00	1.22E+01
Cs-134	1.6887E-02	9.20	18.40	0.00E+00	1.55E-01	3.11E-01
Cs-135	3.2195E-05	9.20	18.40	0.00E+00	2.96E-04	5.92E-04
Cs-137	2.4556E+00	9.20	18.40	0.00E+00	2.26E+01	4.52E+01
Eu-154	1.0268E-02	9.20	18.40	0.00E+00	9.45E-02	1.89E-01
Eu-155	1.4570E-02	9.20	18.40	0.00E+00	1.34E-01	2.68E-01
Fe-55	2.0361E-01	9.20	18.40	0.00E+00	1.87E+00	3.75E+00
H-3	8.3940E-03	9.20	18.40	0.00E+00	7.72E-02	1.54E-01
I-129	7.3684E-07	9.20	18.40	0.00E+00	6.78E-06	1.36E-05
Kr-85	1.8286E-01	9.20	18.40	0.00E+00	1.68E+00	3.36E+00
Np-237	1.2462E-06	9.20	18.40	0.00E+00	1.15E-05	2.29E-05
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
Tl-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-05	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.377E+12
0.0250	5.036E+11
0.0375	4.302E+11
0.0575	4.585E+11
0.0850	2.782E+11
0.1250	1.829E+11
0.2250	2.372E+11
0.3750	1.090E+11
0.5750	1.707E+12
0.8500	3.048E+10
1.2500	9.164E+11
1.7500	5.515E+08
2.2500	2.880E+07
2.7500	4.768E+05
3.5000	5.650E+04
5.0000	9.771E+00
7.0000	1.105E+00
11.0000	1.258E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.60E-01	7.21E-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 %:		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)[2]

	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

[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 8.5/20 FFCR ENGLAND
SNF ID #: 967
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.641kg; EOL=0.624kg
ROD Storage Site: INEEL

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

Estimated Canister usage:
16"x10'
0.04

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	18.75	37.49	0.00E+00	4.96E-08	9.91E-08
Am-241	3.1429E-03	18.75	37.49	0.00E+00	5.89E-02	1.18E-01
Am-242m	1.3195E-06	18.75	37.49	0.00E+00	2.47E-05	4.95E-05
Am-243	1.4753E-07	18.75	37.49	0.00E+00	2.77E-06	5.53E-06
C-14	1.2847E-04	18.75	37.49	0.00E+00	2.41E-03	4.82E-03
Cl-36	2.8120E-06	18.75	37.49	0.00E+00	5.27E-05	1.05E-04
Cm-243	1.2465E-07	18.75	37.49	0.00E+00	2.34E-06	4.67E-06
Cm-244	9.5564E-07	18.75	37.49	0.00E+00	1.79E-05	3.58E-05
Co-60	1.7880E-01	18.75	37.49	0.00E+00	3.35E+00	6.70E+00
Cs-134	5.8692E-04	18.75	37.49	0.00E+00	1.10E-02	2.20E-02
Cs-135	3.2195E-05	18.75	37.49	0.00E+00	6.04E-04	1.21E-03
Cs-137	1.9489E+00	18.75	37.49	0.00E+00	3.65E+01	7.31E+01
Eu-154	4.5895E-03	18.75	37.49	0.00E+00	8.60E-02	1.72E-01
Eu-155	3.6045E-03	18.75	37.49	0.00E+00	6.76E-02	1.35E-01
Fe-55	1.4185E-02	18.75	37.49	0.00E+00	2.66E-01	5.32E-01
H-3	4.7895E-03	18.75	37.49	0.00E+00	8.98E-02	1.80E-01
I-129	7.3684E-07	18.75	37.49	0.00E+00	1.38E-05	2.76E-05
Kr-85	9.5820E-02	18.75	37.49	0.00E+00	1.80E+00	3.59E+00
Np-237	1.2552E-06	18.75	37.49	0.00E+00	2.35E-05	4.71E-05
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
Tl-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-90	1.8241E+00	18.75	37.49	0.00E+00	3.42E+01	6.84E+01
Other Radionuclides					3.61E+01	7.22E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.757E+12
0.0250	7.822E+11
0.0375	6.776E+11
0.0575	7.290E+11
0.0850	4.401E+11
0.1250	2.876E+11
0.2250	3.779E+11
0.3750	1.656E+11
0.5750	2.724E+12
0.8500	3.070E+10
1.2500	5.088E+11
1.7500	7.888E+08
2.2500	2.717E+06
2.7500	2.993E+04
3.5000	1.664E+02
5.0000	1.988E+01
7.0000	2.246E+00
11.0000	2.555E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.69E-01	9.36E-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)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.86	0.90
Bounding:	1.71	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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 CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	15.61	31.23	0.00E+00	4.13E-08	8.25E-08
Am-241	3.1429E-03	15.61	31.23	0.00E+00	4.91E-02	9.81E-02
Am-242m	1.3195E-06	15.61	31.23	0.00E+00	2.06E-05	4.12E-05
Am-243	1.4753E-07	15.61	31.23	0.00E+00	2.30E-06	4.61E-06
C-14	1.2847E-04	15.61	31.23	0.00E+00	2.01E-03	4.01E-03
Cl-36	2.8120E-06	15.61	31.23	0.00E+00	4.39E-05	8.78E-05
Cm-243	1.2465E-07	15.61	31.23	0.00E+00	1.95E-06	3.89E-06
Cm-244	9.5564E-07	15.61	31.23	0.00E+00	1.49E-05	2.98E-05
Co-60	1.7880E-01	15.61	31.23	0.00E+00	2.79E+00	5.58E+00
Cs-134	5.8692E-04	15.61	31.23	0.00E+00	9.16E-03	1.83E-02
Cs-135	3.2195E-05	15.61	31.23	0.00E+00	5.03E-04	1.01E-03
Cs-137	1.9489E+00	15.61	31.23	0.00E+00	3.04E+01	6.09E+01
Eu-154	4.5895E-03	15.61	31.23	0.00E+00	7.17E-02	1.43E-01
Eu-155	3.6045E-03	15.61	31.23	0.00E+00	5.63E-02	1.13E-01
Fe-55	1.4185E-02	15.61	31.23	0.00E+00	2.21E-01	4.43E-01
H-3	4.7895E-03	15.61	31.23	0.00E+00	7.48E-02	1.50E-01
I-129	7.3684E-07	15.61	31.23	0.00E+00	1.15E-05	2.30E-05
Kr-85	9.5820E-02	15.61	31.23	0.00E+00	1.50E+00	2.99E+00
Np-237	1.2552E-06	15.61	31.23	0.00E+00	1.96E-05	3.92E-05
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	1.2165E-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	6.61E-10	1.32E-09
Th-232	2.5278E-10	15.61	31.23	0.00E+00	3.95E-09	7.89E-09
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.129E+12
0.0250	6.514E+11
0.0375	5.643E+11
0.0575	6.071E+11
0.0850	3.665E+11
0.1250	2.395E+11
0.2250	3.147E+11
0.3750	1.379E+11
0.5750	2.268E+12
0.8500	2.557E+10
1.2500	4.237E+11
1.7500	6.569E+08
2.2500	2.263E+06
2.7500	2.493E+04
3.5000	1.390E+02
5.0000	1.672E+01
7.0000	1.889E+00
11.0000	2.150E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.91E-01	7.81E-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 %:	19.85018727	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	15.61	10.02	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		31.23	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

[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 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

[1]Fuel decay start date: 1959
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.2442E-08	24.34	48.68	0.00E+00	3.03E-07	6.06E-07
Am-241	4.0120E-03	24.34	48.68	0.00E+00	9.77E-02	1.95E-01
Am-242m	1.0749E-06	24.34	48.68	0.00E+00	2.62E-05	5.23E-05
Am-243	1.4692E-07	24.34	48.68	0.00E+00	3.58E-06	7.15E-06
C-14	1.2777E-04	24.34	48.68	0.00E+00	3.11E-03	6.22E-03
Cl-36	2.8120E-06	24.34	48.68	0.00E+00	6.85E-05	1.37E-04
Cm-243	4.1759E-08	24.34	48.68	0.00E+00	1.02E-06	2.03E-06
Cm-244	1.7098E-07	24.34	48.68	0.00E+00	4.16E-06	8.32E-06
Co-60	4.8241E-04	24.34	48.68	0.00E+00	1.17E-02	2.35E-02
Cs-134	1.5970E-10	24.34	48.68	0.00E+00	3.89E-09	7.77E-09
Cs-135	3.2195E-05	24.34	48.68	0.00E+00	7.84E-04	1.57E-03
Cs-137	6.8977E-01	24.34	48.68	0.00E+00	1.68E+01	3.36E+01
Eu-154	1.2238E-04	24.34	48.68	0.00E+00	2.98E-03	5.96E-03
Eu-155	6.7158E-06	24.34	48.68	0.00E+00	1.63E-04	3.27E-04
Fe-55	8.8165E-08	24.34	48.68	0.00E+00	2.15E-06	4.29E-06
H-3	3.8376E-04	24.34	48.68	0.00E+00	9.34E-03	1.87E-02
I-129	7.3684E-07	24.34	48.68	0.00E+00	1.79E-05	3.59E-05
Kr-85	5.2316E-03	24.34	48.68	0.00E+00	1.27E-01	2.55E-01
Np-237	1.3232E-06	24.34	48.68	0.00E+00	3.22E-05	6.44E-05
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	2.6466E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.665E+12
0.0250	3.456E+11
0.0375	3.015E+11
0.0575	3.248E+11
0.0850	1.946E+11
0.1250	1.262E+11
0.2250	1.676E+11
0.3750	7.311E+10
0.5750	1.249E+12
0.8500	1.201E+10
1.2500	5.826E+09
1.7500	3.091E+08
2.2500	4.290E+04
2.7500	1.771E+04
3.5000	5.983E+01
5.0000	2.519E+01
7.0000	2.842E+00
11.0000	3.231E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.93E-01	3.87E-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 %:	20.04130579	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	16.51	24.34	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		48.68	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

[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 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	39.14	78.28	0.00E+00	3.33E-08	6.67E-08
Am-241	1.8331E-03	39.14	78.28	0.00E+00	7.17E-02	1.43E-01
Am-242m	1.4129E-06	39.14	78.28	0.00E+00	5.53E-05	1.11E-04
Am-243	1.4774E-07	39.14	78.28	0.00E+00	5.78E-06	1.16E-05
C-14	1.2871E-04	39.14	78.28	0.00E+00	5.04E-03	1.01E-02
Cl-36	2.8120E-06	39.14	78.28	0.00E+00	1.10E-04	2.20E-04
Cm-243	1.7940E-07	39.14	78.28	0.00E+00	7.02E-06	1.40E-05
Cm-244	1.6962E-06	39.14	78.28	0.00E+00	6.64E-05	1.33E-04
Co-60	1.2839E+00	39.14	78.28	0.00E+00	5.03E+01	1.01E+02
Cs-134	9.0541E-02	39.14	78.28	0.00E+00	3.54E+00	7.09E+00
Cs-135	3.2195E-05	39.14	78.28	0.00E+00	1.26E-03	2.52E-03
Cs-137	2.7564E+00	39.14	78.28	0.00E+00	1.08E+02	2.16E+02
Eu-154	1.5368E-02	39.14	78.28	0.00E+00	6.02E-01	1.20E+00
Eu-155	2.9293E-02	39.14	78.28	0.00E+00	1.15E+00	2.29E+00
Fe-55	7.7158E-01	39.14	78.28	0.00E+00	3.02E+01	6.04E+01
H-3	1.1111E-02	39.14	78.28	0.00E+00	4.35E-01	8.70E-01
I-129	7.3684E-07	39.14	78.28	0.00E+00	2.88E-05	5.77E-05
Kr-85	2.5263E-01	39.14	78.28	0.00E+00	9.89E+00	1.98E+01
Np-237	1.2427E-06	39.14	78.28	0.00E+00	4.86E-05	9.73E-05
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.265E+13
0.0250	2.784E+12
0.0375	2.371E+12
0.0575	2.433E+12
0.0850	1.508E+12
0.1250	1.095E+12
0.2250	1.279E+12
0.3750	6.490E+11
0.5750	8.628E+12
0.8500	3.703E+11
1.2500	7.520E+12
1.7500	5.013E+09
2.2500	8.080E+09
2.7500	6.412E+07
3.5000	7.462E+06
5.0000	4.153E+01
7.0000	4.701E+00
11.0000	5.355E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.28E+00	4.56E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	27.34	39.14	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		78.28	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

[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 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

[1]Fuel decay start date: 2025
Estimates as of: 2030
Template: TRIGA-FLIP (LW/U-Zr, SST, 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.8488E-10	20.91	41.82	0.00E+00	5.96E-09	1.19E-08
Am-241	7.5767E-03	20.91	41.82	0.00E+00	1.58E-01	3.17E-01
Am-242m	2.4459E-05	20.91	41.82	0.00E+00	5.11E-04	1.02E-03
Am-243	3.0983E-05	20.91	41.82	0.00E+00	6.48E-04	1.30E-03
C-14	1.2590E-04	20.91	41.82	0.00E+00	2.63E-03	5.27E-03
Cl-36	2.6624E-06	20.91	41.82	0.00E+00	5.57E-05	1.11E-04
Cm-243	3.8244E-05	20.91	41.82	0.00E+00	8.00E-04	1.60E-03
Cm-244	4.1010E-03	20.91	41.82	0.00E+00	8.57E-02	1.71E-01
Co-60	1.2410E+00	20.91	41.82	0.00E+00	2.59E+01	5.19E+01
Cs-134	6.5454E-01	20.91	41.82	0.00E+00	1.37E+01	2.74E+01
Cs-135	1.9753E-05	20.91	41.82	0.00E+00	4.13E-04	8.26E-04
Cs-137	2.7375E+00	20.91	41.82	0.00E+00	5.72E+01	1.14E+02
Eu-154	1.2324E-01	20.91	41.82	0.00E+00	2.58E+00	5.15E+00
Eu-155	5.3037E-02	20.91	41.82	0.00E+00	1.11E+00	2.22E+00
Fe-55	7.9555E-01	20.91	41.82	0.00E+00	1.66E+01	3.33E+01
H-3	1.0531E-02	20.91	41.82	0.00E+00	2.20E-01	4.40E-01
I-129	7.1287E-07	20.91	41.82	0.00E+00	1.49E-05	2.98E-05
Kr-85	2.4955E-01	20.91	41.82	0.00E+00	5.22E+00	1.04E+01
Np-237	1.2121E-05	20.91	41.82	0.00E+00	2.53E-04	5.07E-04
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
Tl-208	1.4313E-07	20.91	41.82	0.00E+00	2.99E-06	5.99E-06
U-232	4.1927E-07	20.91	41.82	0.00E+00	8.77E-06	1.75E-05
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.747E+12
0.0250	1.481E+12
0.0375	1.310E+12
0.0575	1.307E+12
0.0850	8.134E+11
0.1250	6.531E+11
0.2250	6.913E+11
0.3750	3.449E+11
0.5750	5.709E+12
0.8500	1.047E+12
1.2500	4.023E+12
1.7500	5.360E+09
2.2500	4.217E+09
2.7500	3.823E+07
3.5000	4.499E+06
5.0000	1.078E+03
7.0000	1.241E+02
11.0000	1.424E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+00	2.74E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	5.73	20.91	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		41.82	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

[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 8.5/20 FFCR PENN. STATE UNIV.
SNF ID #: 815
Fuel Units & Descr: 7 - ELEMENT
Heavy Metal Mass: BOL=1.379kg; EOL=1.316kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.09

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07
Am-241	1.8331E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-05	1.70E-04
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.55E-02
Cl-36	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05
Cm-244	1.6962E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04
Co-60	1.2839E+00	60.14	120.28	0.00E+00	7.72E+01	1.54E+02
Cs-134	9.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01
Cs-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03
Cs-137	2.7564E+00	60.14	120.28	0.00E+00	1.66E+02	3.32E+02
Eu-154	1.5368E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.76E+00	3.52E+00
Fe-55	7.7158E-01	60.14	120.28	0.00E+00	4.64E+01	9.28E+01
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.68E-01	1.34E+00
I-129	7.3684E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05
Kr-85	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04
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
Tl-208	1.6947E-08	60.14	120.28	0.00E+00	1.02E-06	2.04E-06
U-232	4.8737E-08	60.14	120.28	0.00E+00	2.93E-06	5.86E-06
U-233	1.2203E-07	60.14	120.28	0.00E+00	7.34E-06	1.47E-05
U-234	1.5925E-07	60.14	120.28	0.00E+00	9.58E-06	1.92E-05
U-235	-2.6194E-06	60.14	0.00	5.90E-04	4.32E-04	5.90E-04
U-236	1.2693E-05	60.14	120.28	0.00E+00	7.63E-04	1.53E-03
U-238	-3.6331E-08	60.14	0.00	3.72E-04	3.70E-04	3.72E-04
Y-90	2.6060E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02
Other Radionuclides					2.17E+02	4.34E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+13
0.0250	4.278E+12
0.0375	3.643E+12
0.0575	3.739E+12
0.0850	2.316E+12
0.1250	1.682E+12
0.2250	1.965E+12
0.3750	9.972E+11
0.5750	1.326E+13
0.8500	5.690E+11
1.2500	1.155E+13
1.7500	7.702E+09
2.2500	1.241E+10
2.7500	9.852E+07
3.5000	1.147E+07
5.0000	6.389E+01
7.0000	7.233E+00
11.0000	8.239E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+00	7.00E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	40.32	60.14	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		120.28	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.28	1.49
Bounding:	2.56	

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 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

[1]Fuel decay start date: 1959
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.2442E-08	16.14	32.28	0.00E+00	2.01E-07	4.02E-07
Am-241	4.0120E-03	16.14	32.28	0.00E+00	6.47E-02	1.29E-01
Am-242m	1.0749E-06	16.14	32.28	0.00E+00	1.73E-05	3.47E-05
Am-243	1.4692E-07	16.14	32.28	0.00E+00	2.37E-06	4.74E-06
C-14	1.2777E-04	16.14	32.28	0.00E+00	2.06E-03	4.12E-03
Cl-36	2.8120E-06	16.14	32.28	0.00E+00	4.54E-05	9.08E-05
Cm-243	4.1759E-08	16.14	32.28	0.00E+00	6.74E-07	1.35E-06
Cm-244	1.7098E-07	16.14	32.28	0.00E+00	2.76E-06	5.52E-06
Co-60	4.8241E-04	16.14	32.28	0.00E+00	7.79E-03	1.56E-02
Cs-134	1.5970E-10	16.14	32.28	0.00E+00	2.58E-09	5.15E-09
Cs-135	3.2195E-05	16.14	32.28	0.00E+00	5.20E-04	1.04E-03
Cs-137	6.8977E-01	16.14	32.28	0.00E+00	1.11E+01	2.23E+01
Eu-154	1.2238E-04	16.14	32.28	0.00E+00	1.97E-03	3.95E-03
Eu-155	6.7158E-06	16.14	32.28	0.00E+00	1.08E-04	2.17E-04
Fe-55	8.8165E-08	16.14	32.28	0.00E+00	1.42E-06	2.85E-06
H-3	3.8376E-04	16.14	32.28	0.00E+00	6.19E-03	1.24E-02
I-129	7.3684E-07	16.14	32.28	0.00E+00	1.19E-05	2.38E-05
Kr-85	5.2316E-03	16.14	32.28	0.00E+00	8.44E-02	1.69E-01
Np-237	1.3232E-06	16.14	32.28	0.00E+00	2.14E-05	4.27E-05
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	2.76E-09	5.52E-09
Th-232	2.5278E-10	16.14	32.28	0.00E+00	4.08E-09	8.16E-09
Tl-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
U-234	3.1278E-07	16.14	32.28	0.00E+00	5.05E-06	1.01E-05
U-235	-2.6179E-06	16.14	0.00	2.03E-04	1.61E-04	2.03E-04
U-236	1.2696E-05	16.14	32.28	0.00E+00	2.05E-04	4.10E-04
U-238	-3.6331E-08	16.14	0.00	1.27E-04	1.27E-04	1.27E-04
Y-90	6.2541E-01	16.14	32.28	0.00E+00	1.01E+01	2.02E+01
Other Radionuclides					1.14E+01	2.29E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.104E+12
0.0250	2.291E+11
0.0375	1.999E+11
0.0575	2.153E+11
0.0850	1.290E+11
0.1250	8.366E+10
0.2250	1.111E+11
0.3750	4.847E+10
0.5750	8.280E+11
0.8500	7.964E+09
1.2500	3.863E+09
1.7500	2.049E+08
2.2500	2.844E+04
2.7500	1.174E+04
3.5000	3.988E+01
5.0000	1.679E+01
7.0000	1.895E+00
11.0000	2.154E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.28E-01	2.56E-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 %:	19.87312476	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	16.14	15.46	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		32.28	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	0.96
Bounding:	2.00	

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 8.5/20 FFCR SO. KOREA
SNF ID #: 734
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg; EOL=0.472kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	11.70	23.39	0.00E+00	4.85E-08	9.70E-08
Am-241	3.5850E-03	11.70	23.39	0.00E+00	4.19E-02	8.39E-02
Am-242m	1.2899E-06	11.70	23.39	0.00E+00	1.51E-05	3.02E-05
Am-243	1.4747E-07	11.70	23.39	0.00E+00	1.72E-06	3.45E-06
C-14	1.2839E-04	11.70	23.39	0.00E+00	1.50E-03	3.00E-03
Cl-36	2.8120E-06	11.70	23.39	0.00E+00	3.29E-05	6.58E-05
Cm-243	1.1038E-07	11.70	23.39	0.00E+00	1.29E-06	2.58E-06
Cm-244	7.8917E-07	11.70	23.39	0.00E+00	9.23E-06	1.85E-05
Co-60	9.2647E-02	11.70	23.39	0.00E+00	1.08E+00	2.17E+00
Cs-134	1.0940E-04	11.70	23.39	0.00E+00	1.28E-03	2.56E-03
Cs-135	3.2195E-05	11.70	23.39	0.00E+00	3.77E-04	7.53E-04
Cs-137	1.7368E+00	11.70	23.39	0.00E+00	2.03E+01	4.06E+01
Eu-154	3.0677E-03	11.70	23.39	0.00E+00	3.59E-02	7.18E-02
Eu-155	1.7925E-03	11.70	23.39	0.00E+00	2.10E-02	4.19E-02
Fe-55	3.7444E-03	11.70	23.39	0.00E+00	4.38E-02	8.76E-02
H-3	3.6180E-03	11.70	23.39	0.00E+00	4.23E-02	8.46E-02
I-129	7.3684E-07	11.70	23.39	0.00E+00	8.62E-06	1.72E-05
Kr-85	6.9368E-02	11.70	23.39	0.00E+00	8.11E-01	1.62E+00
Np-237	1.2662E-06	11.70	23.39	0.00E+00	1.48E-05	2.96E-05
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-06	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
Tl-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
U-234	2.2391E-07	11.70	23.39	0.00E+00	2.62E-06	5.24E-06
U-235	-2.6194E-06	11.70	0.00	2.07E-04	1.77E-04	2.07E-04
U-236	1.2695E-05	11.70	23.39	0.00E+00	1.48E-04	2.97E-04
U-238	-3.6331E-06	11.70	0.00	1.29E-04	1.29E-04	1.29E-04
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.076E+12
0.0250	4.316E+11
0.0375	3.745E+11
0.0575	4.033E+11
0.0850	2.431E+11
0.1250	1.586E+11
0.2250	2.091E+11
0.3750	9.130E+10
0.5750	1.514E+12
0.8500	1.625E+10
1.2500	1.669E+11
1.7500	4.230E+08
2.2500	8.919E+06
2.7500	1.508E+04
3.5000	3.190E+01
5.0000	1.243E+01
7.0000	1.403E+00
11.0000	1.596E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.48E-01	4.96E-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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	0.64
Bounding:	1.43	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 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

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

Estimated Canister usage: 18"x10'
0.03

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.95	1.91	0.00E+00	8.13E-10	1.63E-09
Am-241	1.8331E-03	0.95	1.91	0.00E+00	1.75E-03	3.50E-03
Am-242m	1.4129E-06	0.95	1.91	0.00E+00	1.35E-06	2.70E-06
Am-243	1.4774E-07	0.95	1.91	0.00E+00	1.41E-07	2.82E-07
C-14	1.2871E-04	0.95	1.91	0.00E+00	1.23E-04	2.46E-04
Cl-36	2.8120E-06	0.95	1.91	0.00E+00	2.68E-06	5.37E-06
Cm-243	1.7940E-07	0.95	1.91	0.00E+00	1.71E-07	3.43E-07
Cm-244	1.6962E-06	0.95	1.91	0.00E+00	1.62E-06	3.24E-06
Co-60	1.2839E+00	0.95	1.91	0.00E+00	1.23E+00	2.45E+00
Cs-134	9.0541E-02	0.95	1.91	0.00E+00	8.64E-02	1.73E-01
Cs-135	3.2195E-05	0.95	1.91	0.00E+00	3.07E-05	6.15E-05
Cs-137	2.7564E+00	0.95	1.91	0.00E+00	2.63E+00	5.26E+00
Eu-154	1.5368E-02	0.95	1.91	0.00E+00	1.47E-02	2.93E-02
Eu-155	2.9293E-02	0.95	1.91	0.00E+00	2.80E-02	5.59E-02
Fe-55	7.7158E-01	0.95	1.91	0.00E+00	7.37E-01	1.47E+00
H-3	1.1111E-02	0.95	1.91	0.00E+00	1.06E-02	2.12E-02
I-129	7.3684E-07	0.95	1.91	0.00E+00	7.03E-07	1.41E-06
Kr-85	2.5263E-01	0.95	1.91	0.00E+00	2.41E-01	4.82E-01
Np-237	1.2427E-06	0.95	1.91	0.00E+00	1.19E-06	2.37E-06
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
Tl-208	1.6947E-08	0.95	1.91	0.00E+00	1.62E-08	3.24E-08
U-232	4.8737E-08	0.95	1.91	0.00E+00	4.65E-08	9.30E-08
U-233	1.2203E-07	0.95	1.91	0.00E+00	1.16E-07	2.33E-07
U-234	1.5925E-07	0.95	1.91	0.00E+00	1.52E-07	3.04E-07
U-235	-2.6194E-06	0.95	0.00	1.37E-04	1.35E-04	1.37E-04
U-236	1.2693E-05	0.95	1.91	0.00E+00	1.21E-05	2.42E-05
U-238	-3.6331E-08	0.95	0.00	8.62E-05	8.61E-05	8.62E-05
Y-90	2.6060E+00	0.95	1.91	0.00E+00	2.49E+00	4.98E+00
Other Radionuclides					3.44E+00	6.88E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.086E+11
0.0250	6.790E+10
0.0375	5.782E+10
0.0575	5.935E+10
0.0850	3.677E+10
0.1250	2.670E+10
0.2250	3.119E+10
0.3750	1.583E+10
0.5750	2.104E+11
0.8500	9.031E+09
1.2500	1.834E+11
1.7500	1.223E+08
2.2500	1.971E+08
2.7500	1.564E+06
3.5000	1.820E+05
5.0000	1.200E+00
7.0000	1.362E-01
11.0000	1.553E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.86E-02	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 %:	19.875	10 to 20.1

Basis for Parameter Differences:

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
Nominal:	0.09	1.22
Bounding:	0.17	

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 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 Site: INEEL

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

Estimated Canister usage: 18"x10'
0.05

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	46.58	93.17	0.00E+00	3.97E-08	7.94E-08
Am-241	1.8331E-03	46.58	93.17	0.00E+00	8.54E-02	1.71E-01
Am-242m	1.4129E-06	46.58	93.17	0.00E+00	6.58E-05	1.32E-04
Am-243	1.4774E-07	46.58	93.17	0.00E+00	6.88E-06	1.38E-05
C-14	1.2871E-04	46.58	93.17	0.00E+00	6.00E-03	1.20E-02
Cl-36	2.8120E-06	46.58	93.17	0.00E+00	1.31E-04	2.62E-04
Cm-243	1.7940E-07	46.58	93.17	0.00E+00	8.36E-06	1.67E-05
Cm-244	1.6962E-06	46.58	93.17	0.00E+00	7.90E-05	1.58E-04
Co-60	1.2839E+00	46.58	93.17	0.00E+00	5.98E+01	1.20E+02
Cs-134	9.0541E-02	46.58	93.17	0.00E+00	4.22E+00	8.44E+00
Cs-135	3.2195E-05	46.58	93.17	0.00E+00	1.50E-03	3.00E-03
Cs-137	2.7564E+00	46.58	93.17	0.00E+00	1.28E+02	2.57E+02
Eu-154	1.5368E-02	46.58	93.17	0.00E+00	7.16E-01	1.43E+00
Eu-155	2.9293E-02	46.58	93.17	0.00E+00	1.36E+00	2.73E+00
Fe-55	7.7158E-01	46.58	93.17	0.00E+00	3.59E+01	7.19E+01
H-3	1.1111E-02	46.58	93.17	0.00E+00	5.18E-01	1.04E+00
I-129	7.3684E-07	46.58	93.17	0.00E+00	3.43E-05	6.87E-05
Kr-85	2.5263E-01	46.58	93.17	0.00E+00	1.18E+01	2.35E+01
Np-237	1.2427E-06	46.58	93.17	0.00E+00	5.79E-05	1.16E-04
Pa-231	3.8511E-09	46.58	93.17	0.00E+00	1.79E-07	3.59E-07
Pb-210	7.3880E-15	46.58	93.17	0.00E+00	3.44E-13	6.88E-13
Pm-147	2.1023E+00	46.58	93.17	0.00E+00	9.79E+01	1.96E+02
Pu-238	1.0383E-03	46.58	93.17	0.00E+00	4.84E-02	9.67E-02
Pu-239	5.5293E-03	46.58	93.17	0.00E+00	2.58E-01	5.15E-01
Pu-240	2.1278E-03	46.58	93.17	0.00E+00	9.91E-02	1.98E-01
Pu-241	1.0195E-01	46.58	93.17	0.00E+00	4.75E+00	9.50E+00
Pu-242	2.3128E-07	46.58	93.17	0.00E+00	1.08E-05	2.15E-05
Ra-226	5.2782E-14	46.58	93.17	0.00E+00	2.46E-12	4.92E-12
Ra-228	1.9338E-10	46.58	93.17	0.00E+00	9.01E-09	1.80E-08
Ru-106	9.1684E-02	46.58	93.17	0.00E+00	4.27E+00	8.54E+00
Se-79	1.3018E-05	46.58	93.17	0.00E+00	6.06E-04	1.21E-03
Sn-126	1.2167E-05	46.58	93.17	0.00E+00	5.67E-04	1.13E-03
Sr-90	2.6045E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02
Tc-99	4.4241E-04	46.58	93.17	0.00E+00	2.06E-02	4.12E-02
Th-229	1.3713E-10	46.58	93.17	0.00E+00	6.39E-09	1.28E-08
Th-230	1.8090E-11	46.58	93.17	0.00E+00	8.43E-10	1.69E-09
Th-232	2.5278E-10	46.58	93.17	0.00E+00	1.18E-08	2.36E-08
Tl-208	1.6947E-08	46.58	93.17	0.00E+00	7.89E-07	1.58E-06
U-232	4.8737E-08	46.58	93.17	0.00E+00	2.27E-06	4.54E-06
U-233	1.2203E-07	46.58	93.17	0.00E+00	5.68E-06	1.14E-05
U-234	1.5925E-07	46.58	93.17	0.00E+00	7.42E-06	1.48E-05
U-235	-2.6194E-06	46.58	0.00	3.46E-04	2.24E-04	3.46E-04
U-236	1.2693E-05	46.58	93.17	0.00E+00	5.91E-04	1.18E-03
U-238	-3.6331E-08	46.58	0.00	2.15E-04	2.13E-04	2.15E-04
Y-90	2.6060E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02
Other Radionuclides					1.68E+02	3.36E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.506E+13
0.0250	3.313E+12
0.0375	2.822E+12
0.0575	2.896E+12
0.0850	1.794E+12
0.1250	1.303E+12
0.2250	1.522E+12
0.3750	7.724E+11
0.5750	1.027E+13
0.8500	4.407E+11
1.2500	8.950E+12
1.7500	5.966E+09
2.2500	9.617E+09
2.7500	7.631E+07
3.5000	8.881E+06
5.0000	4.932E+01
7.0000	5.583E+00
11.0000	6.360E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.71E+00	5.42E+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 %:	20.00000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.71	2.39
Bounding:	3.42	

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 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	9.16	18.33	0.00E+00	7.81E-09	1.56E-08
Am-241	1.8331E-03	9.16	18.33	0.00E+00	1.68E-02	3.36E-02
Am-242m	1.4129E-06	9.16	18.33	0.00E+00	1.29E-05	2.59E-05
Am-243	1.4774E-07	9.16	18.33	0.00E+00	1.35E-06	2.71E-06
C-14	1.2871E-04	9.16	18.33	0.00E+00	1.18E-03	2.36E-03
Cl-36	2.8120E-06	9.16	18.33	0.00E+00	2.58E-05	5.15E-05
Cm-243	1.7940E-07	9.16	18.33	0.00E+00	1.64E-06	3.29E-06
Cm-244	1.6962E-06	9.16	18.33	0.00E+00	1.55E-05	3.11E-05
Co-60	1.2839E+00	9.16	18.33	0.00E+00	1.18E+01	2.35E+01
Cs-134	9.0541E-02	9.16	18.33	0.00E+00	8.30E-01	1.66E+00
Cs-135	3.2195E-05	9.16	18.33	0.00E+00	2.95E-04	5.90E-04
Cs-137	2.7564E+00	9.16	18.33	0.00E+00	2.53E+01	5.05E+01
Eu-154	1.5368E-02	9.16	18.33	0.00E+00	1.41E-01	2.82E-01
Eu-155	2.9293E-02	9.16	18.33	0.00E+00	2.68E-01	5.37E-01
Fe-55	7.7158E-01	9.16	18.33	0.00E+00	7.07E+00	1.41E+01
H-3	1.1111E-02	9.16	18.33	0.00E+00	1.02E-01	2.04E-01
I-129	7.3684E-07	9.16	18.33	0.00E+00	6.75E-06	1.35E-05
Kr-85	2.5263E-01	9.16	18.33	0.00E+00	2.32E+00	4.63E+00
Np-237	1.2427E-06	9.16	18.33	0.00E+00	1.14E-05	2.28E-05
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.962E+12
0.0250	6.518E+11
0.0375	5.551E+11
0.0575	5.698E+11
0.0850	3.530E+11
0.1250	2.563E+11
0.2250	2.994E+11
0.3750	1.520E+11
0.5750	2.020E+12
0.8500	8.670E+10
1.2500	1.761E+12
1.7500	1.174E+09
2.2500	1.892E+09
2.7500	1.501E+07
3.5000	1.747E+06
5.0000	9.905E+00
7.0000	1.122E+00
11.0000	1.278E-01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

[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 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	6.22	12.44	0.00E+00	1.64E-08	3.29E-08
Am-241	3.1429E-03	6.22	12.44	0.00E+00	1.95E-02	3.91E-02
Am-242m	1.3195E-06	6.22	12.44	0.00E+00	8.20E-06	1.64E-05
Am-243	1.4753E-07	6.22	12.44	0.00E+00	9.17E-07	1.83E-06
C-14	1.2847E-04	6.22	12.44	0.00E+00	7.99E-04	1.60E-03
Cl-36	2.8120E-06	6.22	12.44	0.00E+00	1.75E-05	3.50E-05
Cm-243	1.2465E-07	6.22	12.44	0.00E+00	7.75E-07	1.55E-06
Cm-244	9.5564E-07	6.22	12.44	0.00E+00	5.94E-06	1.19E-05
Co-60	1.7880E-01	6.22	12.44	0.00E+00	1.11E+00	2.22E+00
Cs-134	5.8692E-04	6.22	12.44	0.00E+00	3.65E-03	7.30E-03
Cs-135	3.2195E-05	6.22	12.44	0.00E+00	2.00E-04	4.00E-04
Cs-137	1.9489E+00	6.22	12.44	0.00E+00	1.21E+01	2.42E+01
Eu-154	4.5895E-03	6.22	12.44	0.00E+00	2.85E-02	5.71E-02
Eu-155	3.6045E-03	6.22	12.44	0.00E+00	2.24E-02	4.48E-02
Fe-55	1.4185E-02	6.22	12.44	0.00E+00	8.82E-02	1.76E-01
H-3	4.7895E-03	6.22	12.44	0.00E+00	2.98E-02	5.96E-02
I-129	7.3684E-07	6.22	12.44	0.00E+00	4.58E-06	9.16E-06
Kr-85	9.5820E-02	6.22	12.44	0.00E+00	5.96E-01	1.19E+00
Np-237	1.2552E-06	6.22	12.44	0.00E+00	7.80E-06	1.56E-05
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
Tl-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-236	1.2693E-05	6.22	12.44	0.00E+00	7.89E-05	1.58E-04
U-238	-3.6331E-08	6.22	0.00	1.72E-04	1.71E-04	1.72E-04
Y-90	1.8241E+00	6.22	12.44	0.00E+00	1.13E+01	2.27E+01
Other Radionuclides					1.20E+01	2.39E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.248E+12
0.0250	2.594E+11
0.0375	2.247E+11
0.0575	2.418E+11
0.0850	1.460E+11
0.1250	9.540E+10
0.2250	1.253E+11
0.3750	5.493E+10
0.5750	9.034E+11
0.8500	1.018E+10
1.2500	1.687E+11
1.7500	2.616E+08
2.2500	9.011E+05
2.7500	9.929E+03
3.5000	5.582E+01
5.0000	6.857E+00
7.0000	7.753E-01
11.0000	8.825E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.56E-01	3.11E-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 %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	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

[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 (ACPR)
SNF ID #: 895
Fuel Units & Descr: 182 - ELEMENT
Heavy Metal Mass: BOL=48.357kg; EOL=48.357kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	2.08E-02	2.08E-02	2.08E-02
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	1.30E-02	1.30E-02	1.30E-02
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.162E+08
0.0250	0.000E+00
0.0375	7.043E+05
0.0575	4.276E+05
0.0850	6.017E+07
0.1250	1.188E+08
0.2250	4.204E+08
0.3750	1.049E+06
0.5750	5.161E+04
0.8500	8.046E+03
1.2500	4.756E+02
1.7500	2.327E+02
2.2500	1.348E+02
2.7500	7.832E+01
3.5000	7.002E+01
5.0000	3.008E+01
7.0000	3.463E+00
11.0000	3.981E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.76E-04	8.76E-04
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 %:	19.95031243	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

[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) ARRR
SNF ID #: 238
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.376kg; EOL=9.322kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrc, Alum., 10 to 20%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	3,869.71	7,739.43	0.00E+00	3.12E-06	6.24E-06
Am-241	2.2586E-03	3,869.71	7,739.43	0.00E+00	8.74E+00	1.75E+01
Am-242m	1.9925E-06	3,869.71	7,739.43	0.00E+00	7.71E-03	1.54E-02
Am-243	2.3323E-07	3,869.71	7,739.43	0.00E+00	9.03E-04	1.81E-03
C-14	4.3308E-05	3,869.71	7,739.43	0.00E+00	1.68E-01	3.35E-01
Cl-36	4.3023E-06	3,869.71	7,739.43	0.00E+00	1.66E-04	3.33E-04
Cm-243	2.7429E-07	3,869.71	7,739.43	0.00E+00	1.06E-03	2.12E-03
Cm-244	3.1504E-06	3,869.71	7,739.43	0.00E+00	1.22E-02	2.44E-02
Co-60	3.1008E-02	3,869.71	7,739.43	0.00E+00	1.20E+02	2.40E+02
Cs-134	1.0367E-01	3,869.71	7,739.43	0.00E+00	4.01E+02	8.02E+02
Cs-135	3.1549E-05	3,869.71	7,739.43	0.00E+00	1.22E-01	2.44E-01
Cs-137	2.7564E+00	3,869.71	7,739.43	0.00E+00	1.07E+04	2.13E+04
Eu-154	1.3490E+00	3,869.71	7,739.43	0.00E+00	5.22E+03	1.04E+04
Eu-155	4.3880E-01	3,869.71	7,739.43	0.00E+00	1.70E+03	3.40E+03
Fe-55	8.6782E-03	3,869.71	7,739.43	0.00E+00	3.36E+01	6.72E+01
H-3	1.0805E-02	3,869.71	7,739.43	0.00E+00	4.18E+01	8.36E+01
I-129	7.3805E-07	3,869.71	7,739.43	0.00E+00	2.86E-03	5.71E-03
Kr-85	2.5218E-01	3,869.71	7,739.43	0.00E+00	9.76E+02	1.95E+03
Np-237	1.4463E-06	3,869.71	7,739.43	0.00E+00	5.60E-03	1.12E-02
Pa-231	3.5970E-09	3,869.71	7,739.43	0.00E+00	1.39E-05	2.78E-05
Pb-210	8.2511E-15	3,869.71	7,739.43	0.00E+00	3.19E-11	6.39E-11
Pm-147	2.0767E+00	3,869.71	7,739.43	0.00E+00	8.04E+03	1.61E+04
Pu-238	1.3514E-03	3,869.71	7,739.43	0.00E+00	5.23E+00	1.05E+01
Pu-239	5.6947E-03	3,869.71	7,739.43	0.00E+00	2.20E+01	4.41E+01
Pu-240	2.2647E-03	3,869.71	7,739.43	0.00E+00	8.76E+00	1.75E+01
Pu-241	1.2574E-01	3,869.71	7,739.43	0.00E+00	4.87E+02	9.73E+02
Pu-242	3.0602E-07	3,869.71	7,739.43	0.00E+00	1.18E-03	2.37E-03
Ra-226	5.7353E-14	3,869.71	7,739.43	0.00E+00	2.22E-10	4.44E-10
Ra-228	1.8150E-10	3,869.71	7,739.43	0.00E+00	7.02E-07	1.40E-06
Ru-106	9.3744E-02	3,869.71	7,739.43	0.00E+00	3.63E+02	7.26E+02
Se-79	1.2938E-05	3,869.71	7,739.43	0.00E+00	5.01E-02	1.00E-01
Sn-126	1.2239E-05	3,869.71	7,739.43	0.00E+00	4.74E-02	9.47E-02
Sr-90	2.6000E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04
Tc-99	4.4120E-04	3,869.71	7,739.43	0.00E+00	1.71E+00	3.41E+00
Th-229	1.4749E-10	3,869.71	7,739.43	0.00E+00	5.71E-07	1.14E-06
Th-230	1.9549E-11	3,869.71	7,739.43	0.00E+00	7.56E-08	1.51E-07
Th-232	2.3744E-10	3,869.71	7,739.43	0.00E+00	9.19E-07	1.84E-06
Tl-208	1.9459E-08	3,869.71	7,739.43	0.00E+00	7.53E-05	1.51E-04
U-232	5.6015E-08	3,869.71	7,739.43	0.00E+00	2.17E-04	4.34E-04
U-233	1.3132E-07	3,869.71	7,739.43	0.00E+00	5.08E-04	1.02E-03
U-234	1.7323E-07	3,869.71	7,739.43	0.00E+00	6.70E-04	1.34E-03
U-235	-2.6159E-06	3,869.71	0.00	5.67E-03	0.00E+00	5.67E-03
U-236	1.2717E-05	3,869.71	7,739.43	0.00E+00	4.92E-02	9.84E-02
U-238	-3.8857E-08	3,869.71	0.00	3.61E-03	3.46E-03	3.61E-03
Y-90	2.6015E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04
Other Radionuclides					1.47E+04	2.94E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.310E+15
0.0250	2.843E+14
0.0375	3.541E+14
0.0575	2.715E+14
0.0850	1.900E+14
0.1250	2.842E+14
0.2250	1.586E+14
0.3750	7.061E+13
0.5750	8.952E+14
0.8500	2.204E+14
1.2500	2.284E+14
1.7500	6.537E+12
2.2500	7.946E+11
2.7500	6.454E+09
3.5000	7.543E+08
5.0000	4.423E+03
7.0000	5.006E+02
11.0000	5.701E+01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	494.30	3,869.71	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		7,739.43	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

[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) AUSTRIA
SNF ID #: 462
Fuel Units & Descr: 66 - ELEMENT
Heavy Metal Mass: BOL=11.88kg; EOL=11.814kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage:
16"x10'
0.59

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	63.00	126.00	0.00E+00	1.55E-07	3.09E-07
Am-241	3.8752E-03	63.00	126.00	0.00E+00	2.44E-01	4.88E-01
Am-242m	1.8617E-06	63.00	126.00	0.00E+00	1.17E-04	2.35E-04
Am-243	2.3293E-07	63.00	126.00	0.00E+00	1.47E-05	2.93E-05
C-14	4.3233E-05	63.00	126.00	0.00E+00	2.72E-03	5.45E-03
Cl-36	4.3023E-08	63.00	126.00	0.00E+00	2.71E-06	5.42E-06
Cm-243	1.9053E-07	63.00	126.00	0.00E+00	1.20E-05	2.40E-05
Cm-244	1.7744E-06	63.00	126.00	0.00E+00	1.12E-04	2.24E-04
Co-60	4.3188E-03	63.00	126.00	0.00E+00	2.72E-01	5.44E-01
Cs-134	6.7188E-04	63.00	126.00	0.00E+00	4.23E-02	8.47E-02
Cs-135	3.1549E-05	63.00	126.00	0.00E+00	1.99E-03	3.98E-03
Cs-137	1.9489E+00	63.00	126.00	0.00E+00	1.23E+02	2.46E+02
Eu-154	4.0301E-01	63.00	126.00	0.00E+00	2.54E+01	5.08E+01
Eu-155	5.4000E-02	63.00	126.00	0.00E+00	3.40E+00	6.80E+00
Fe-55	1.5955E-04	63.00	126.00	0.00E+00	1.01E-02	2.01E-02
H-3	4.8571E-03	63.00	126.00	0.00E+00	2.93E-01	5.87E-01
I-129	7.3805E-07	63.00	126.00	0.00E+00	4.65E-05	9.30E-05
Kr-85	9.5684E-02	63.00	126.00	0.00E+00	6.03E+00	1.21E+01
Np-237	1.4618E-06	63.00	126.00	0.00E+00	9.21E-05	1.84E-04
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	4.6526E-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
Tl-208	1.8195E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.293E+13
0.0250	2.670E+12
0.0375	2.795E+12
0.0575	2.583E+12
0.0850	1.573E+12
0.1250	1.765E+12
0.2250	1.425E+12
0.3750	5.856E+11
0.5750	9.330E+12
0.8500	9.926E+11
1.2500	1.069E+12
1.7500	3.203E+10
2.2500	5.078E+05
2.7500	8.452E+04
3.5000	5.953E+02
5.0000	7.820E+01
7.0000	8.843E+00
11.0000	1.007E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.64E+00	3.27E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	57.89	63.00	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		126.00	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

[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) BRAZIL
SNF ID #: 471
Fuel Units & Descr: 59 - ELEMENT
Heavy Metal Mass: BOL=11.086kg; EOL=10.585kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
0.53

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	478.69	957.38	0.00E+00	1.18E-06	2.35E-06
Am-241	3.8752E-03	478.69	957.38	0.00E+00	1.86E+00	3.71E+00
Am-242m	1.8617E-06	478.69	957.38	0.00E+00	8.91E-04	1.78E-03
Am-243	2.3293E-07	478.69	957.38	0.00E+00	1.12E-04	2.23E-04
C-14	4.3233E-05	478.69	957.38	0.00E+00	2.07E-02	4.14E-02
Cl-36	4.3023E-08	478.69	957.38	0.00E+00	2.06E-05	4.12E-05
Cm-243	1.9053E-07	478.69	957.38	0.00E+00	9.12E-05	1.82E-04
Cm-244	1.7744E-06	478.69	957.38	0.00E+00	8.49E-04	1.70E-03
Co-60	4.3188E-03	478.69	957.38	0.00E+00	2.07E+00	4.13E+00
Cs-134	6.7188E-04	478.69	957.38	0.00E+00	3.22E-01	6.43E-01
Cs-135	3.1549E-05	478.69	957.38	0.00E+00	1.51E-02	3.02E-02
Cs-137	1.9489E+00	478.69	957.38	0.00E+00	9.33E+02	1.87E+03
Eu-154	4.0301E-01	478.69	957.38	0.00E+00	1.93E+02	3.86E+02
Eu-155	5.4000E-02	478.69	957.38	0.00E+00	2.58E+01	5.17E+01
Fe-55	1.5955E-04	478.69	957.38	0.00E+00	7.64E-02	1.53E-01
H-3	4.6571E-03	478.69	957.38	0.00E+00	2.23E+00	4.46E+00
I-129	7.3805E-07	478.69	957.38	0.00E+00	3.53E-04	7.07E-04
Kr-85	9.5684E-02	478.69	957.38	0.00E+00	4.58E+01	9.16E+01
Np-237	1.4618E-06	478.69	957.38	0.00E+00	7.00E-04	1.40E-03
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-05	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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.825E+13
0.0250	2.029E+13
0.0375	2.123E+13
0.0575	1.963E+13
0.0850	1.195E+13
0.1250	1.341E+13
0.2250	1.083E+13
0.3750	4.450E+12
0.5750	7.089E+13
0.8500	7.543E+12
1.2500	8.125E+12
1.7500	2.434E+11
2.2500	3.858E+06
2.7500	6.421E+05
3.5000	4.408E+03
5.0000	5.450E+02
7.0000	6.153E+01
11.0000	6.998E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.24E+01	2.49E+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 %:	19.81	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	108.05	478.69	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		957.38	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

[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) CORNELL
SNF ID #: 1047
Fuel Units & Descr: 7 - ELEMENT
Heavy Metal Mass: BOL=1.295kg; EOL=1.263kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2002
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%. U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage:
18"x10'
0.06

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	30.07	60.13	0.00E+00	1.15E-07	2.30E-07
Am-241	4.4195E-03	30.07	60.13	0.00E+00	1.33E-01	2.66E-01
Am-242m	1.8195E-06	30.07	60.13	0.00E+00	5.47E-05	1.09E-04
Am-243	2.3278E-07	30.07	60.13	0.00E+00	7.00E-06	1.40E-05
C-14	4.3203E-05	30.07	60.13	0.00E+00	1.30E-03	2.60E-03
Cl-36	4.3023E-08	30.07	60.13	0.00E+00	1.29E-06	2.59E-06
Cm-243	1.6872E-07	30.07	60.13	0.00E+00	5.07E-06	1.01E-05
Cm-244	1.4660E-06	30.07	60.13	0.00E+00	4.41E-05	8.82E-05
Co-60	2.2376E-03	30.07	60.13	0.00E+00	6.73E-02	1.35E-01
Cs-134	1.2525E-04	30.07	60.13	0.00E+00	3.77E-03	7.53E-03
Cs-135	3.1549E-05	30.07	60.13	0.00E+00	9.49E-04	1.90E-03
Cs-137	1.7368E+00	30.07	60.13	0.00E+00	5.22E+01	1.04E+02
Eu-154	2.6947E-01	30.07	60.13	0.00E+00	8.10E+00	1.62E+01
Eu-155	2.6857E-02	30.07	60.13	0.00E+00	8.08E-01	1.62E+00
Fe-55	4.2105E-05	30.07	60.13	0.00E+00	1.27E-03	2.53E-03
H-3	3.5173E-03	30.07	60.13	0.00E+00	1.06E-01	2.12E-01
I-129	7.3805E-07	30.07	60.13	0.00E+00	2.22E-05	4.44E-05
Kr-85	6.9263E-02	30.07	60.13	0.00E+00	2.08E+00	4.17E+00
Np-237	1.4752E-06	30.07	60.13	0.00E+00	4.44E-05	8.87E-05
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	6.35E-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					5.66E+01	1.13E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.435E+12
0.0250	1.123E+12
0.0375	1.124E+12
0.0575	1.078E+12
0.0850	6.486E+11
0.1250	6.594E+11
0.2250	5.868E+11
0.3750	2.441E+11
0.5750	3.947E+12
0.8500	3.258E+11
1.2500	3.419E+11
1.7500	1.047E+10
2.2500	1.606E+05
2.7500	3.698E+04
3.5000	8.825E+01
5.0000	3.451E+01
7.0000	3.893E+00
11.0000	4.427E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.70E-01	1.34E+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)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.63	4.76
Bounding:	1.26	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
0.59

II. Estimates

Radionuclide	m: CI/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_a: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.6842E-09	80.66	161.31	0.00E+00	7.00E-07	1.40E-06
Am-241	4.9459E-03	80.66	161.31	0.00E+00	3.99E-01	7.98E-01
Am-242m	1.6241E-06	80.66	161.31	0.00E+00	1.31E-04	2.62E-04
Am-243	2.3233E-07	80.66	161.31	0.00E+00	1.87E-05	3.75E-05
C-14	4.3083E-05	80.66	161.31	0.00E+00	3.47E-03	6.95E-03
Cl-36	4.3023E-08	80.66	161.31	0.00E+00	3.47E-06	6.94E-06
Cm-243	9.1880E-08	80.66	161.31	0.00E+00	7.41E-06	1.48E-05
Cm-244	5.6346E-07	80.66	161.31	0.00E+00	4.54E-05	9.09E-05
Co-60	8.3699E-05	80.66	161.31	0.00E+00	6.75E-03	1.35E-02
Cs-134	2.8211E-08	80.66	161.31	0.00E+00	2.28E-06	4.55E-06
Cs-135	3.1549E-05	80.66	161.31	0.00E+00	2.54E-03	5.09E-03
Cs-137	9.7519E-01	80.66	161.31	0.00E+00	7.87E+01	1.57E+02
Eu-154	3.5970E-02	80.66	161.31	0.00E+00	2.90E+00	5.80E+00
Eu-155	8.1774E-04	80.66	161.31	0.00E+00	6.60E-02	1.32E-01
Fe-55	5.3940E-06	80.66	161.31	0.00E+00	4.35E-06	8.70E-06
H-3	8.6571E-04	80.66	161.31	0.00E+00	6.98E-02	1.40E-01
I-129	7.3805E-07	80.66	161.31	0.00E+00	5.95E-05	1.19E-04
Kr-85	1.3771E-02	80.66	161.31	0.00E+00	1.11E+00	2.22E+00
Np-237	1.5218E-06	80.66	161.31	0.00E+00	1.23E-04	2.45E-04
Pa-231	1.4152E-06	80.66	161.31	0.00E+00	1.14E-06	2.28E-06
Pb-210	7.9774E-13	80.66	161.31	0.00E+00	6.43E-11	1.29E-10
Pm-147	1.4362E-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	3.0602E-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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.910E+12
0.0250	1.640E+12
0.0375	1.480E+12
0.0575	1.549E+12
0.0850	9.239E+11
0.1250	6.856E+11
0.2250	8.108E+11
0.3750	3.498E+11
0.5750	5.873E+12
0.8500	1.599E+11
1.2500	1.352E+11
1.7500	4.848E+09
2.2500	1.644E+06
2.7500	7.769E+04
3.5000	2.293E+02
5.0000	9.660E+01
7.0000	1.090E+01
11.0000	1.240E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.27E-01	1.85E+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)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

[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) DOW
SNF ID #: 970
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.19kg; EOL=0.18kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.01

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	9.55	19.09	0.00E+00	7.70E-09	1.54E-08
Am-241	2.2586E-03	9.55	19.09	0.00E+00	2.16E-02	4.31E-02
Am-242m	1.9925E-06	9.55	19.09	0.00E+00	1.90E-05	3.80E-05
Am-243	2.3323E-07	9.55	19.09	0.00E+00	2.23E-06	4.45E-06
C-14	4.3308E-05	9.55	19.09	0.00E+00	4.13E-04	8.27E-04
Cl-36	4.3023E-08	9.55	19.09	0.00E+00	4.11E-07	8.21E-07
Cm-243	2.7429E-07	9.55	19.09	0.00E+00	2.62E-06	5.24E-06
Cm-244	3.1504E-06	9.55	19.09	0.00E+00	3.01E-05	6.01E-05
Co-60	3.1008E-02	9.55	19.09	0.00E+00	2.96E-01	5.92E-01
Cs-134	1.0367E-01	9.55	19.09	0.00E+00	9.90E-01	1.98E+00
Cs-135	3.1549E-05	9.55	19.09	0.00E+00	3.01E-04	6.02E-04
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01
Eu-154	1.3490E+00	9.55	19.09	0.00E+00	1.29E+01	2.58E+01
Eu-155	4.3880E-01	9.55	19.09	0.00E+00	4.19E+00	8.38E+00
Fe-55	8.6782E-03	9.55	19.09	0.00E+00	8.28E-02	1.66E-01
H-3	1.0805E-02	9.55	19.09	0.00E+00	1.03E-01	2.06E-01
I-129	7.3805E-07	9.55	19.09	0.00E+00	7.04E-06	1.41E-05
Kr-85	2.5218E-01	9.55	19.09	0.00E+00	2.41E+00	4.81E+00
Np-237	1.4463E-06	9.55	19.09	0.00E+00	1.38E-05	2.76E-05
Pa-231	3.5970E-09	9.55	19.09	0.00E+00	3.43E-08	6.87E-08
Pb-210	8.2511E-15	9.55	19.09	0.00E+00	7.88E-14	1.58E-13
Pm-147	2.0767E+00	9.55	19.09	0.00E+00	1.98E+01	3.96E+01
Pu-238	1.3514E-03	9.55	19.09	0.00E+00	1.29E-02	2.58E-02
Pu-239	5.6947E-03	9.55	19.09	0.00E+00	5.44E-02	1.09E-01
Pu-240	2.2647E-03	9.55	19.09	0.00E+00	2.16E-02	4.32E-02
Pu-241	1.2574E-01	9.55	19.09	0.00E+00	1.20E+00	2.40E+00
Pu-242	3.0602E-07	9.55	19.09	0.00E+00	2.92E-06	5.84E-06
Ra-226	5.7353E-14	9.55	19.09	0.00E+00	5.47E-13	1.09E-12
Ra-228	1.8150E-10	9.55	19.09	0.00E+00	1.73E-09	3.46E-09
Ru-106	9.3744E-02	9.55	19.09	0.00E+00	8.95E-01	1.79E+00
Se-79	1.2938E-05	9.55	19.09	0.00E+00	1.23E-04	2.47E-04
Sn-126	1.2239E-05	9.55	19.09	0.00E+00	1.17E-04	2.34E-04
Sr-90	2.6000E+00	9.55	19.09	0.00E+00	2.48E+01	4.96E+01
Tc-99	4.4120E-04	9.55	19.09	0.00E+00	4.21E-03	8.42E-03
Th-229	1.4749E-10	9.55	19.09	0.00E+00	1.41E-09	2.82E-09
Th-230	1.9549E-11	9.55	19.09	0.00E+00	1.87E-10	3.73E-10
Th-232	2.3744E-10	9.55	19.09	0.00E+00	2.27E-09	4.53E-09
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.230E+12
0.0250	7.013E+11
0.0375	8.735E+11
0.0575	6.697E+11
0.0850	4.687E+11
0.1250	7.011E+11
0.2250	3.913E+11
0.3750	1.742E+11
0.5750	2.208E+12
0.8500	5.435E+11
1.2500	5.634E+11
1.7500	1.612E+10
2.2500	1.960E+09
2.7500	1.592E+07
3.5000	1.861E+06
5.0000	1.101E+01
7.0000	1.246E+00
11.0000	1.419E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E-01	9.59E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	1.85	9.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		19.09	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

[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) FINLAND
SNF ID #: 463
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=12.42kg; EOL=12.344kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 0.62

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	72.45	144.90	0.00E+00	1.78E-07	3.56E-07
Am-241	3.8752E-03	72.45	144.90	0.00E+00	2.81E-01	5.61E-01
Am-242m	1.8617E-06	72.45	144.90	0.00E+00	1.35E-04	2.70E-04
Am-243	2.3293E-07	72.45	144.90	0.00E+00	1.69E-05	3.38E-05
C-14	4.3233E-05	72.45	144.90	0.00E+00	3.13E-03	6.26E-03
Cl-36	4.3023E-08	72.45	144.90	0.00E+00	3.12E-06	6.23E-06
Cm-243	1.9053E-07	72.45	144.90	0.00E+00	1.38E-05	2.76E-05
Cm-244	1.7744E-06	72.45	144.90	0.00E+00	1.29E-04	2.57E-04
Co-60	4.3188E-03	72.45	144.90	0.00E+00	3.13E-01	6.26E-01
Cs-134	6.7188E-04	72.45	144.90	0.00E+00	4.87E-02	9.74E-02
Cs-135	3.1549E-05	72.45	144.90	0.00E+00	2.29E-03	4.57E-03
Cs-137	1.9489E+00	72.45	144.90	0.00E+00	1.41E+02	2.82E+02
Eu-154	4.0301E-01	72.45	144.90	0.00E+00	2.92E+01	5.84E+01
Eu-155	5.4000E-02	72.45	144.90	0.00E+00	3.91E+00	7.82E+00
Fe-55	1.5955E-04	72.45	144.90	0.00E+00	1.16E-02	2.31E-02
H-3	4.6571E-03	72.45	144.90	0.00E+00	3.37E-01	6.75E-01
I-129	7.3805E-07	72.45	144.90	0.00E+00	5.35E-05	1.07E-04
Kr-85	9.5684E-02	72.45	144.90	0.00E+00	6.93E+00	1.39E+01
Np-237	1.4618E-06	72.45	144.90	0.00E+00	1.06E-04	2.12E-04
Pa-231	6.4782E-09	72.45	144.90	0.00E+00	4.69E-07	9.39E-07
Pb-210	6.3158E-14	72.45	144.90	0.00E+00	4.58E-12	9.15E-12
Pm-147	3.9564E-02	72.45	144.90	0.00E+00	2.87E+00	5.73E+00
Pu-238	1.2008E-03	72.45	144.90	0.00E+00	8.70E-02	1.74E-01
Pu-239	5.6917E-03	72.45	144.90	0.00E+00	4.12E-01	8.25E-01
Pu-240	2.2617E-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+00	8.85E+00
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	1.93E-11	3.87E-11
Ra-228	2.2556E-10	72.45	144.90	0.00E+00	1.63E-08	3.27E-08
Ru-106	3.1293E-06	72.45	144.90	0.00E+00	2.27E-04	4.53E-04
Se-79	1.2935E-05	72.45	144.90	0.00E+00	9.37E-04	1.87E-03
Sn-126	1.2238E-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
Tl-208	1.8195E-06	72.45	144.90	0.00E+00	1.32E-06	2.64E-06
U-232	4.9098E-06	72.45	144.90	0.00E+00	3.56E-06	7.11E-06
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	-2.6159E-06	72.45	0.00	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	0.00	3.34E-03	3.34E-03	3.34E-03
Y-90	1.8211E+00	72.45	144.90	0.00E+00	1.32E+02	2.64E+02
Other Radionuclides					1.52E+02	3.03E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.487E+13
0.0250	3.070E+12
0.0375	3.214E+12
0.0575	2.971E+12
0.0850	1.809E+12
0.1250	2.030E+12
0.2250	1.639E+12
0.3750	6.735E+11
0.5750	1.073E+13
0.8500	1.142E+12
1.2500	1.230E+12
1.7500	3.684E+10
2.2500	5.840E+05
2.7500	9.720E+04
3.5000	6.827E+02
5.0000	8.916E+01
7.0000	1.008E+01
11.0000	1.147E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.88E+00	3.75E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	60.52	72.45	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		144.90	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.16	1.20
Bounding:	0.32	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GA
SNF ID #: 728
Fuel Units & Descr: 52 - ELEMENT
Heavy Metal Mass: BOL=9.412kg; EOL=9.329kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10"
0.47

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.0632E-10	91.73	183.46	0.00E+00	7.40E-08	1.48E-07
Am-241	2.2586E-03	91.73	183.46	0.00E+00	2.07E-01	4.14E-01
Am-242m	1.9925E-06	91.73	183.46	0.00E+00	1.83E-04	3.66E-04
Am-243	2.3323E-07	91.73	183.46	0.00E+00	2.14E-05	4.28E-05
C-14	4.3308E-05	91.73	183.46	0.00E+00	3.97E-03	7.95E-03
Cl-36	4.3023E-08	91.73	183.46	0.00E+00	3.95E-06	7.89E-06
Cm-243	2.7429E-07	91.73	183.46	0.00E+00	2.52E-05	5.03E-05
Cm-244	3.1504E-06	91.73	183.46	0.00E+00	2.89E-04	5.78E-04
Co-60	3.1008E-02	91.73	183.46	0.00E+00	2.84E+00	5.69E+00
Cs-134	1.0367E-01	91.73	183.46	0.00E+00	9.51E+00	1.90E+01
Cs-135	3.1549E-05	91.73	183.46	0.00E+00	2.89E-03	5.79E-03
Cs-137	2.7564E+00	91.73	183.46	0.00E+00	2.53E+02	5.06E+02
Eu-154	1.3490E+00	91.73	183.46	0.00E+00	1.24E+02	2.47E+02
Eu-155	4.3880E-01	91.73	183.46	0.00E+00	4.03E+01	8.05E+01
Fe-55	8.6782E-03	91.73	183.46	0.00E+00	7.96E-01	1.59E+00
H-3	1.0805E-02	91.73	183.46	0.00E+00	9.91E-01	1.98E+00
I-129	7.3805E-07	91.73	183.46	0.00E+00	6.77E-05	1.35E-04
Kr-85	2.5218E-01	91.73	183.46	0.00E+00	2.31E+01	4.63E+01
Np-237	1.4463E-06	91.73	183.46	0.00E+00	1.33E-04	2.65E-04
Pa-231	3.5970E-09	91.73	183.46	0.00E+00	3.30E-07	6.60E-07
Pb-210	8.2511E-15	91.73	183.46	0.00E+00	7.57E-13	1.51E-12
Pm-147	2.0767E+00	91.73	183.46	0.00E+00	1.90E+02	3.81E+02
Pu-238	1.3514E-03	91.73	183.46	0.00E+00	1.24E-01	2.48E-01
Pu-239	5.6947E-03	91.73	183.46	0.00E+00	5.22E-01	1.04E+00
Pu-240	2.2647E-03	91.73	183.46	0.00E+00	2.08E-01	4.15E-01
Pu-241	1.2574E-01	91.73	183.46	0.00E+00	1.15E+01	2.31E+01
Pu-242	3.0602E-07	91.73	183.46	0.00E+00	2.81E-05	5.61E-05
Ra-226	5.7353E-14	91.73	183.46	0.00E+00	5.26E-12	1.05E-11
Ra-228	1.8150E-10	91.73	183.46	0.00E+00	1.66E-08	3.33E-08
Ru-106	9.3744E-02	91.73	183.46	0.00E+00	8.60E+00	1.72E+01
Se-79	1.2938E-05	91.73	183.46	0.00E+00	1.19E-03	2.37E-03
Sn-126	1.2239E-05	91.73	183.46	0.00E+00	1.12E-03	2.25E-03
Sr-90	2.6000E+00	91.73	183.46	0.00E+00	2.38E+02	4.77E+02
Tc-99	4.4120E-04	91.73	183.46	0.00E+00	4.05E-02	8.09E-02
Th-229	1.4749E-10	91.73	183.46	0.00E+00	1.35E-08	2.71E-08
Th-230	1.9549E-11	91.73	183.46	0.00E+00	1.79E-09	3.59E-09
Th-232	2.3744E-10	91.73	183.46	0.00E+00	2.18E-08	4.36E-08
Tl-208	1.9459E-08	91.73	183.46	0.00E+00	1.78E-06	3.57E-06
U-232	5.6015E-08	91.73	183.46	0.00E+00	5.14E-06	1.03E-05
U-233	1.3132E-07	91.73	183.46	0.00E+00	1.20E-05	2.41E-05
U-234	1.7323E-07	91.73	183.46	0.00E+00	1.59E-05	3.18E-05
U-235	-2.6159E-06	91.73	0.00	4.03E-03	3.79E-03	4.03E-03
U-236	1.2717E-05	91.73	183.46	0.00E+00	1.17E-03	2.33E-03
U-238	-3.8857E-08	91.73	0.00	2.54E-03	2.53E-03	2.54E-03
Y-90	2.6015E+00	91.73	183.46	0.00E+00	2.39E+02	4.77E+02
Other Radionuclides					3.49E+02	6.97E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.104E+13
0.0250	6.739E+12
0.0375	8.395E+12
0.0575	6.435E+12
0.0850	4.505E+12
0.1250	6.737E+12
0.2250	3.761E+12
0.3750	1.674E+12
0.5750	2.122E+13
0.8500	5.223E+12
1.2500	5.414E+12
1.7500	1.550E+11
2.2500	1.884E+10
2.7500	1.530E+08
3.5000	1.788E+07
5.0000	1.105E+02
7.0000	1.252E+01
11.0000	1.426E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.61E+00	9.22E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8109242	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	91.73	79.42	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		183.46	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	0.87
Bounding:	0.53	

Estimated EOL HM/Given EOL HM: 1.00

[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) GA
SNF ID #: 870
Fuel Units & Descr: 246 - ELEMENT
Heavy Metal Mass: BOL=46.74kg; EOL=45.19kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: $18"x10'$ 2.22

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.6842E-09	1,479.31	2,958.63	0.00E+00	1.28E-05	2.57E-05
Am-241	4.9459E-03	1,479.31	2,958.63	0.00E+00	7.32E+00	1.46E+01
Am-242m	1.6241E-06	1,479.31	2,958.63	0.00E+00	2.40E-03	4.80E-03
Am-243	2.3233E-07	1,479.31	2,958.63	0.00E+00	3.44E-04	6.87E-04
C-14	4.3083E-05	1,479.31	2,958.63	0.00E+00	6.37E-02	1.27E-01
Cl-36	4.3023E-06	1,479.31	2,958.63	0.00E+00	6.36E-05	1.27E-04
Cm-243	9.1880E-06	1,479.31	2,958.63	0.00E+00	1.36E-04	2.72E-04
Cm-244	5.6346E-07	1,479.31	2,958.63	0.00E+00	8.34E-04	1.67E-03
Co-60	8.3699E-05	1,479.31	2,958.63	0.00E+00	1.24E-01	2.48E-01
Cs-134	2.8211E-08	1,479.31	2,958.63	0.00E+00	4.17E-05	8.35E-05
Cs-135	3.1549E-05	1,479.31	2,958.63	0.00E+00	4.67E-02	9.33E-02
Cs-137	9.7519E-01	1,479.31	2,958.63	0.00E+00	1.44E+03	2.89E+03
Eu-154	3.5970E-02	1,479.31	2,958.63	0.00E+00	5.32E+01	1.06E+02
Eu-155	8.1774E-04	1,479.31	2,958.63	0.00E+00	1.21E+00	2.42E+00
Fe-55	5.3940E-08	1,479.31	2,958.63	0.00E+00	7.98E-05	1.60E-04
H-3	8.6571E-04	1,479.31	2,958.63	0.00E+00	1.28E+00	2.56E+00
I-129	7.3805E-07	1,479.31	2,958.63	0.00E+00	1.09E-03	2.18E-03
Kr-85	1.3771E-02	1,479.31	2,958.63	0.00E+00	2.04E+01	4.07E+01
Np-237	1.5218E-06	1,479.31	2,958.63	0.00E+00	2.25E-03	4.50E-03
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-05	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.451E+14
0.0250	3.008E+13
0.0375	2.714E+13
0.0575	2.840E+13
0.0850	1.694E+13
0.1250	1.257E+13
0.2250	1.487E+13
0.3750	6.416E+12
0.5750	1.077E+14
0.8500	2.934E+12
1.2500	2.480E+12
1.7500	8.892E+10
2.2500	3.015E+06
2.7500	1.425E+06
3.5000	3.954E+03
5.0000	1.664E+03
7.0000	1.875E+02
11.0000	2.131E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.70E+01	3.40E+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 %:	19.9	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.86	3.25
Bounding:	1.71	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GERMANY
SNF ID #: 465
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=11.7kg; EOL=11.635kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage:
18"x10'
0.59

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	62.04	124.09	0.00E+00	1.52E-07	3.05E-07
Am-241	3.8752E-03	62.04	124.09	0.00E+00	2.40E-01	4.81E-01
Am-242m	1.8617E-06	62.04	124.09	0.00E+00	1.16E-04	2.31E-04
Am-243	2.3293E-07	62.04	124.09	0.00E+00	1.45E-05	2.89E-05
C-14	4.3233E-05	62.04	124.09	0.00E+00	2.68E-03	5.36E-03
Cl-36	4.3023E-08	62.04	124.09	0.00E+00	2.67E-06	5.34E-06
Cm-243	1.9053E-07	62.04	124.09	0.00E+00	1.18E-05	2.36E-05
Cm-244	1.7744E-06	62.04	124.09	0.00E+00	1.10E-04	2.20E-04
Co-60	4.3188E-03	62.04	124.09	0.00E+00	2.68E-01	5.36E-01
Cs-134	6.7188E-04	62.04	124.09	0.00E+00	4.17E-02	8.34E-02
Cs-135	3.1549E-05	62.04	124.09	0.00E+00	1.96E-03	3.91E-03
Cs-137	1.9489E+00	62.04	124.09	0.00E+00	1.21E+02	2.42E+02
Eu-154	4.0301E-01	62.04	124.09	0.00E+00	2.50E+01	5.00E+01
Eu-155	5.4000E-02	62.04	124.09	0.00E+00	3.35E+00	6.70E+00
Fe-55	1.5955E-04	62.04	124.09	0.00E+00	9.90E-03	1.98E-02
H-3	4.6571E-03	62.04	124.09	0.00E+00	2.89E-01	5.78E-01
I-129	7.3805E-07	62.04	124.09	0.00E+00	4.58E-05	9.16E-05
Kr-85	9.5684E-02	62.04	124.09	0.00E+00	5.94E+00	1.19E+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
Tl-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-05	62.04	124.09	0.00E+00	7.89E-04	1.58E-03
U-238	-3.8857E-08	62.04	0.00	3.15E-03	3.14E-03	3.15E-03
Y-90	1.8211E+00	62.04	124.09	0.00E+00	1.13E+02	2.26E+02
Other Radionuclides					1.30E+02	2.60E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.273E+13
0.0250	2.630E+12
0.0375	2.752E+12
0.0575	2.544E+12
0.0850	1.549E+12
0.1250	1.739E+12
0.2250	1.404E+12
0.3750	5.768E+11
0.5750	9.188E+12
0.8500	9.776E+11
1.2500	1.053E+12
1.7500	3.155E+10
2.2500	5.001E+05
2.7500	8.324E+04
3.5000	5.862E+02
5.0000	7.701E+01
7.0000	8.709E+00
11.0000	9.914E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.61E+00	3.22E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	57.01	62.04	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		124.09	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

[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) HANFORD
SNF ID #: 876
Fuel Units & Descr: 59 - ELEMENT
Heavy Metal Mass: BOL=10.915kg; EOL=10.838kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 0.53

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.6842E-09	73.21	146.42	0.00E+00	6.36E-07	1.27E-06
Am-241	4.9459E-03	73.21	146.42	0.00E+00	3.62E-01	7.24E-01
Am-242m	1.6241E-06	73.21	146.42	0.00E+00	1.19E-04	2.38E-04
Am-243	2.3233E-07	73.21	146.42	0.00E+00	1.70E-05	3.40E-05
C-14	4.3083E-05	73.21	146.42	0.00E+00	3.15E-03	6.31E-03
Cl-36	4.3023E-08	73.21	146.42	0.00E+00	3.15E-06	6.30E-06
Cm-243	9.1880E-08	73.21	146.42	0.00E+00	6.73E-06	1.35E-05
Cm-244	5.6346E-07	73.21	146.42	0.00E+00	4.13E-05	8.25E-05
Co-60	8.3699E-05	73.21	146.42	0.00E+00	6.13E-03	1.23E-02
Cs-134	2.8211E-08	73.21	146.42	0.00E+00	2.07E-06	4.13E-06
Cs-135	3.1549E-05	73.21	146.42	0.00E+00	2.31E-03	4.62E-03
Cs-137	9.7519E-01	73.21	146.42	0.00E+00	7.14E+01	1.43E+02
Eu-154	3.5970E-02	73.21	146.42	0.00E+00	2.63E+00	5.27E+00
Eu-155	8.1774E-04	73.21	146.42	0.00E+00	5.99E-02	1.20E-01
Fe-55	5.3940E-06	73.21	146.42	0.00E+00	3.95E-06	7.90E-06
H-3	8.6571E-04	73.21	146.42	0.00E+00	6.34E-02	1.27E-01
I-129	7.3805E-07	73.21	146.42	0.00E+00	5.40E-05	1.08E-04
Kr-85	1.3771E-02	73.21	146.42	0.00E+00	1.01E+00	2.02E+00
Np-237	1.5218E-06	73.21	146.42	0.00E+00	1.11E-04	2.23E-04
Pa-231	1.4152E-08	73.21	146.42	0.00E+00	1.04E-06	2.07E-06
Pb-210	7.9774E-13	73.21	146.42	0.00E+00	5.84E-11	1.17E-10
Pm-147	1.4362E-05	73.21	146.42	0.00E+00	1.05E-03	2.10E-03
Pu-238	9.4782E-04	73.21	146.42	0.00E+00	6.94E-02	1.39E-01
Pu-239	5.6872E-03	73.21	146.42	0.00E+00	4.16E-01	8.33E-01
Pu-240	2.2541E-03	73.21	146.42	0.00E+00	1.65E-01	3.30E-01
Pu-241	1.4433E-02	73.21	146.42	0.00E+00	1.06E+00	2.11E+00
Pu-242	3.0602E-07	73.21	146.42	0.00E+00	2.24E-05	4.48E-05
Ra-226	1.6857E-12	73.21	146.42	0.00E+00	1.38E-10	2.76E-10
Ra-228	2.3729E-10	73.21	146.42	0.00E+00	1.74E-08	3.47E-08
Ru-106	3.4857E-15	73.21	146.42	0.00E+00	2.55E-13	5.10E-13
Se-79	1.2931E-05	73.21	146.42	0.00E+00	9.47E-04	1.89E-03
Sn-126	1.2235E-05	73.21	146.42	0.00E+00	8.96E-04	1.79E-03
Sr-90	8.9173E-01	73.21	146.42	0.00E+00	6.53E+01	1.31E+02
Tc-99	4.4120E-04	73.21	146.42	0.00E+00	3.23E-02	6.46E-02
Th-229	8.2752E-10	73.21	146.42	0.00E+00	6.06E-08	1.21E-07
Th-230	1.4908E-10	73.21	146.42	0.00E+00	1.09E-08	2.18E-08
Th-232	2.3744E-10	73.21	146.42	0.00E+00	1.74E-08	3.48E-08
Tl-206	1.3668E-08	73.21	146.42	0.00E+00	1.00E-06	2.00E-06
U-232	3.6797E-08	73.21	146.42	0.00E+00	2.69E-06	5.39E-06
U-233	1.3164E-07	73.21	146.42	0.00E+00	9.64E-06	1.93E-05
U-234	3.3865E-07	73.21	146.42	0.00E+00	2.48E-05	4.96E-05
U-235	-2.6144E-06	73.21	0.00	4.72E-03	4.53E-03	4.72E-03
U-236	1.2722E-05	73.21	146.42	0.00E+00	9.31E-04	1.86E-03
U-238	-3.8857E-08	73.21	0.00	2.93E-03	2.93E-03	2.93E-03
Y-90	8.9203E-01	73.21	146.42	0.00E+00	6.53E+01	1.31E+02
Other Radionuclides					8.17E+01	1.63E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.180E+12
0.0250	1.488E+12
0.0375	1.343E+12
0.0575	1.406E+12
0.0850	8.386E+11
0.1250	6.223E+11
0.2250	7.360E+11
0.3750	3.175E+11
0.5750	5.331E+12
0.8500	1.452E+11
1.2500	1.227E+11
1.7500	4.401E+09
2.2500	1.492E+05
2.7500	7.052E+04
3.5000	2.081E+02
5.0000	8.768E+01
7.0000	9.897E+00
11.0000	1.125E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.42E-01	1.68E+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)[2]

	From SFD	Estimated
Nominal:	53.19	73.21
Bounding:		146.42

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:	0.18	1.38
Bounding:	0.36	

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) HANNOVER
SNF ID #: 303
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.561kg; EOL=13.419kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 0.64

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	135.54	271.08	0.00E+00	5.19E-07	1.04E-06
Am-241	4.4195E-03	135.54	271.08	0.00E+00	5.99E-01	1.20E+00
Am-242m	1.8195E-06	135.54	271.08	0.00E+00	2.47E-04	4.93E-04
Am-243	2.3278E-07	135.54	271.08	0.00E+00	3.16E-05	6.31E-05
C-14	4.3203E-05	135.54	271.08	0.00E+00	5.86E-03	1.17E-02
Cl-36	4.3023E-08	135.54	271.08	0.00E+00	5.83E-06	1.17E-05
Cm-243	1.6872E-07	135.54	271.08	0.00E+00	2.29E-05	4.57E-05
Cm-244	1.4660E-06	135.54	271.08	0.00E+00	1.99E-04	3.97E-04
Co-60	2.2376E-03	135.54	271.08	0.00E+00	3.03E-01	6.07E-01
Cs-134	1.2525E-04	135.54	271.08	0.00E+00	1.70E-02	3.40E-02
Cs-135	3.1549E-05	135.54	271.08	0.00E+00	4.28E-03	8.55E-03
Cs-137	1.7368E+00	135.54	271.08	0.00E+00	2.35E+02	4.71E+02
Eu-154	2.6947E-01	135.54	271.08	0.00E+00	3.65E+01	7.30E+01
Eu-155	2.6857E-02	135.54	271.08	0.00E+00	3.64E+00	7.28E+00
Fe-55	4.2105E-05	135.54	271.08	0.00E+00	5.71E-03	1.14E-02
H-3	3.5173E-03	135.54	271.08	0.00E+00	4.77E-01	9.53E-01
I-129	7.3805E-07	135.54	271.08	0.00E+00	1.00E-04	2.00E-04
Kr-85	6.9263E-02	135.54	271.08	0.00E+00	9.39E+00	1.88E+01
Np-237	1.4752E-06	135.54	271.08	0.00E+00	2.00E-04	4.00E-04
Pa-231	8.3970E-09	135.54	271.08	0.00E+00	1.14E-06	2.28E-06
Pb-210	1.4995E-13	135.54	271.08	0.00E+00	2.03E-11	4.07E-11
Pm-147	1.0567E-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
Ra-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	1.37E-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
Sr-90	1.6165E+00	135.54	271.08	0.00E+00	2.19E+02	4.38E+02
Tc-99	4.4120E-04	135.54	271.08	0.00E+00	5.98E-02	1.20E-01
Th-229	4.5684E-10	135.54	271.08	0.00E+00	6.19E-08	1.24E-07
Th-230	6.8271E-11	135.54	271.08	0.00E+00	9.25E-09	1.85E-08
Th-232	2.3744E-10	135.54	271.08	0.00E+00	3.22E-08	6.44E-08
Tl-208	1.7368E-08	135.54	271.08	0.00E+00	2.35E-06	4.71E-06
U-232	4.6797E-06	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	0.00	5.86E-03	5.51E-03	5.86E-03
U-236	1.2719E-05	135.54	271.08	0.00E+00	1.72E-03	3.45E-03
U-238	-3.8857E-08	135.54	0.00	3.65E-03	3.64E-03	3.65E-03
Y-90	1.6165E+00	135.54	271.08	0.00E+00	2.19E+02	4.38E+02
Other Radionuclides					2.55E+02	5.10E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.450E+13
0.0250	5.061E+12
0.0375	5.069E+12
0.0575	4.861E+12
0.0850	2.924E+12
0.1250	2.972E+12
0.2250	2.645E+12
0.3750	1.100E+12
0.5750	1.779E+13
0.8500	1.469E+12
1.2500	1.541E+12
1.7500	4.718E+10
2.2500	7.238E+05
2.7500	1.867E+05
3.5000	4.090E+02
5.0000	1.803E+02
7.0000	1.810E+01
11.0000	2.059E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.82E+00	6.04E+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 %:	20.00391594	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis 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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.27	1.03
Bounding:	0.54	

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) HEIDELBERG
SNF ID #: 464
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=11.648kg; EOL=11.401kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
0.59

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	283.80	567.61	0.00E+00	6.97E-07	1.39E-06
Am-241	3.8752E-03	283.80	567.61	0.00E+00	1.10E+00	2.20E+00
Am-242m	1.8617E-06	283.80	567.61	0.00E+00	5.28E-04	1.06E-03
Am-243	2.3293E-07	283.80	567.61	0.00E+00	6.61E-05	1.32E-04
C-14	4.3233E-05	283.80	567.61	0.00E+00	1.23E-02	2.45E-02
Cl-36	4.3023E-08	283.80	567.61	0.00E+00	1.22E-05	2.44E-05
Cm-243	1.9053E-07	283.80	567.61	0.00E+00	5.41E-05	1.08E-04
Cm-244	1.7744E-06	283.80	567.61	0.00E+00	5.04E-04	1.01E-03
Co-60	4.3188E-03	283.80	567.61	0.00E+00	1.23E+00	2.45E+00
Cs-134	6.7188E-04	283.80	567.61	0.00E+00	1.91E-01	3.81E-01
Cs-135	3.1549E-05	283.80	567.61	0.00E+00	8.95E-03	1.79E-02
Cs-137	1.9489E+00	283.80	567.61	0.00E+00	5.53E+02	1.11E+03
Eu-154	4.0301E-01	283.80	567.61	0.00E+00	1.14E+02	2.29E+02
Eu-155	5.4000E-02	283.80	567.61	0.00E+00	1.53E+01	3.07E+01
Fe-55	1.5955E-04	283.80	567.61	0.00E+00	4.53E-02	9.06E-02
H-3	4.6571E-03	283.80	567.61	0.00E+00	1.32E+00	2.64E+00
I-129	7.3805E-07	283.80	567.61	0.00E+00	2.09E-04	4.19E-04
Kr-85	9.5684E-02	283.80	567.61	0.00E+00	2.72E+01	5.43E+01
Np-237	1.4618E-06	283.80	567.61	0.00E+00	4.15E-04	8.30E-04
Pa-231	6.4782E-09	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	3.9564E-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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.825E+13
0.0250	1.203E+13
0.0375	1.259E+13
0.0575	1.164E+13
0.0850	7.085E+12
0.1250	7.953E+12
0.2250	6.420E+12
0.3750	2.638E+12
0.5750	4.203E+13
0.8500	4.472E+12
1.2500	4.817E+12
1.7500	1.443E+11
2.2500	2.287E+06
2.7500	3.807E+05
3.5000	2.621E+03
5.0000	3.262E+02
7.0000	3.684E+01
11.0000	4.191E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.37E+00	1.47E+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 %:	20.08410778	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	283.80	235.77	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		567.61	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.66	0.83
Bounding:	1.32	

Estimated EOL HM/Given EOL HM: 1.00

[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) ITALY
SNF ID #: 466
Fuel Units & Descr: 60 - ELEMENT
Heavy Metal Mass: BOL=10.8kg; EOL=10.74kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	57.27	114.54	0.00E+00	1.41E-07	2.81E-07
Am-241	3.8752E-03	57.27	114.54	0.00E+00	2.22E-01	4.44E-01
Am-242m	1.8617E-06	57.27	114.54	0.00E+00	1.07E-04	2.13E-04
Am-243	2.3293E-07	57.27	114.54	0.00E+00	1.33E-05	2.67E-05
C-14	4.3233E-05	57.27	114.54	0.00E+00	2.48E-03	4.95E-03
Cl-36	4.3023E-08	57.27	114.54	0.00E+00	2.46E-06	4.93E-06
Cm-243	1.9053E-07	57.27	114.54	0.00E+00	1.09E-05	2.18E-05
Cm-244	1.7744E-06	57.27	114.54	0.00E+00	1.02E-04	2.03E-04
Co-60	4.3188E-03	57.27	114.54	0.00E+00	2.47E-01	4.95E-01
Cs-134	6.7188E-04	57.27	114.54	0.00E+00	3.85E-02	7.70E-02
Cs-135	3.1549E-05	57.27	114.54	0.00E+00	1.81E-03	3.61E-03
Cs-137	1.9489E+00	57.27	114.54	0.00E+00	1.12E+02	2.23E+02
Eu-154	4.0301E-01	57.27	114.54	0.00E+00	2.31E+01	4.62E+01
Eu-155	5.4000E-02	57.27	114.54	0.00E+00	3.09E+00	6.19E+00
Fe-55	1.5955E-04	57.27	114.54	0.00E+00	9.14E-03	1.83E-02
H-3	4.6571E-03	57.27	114.54	0.00E+00	2.67E-01	5.33E-01
I-129	7.3805E-07	57.27	114.54	0.00E+00	4.23E-05	8.45E-05
Kr-85	9.5684E-02	57.27	114.54	0.00E+00	5.48E+00	1.10E+01
Np-237	1.4618E-06	57.27	114.54	0.00E+00	8.37E-05	1.67E-04
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
Tl-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	-2.6159E-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	2.09E+02
Other Radionuclides					1.20E+02	2.40E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.176E+13
0.0250	2.427E+12
0.0375	2.541E+12
0.0575	2.348E+12
0.0850	1.430E+12
0.1250	1.605E+12
0.2250	1.296E+12
0.3750	5.324E+11
0.5750	8.481E+12
0.8500	9.024E+11
1.2500	9.721E+11
1.7500	2.912E+10
2.2500	4.616E+05
2.7500	7.684E+04
3.5000	5.411E+02
5.0000	7.109E+01
7.0000	8.039E+00
11.0000	9.152E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.49E+00	2.97E+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)[2]

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

Checks

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

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) ITALY
SNF ID #: 467
Fuel Units & Descr: 64 - ELEMENT
Heavy Metal Mass: BOL=11.93kg; EOL=11.904kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: TRIGA-Al (LW/Al-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
0.58

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	58.13	116.27	0.00E+00	2.22E-07	4.45E-07
Am-241	4.4195E-03	58.13	116.27	0.00E+00	2.57E-01	5.14E-01
Am-242m	1.8195E-06	58.13	116.27	0.00E+00	1.06E-04	2.12E-04
Am-243	2.3278E-07	58.13	116.27	0.00E+00	1.35E-05	2.71E-05
C-14	4.3203E-05	58.13	116.27	0.00E+00	2.51E-03	5.02E-03
Cl-36	4.3023E-08	58.13	116.27	0.00E+00	2.50E-06	5.00E-06
Cm-243	1.6872E-07	58.13	116.27	0.00E+00	9.81E-06	1.96E-05
Cm-244	1.4680E-06	58.13	116.27	0.00E+00	8.52E-05	1.70E-04
Co-60	2.2376E-03	58.13	116.27	0.00E+00	1.30E-01	2.60E-01
Cs-134	1.2525E-04	58.13	116.27	0.00E+00	7.28E-03	1.46E-02
Cs-135	3.1549E-05	58.13	116.27	0.00E+00	1.83E-03	3.67E-03
Cs-137	1.7368E+00	58.13	116.27	0.00E+00	1.01E+02	2.02E+02
Eu-154	2.6947E-01	58.13	116.27	0.00E+00	1.57E+01	3.13E+01
Eu-155	2.6857E-02	58.13	116.27	0.00E+00	1.56E+00	3.12E+00
Fe-55	4.2105E-05	58.13	116.27	0.00E+00	2.45E-03	4.90E-03
H-3	3.5173E-03	58.13	116.27	0.00E+00	2.04E-01	4.09E-01
I-129	7.3805E-07	58.13	116.27	0.00E+00	4.29E-05	8.58E-05
Kr-85	6.9263E-02	58.13	116.27	0.00E+00	4.03E+00	8.05E+00
Np-237	1.4752E-06	58.13	116.27	0.00E+00	8.58E-05	1.72E-04
Pa-231	8.3970E-09	58.13	116.27	0.00E+00	4.88E-07	9.76E-07
Pb-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	5.1293E-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-79	1.2935E-05	58.13	116.27	0.00E+00	7.52E-04	1.50E-03
Sn-126	1.2238E-05	58.13	116.27	0.00E+00	7.11E-04	1.42E-03
Sr-90	1.6165E+00	58.13	116.27	0.00E+00	9.40E+01	1.88E+02
Tc-99	4.4120E-04	58.13	116.27	0.00E+00	2.56E-02	5.13E-02
Th-229	4.5684E-10	58.13	116.27	0.00E+00	2.66E-08	5.31E-08
Th-230	6.8271E-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
Tl-208	1.7368E-08	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-05	2.99E-05
U-235	-2.6159E-06	58.13	0.00	5.10E-03	4.94E-03	5.10E-03
U-236	1.2719E-05	58.13	116.27	0.00E+00	7.39E-04	1.48E-03
U-238	-3.8857E-08	58.13	0.00	3.22E-03	3.21E-03	3.22E-03
Y-90	1.6165E+00	58.13	116.27	0.00E+00	9.40E+01	1.88E+02
Other Radionuclides					1.09E+02	2.19E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.051E+13
0.0250	2.171E+12
0.0375	2.174E+12
0.0575	2.085E+12
0.0850	1.254E+12
0.1250	1.275E+12
0.2250	1.135E+12
0.3750	4.719E+11
0.5750	7.632E+12
0.8500	6.299E+11
1.2500	6.610E+11
1.7500	2.023E+10
2.2500	3.105E+05
2.7500	7.151E+04
3.5000	1.843E+02
5.0000	7.259E+01
7.0000	8.204E+00
11.0000	9.337E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.29E+00	2.59E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	58.13	24.44
Bounding:		116.27

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

[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) JAPAN
SNF ID #: 481
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.845kg; EOL=13.774kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
0.64

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	134.93	269.87	0.00E+00	3.31E-07	6.63E-07
Am-241	3.8752E-03	134.93	269.87	0.00E+00	5.23E-01	1.05E+00
Am-242m	1.8617E-06	134.93	269.87	0.00E+00	2.51E-04	5.02E-04
Am-243	2.3293E-07	134.93	269.87	0.00E+00	3.14E-05	6.29E-05
C-14	4.3233E-05	134.93	269.87	0.00E+00	5.83E-03	1.17E-02
Cl-36	4.3023E-08	134.93	269.87	0.00E+00	5.81E-06	1.16E-05
Cm-243	1.9053E-07	134.93	269.87	0.00E+00	2.57E-05	5.14E-05
Cm-244	1.7744E-06	134.93	269.87	0.00E+00	2.39E-04	4.79E-04
Co-60	4.3188E-03	134.93	269.87	0.00E+00	5.83E-01	1.17E+00
Cs-134	6.7188E-04	134.93	269.87	0.00E+00	9.07E-02	1.81E-01
Cs-135	3.1549E-05	134.93	269.87	0.00E+00	4.26E-03	8.51E-03
Cs-137	1.9489E+00	134.93	269.87	0.00E+00	2.63E+02	5.26E+02
Eu-154	4.0301E-01	134.93	269.87	0.00E+00	5.44E+01	1.09E+02
Eu-155	5.4000E-02	134.93	269.87	0.00E+00	7.29E+00	1.46E+01
Fe-55	1.5955E-04	134.93	269.87	0.00E+00	2.15E-02	4.31E-02
H-3	4.6571E-03	134.93	269.87	0.00E+00	6.28E-01	1.26E+00
I-129	7.3805E-07	134.93	269.87	0.00E+00	9.96E-05	1.99E-04
Kr-85	9.5684E-02	134.93	269.87	0.00E+00	1.29E+01	2.58E+01
Np-237	1.4618E-06	134.93	269.87	0.00E+00	1.97E-04	3.94E-04
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
Tl-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

Gamma Sources

Photon Energy Group (Avg. MeV)	Total Photons/sec (bounding)
0.0150	2.770E+13
0.0250	5.719E+12
0.0375	5.986E+12
0.0575	5.533E+12
0.0850	3.368E+12
0.1250	3.781E+12
0.2250	3.052E+12
0.3750	1.254E+12
0.5750	1.998E+13
0.8500	2.126E+12
1.2500	2.290E+12
1.7500	6.861E+10
2.2500	1.088E+06
2.7500	1.810E+05
3.5000	1.258E+03
5.0000	1.603E+02
7.0000	1.811E+01
11.0000	2.061E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+00	7.01E+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 %:	20.00000073	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	134.93	67.77	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		269.87	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	0.50
Bounding:	0.53	

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.03

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	25.77	51.54	0.00E+00	2.08E-08	4.16E-08
Am-241	2.2586E-03	25.77	51.54	0.00E+00	5.82E-02	1.16E-01
Am-242m	1.9925E-06	25.77	51.54	0.00E+00	5.14E-05	1.03E-04
Am-243	2.3323E-07	25.77	51.54	0.00E+00	6.01E-06	1.20E-05
C-14	4.3308E-05	25.77	51.54	0.00E+00	1.12E-03	2.23E-03
Cl-36	4.3023E-06	25.77	51.54	0.00E+00	1.11E-06	2.22E-06
Cm-243	2.7429E-07	25.77	51.54	0.00E+00	7.07E-06	1.41E-05
Cm-244	3.1504E-06	25.77	51.54	0.00E+00	8.12E-05	1.62E-04
Co-60	3.1008E-02	25.77	51.54	0.00E+00	7.99E-01	1.60E+00
Cs-134	1.0367E-01	25.77	51.54	0.00E+00	2.67E+00	5.34E+00
Cs-135	3.1549E-05	25.77	51.54	0.00E+00	8.13E-04	1.63E-03
Cs-137	2.7564E+00	25.77	51.54	0.00E+00	7.10E+01	1.42E+02
Eu-154	1.3490E+00	25.77	51.54	0.00E+00	3.48E+01	6.95E+01
Eu-155	4.3880E-01	25.77	51.54	0.00E+00	1.13E+01	2.26E+01
Fe-55	8.6782E-03	25.77	51.54	0.00E+00	2.24E-01	4.47E-01
H-3	1.0805E-02	25.77	51.54	0.00E+00	2.78E-01	5.57E-01
I-129	7.3805E-07	25.77	51.54	0.00E+00	1.90E-05	3.80E-05
Kr-85	2.5218E-01	25.77	51.54	0.00E+00	6.50E+00	1.30E+01
Np-237	1.4463E-06	25.77	51.54	0.00E+00	3.73E-05	7.45E-05
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
Tl-208	1.9459E-08	25.77	51.54	0.00E+00	5.01E-07	1.00E-06
U-232	5.6015E-08	25.77	51.54	0.00E+00	1.44E-06	2.89E-06
U-233	1.3132E-07	25.77	51.54	0.00E+00	3.38E-06	6.77E-06
U-234	1.7323E-07	25.77	51.54	0.00E+00	4.46E-06	8.93E-06
U-235	-2.6159E-06	25.77	0.00	2.33E-04	1.66E-04	2.33E-04
U-236	1.2717E-05	25.77	51.54	0.00E+00	3.28E-04	6.55E-04
U-238	-3.8857E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.721E+12
0.0250	1.893E+12
0.0375	2.359E+12
0.0575	1.808E+12
0.0850	1.266E+12
0.1250	1.893E+12
0.2250	1.057E+12
0.3750	4.702E+11
0.5750	5.962E+12
0.8500	1.468E+12
1.2500	1.521E+12
1.7500	4.354E+10
2.2500	5.292E+09
2.7500	4.298E+07
3.5000	5.024E+06
5.0000	2.974E+01
7.0000	3.366E+00
11.0000	3.834E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.29E+00	2.59E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	19.99999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		25.77	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		51.54	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

[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) KSU
SNF ID #: 671
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=11.285kg; EOL=11.206kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
0.55

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.6842E-09	109.98	219.97	0.00E+00	9.55E-07	1.91E-06
Am-241	4.9459E-03	109.98	219.97	0.00E+00	5.44E-01	1.09E+00
Am-242m	1.6241E-06	109.98	219.97	0.00E+00	1.79E-04	3.57E-04
Am-243	2.3233E-07	109.98	219.97	0.00E+00	2.56E-05	5.11E-05
C-14	4.3083E-05	109.98	219.97	0.00E+00	4.74E-03	9.48E-03
Cl-36	4.3023E-08	109.98	219.97	0.00E+00	4.73E-06	9.46E-06
Cm-243	9.1880E-08	109.98	219.97	0.00E+00	1.01E-05	2.02E-05
Cm-244	5.6346E-07	109.98	219.97	0.00E+00	6.20E-05	1.24E-04
Co-60	8.3699E-05	109.98	219.97	0.00E+00	9.21E-03	1.84E-02
Cs-134	2.8211E-08	109.98	219.97	0.00E+00	3.10E-06	6.21E-06
Cs-135	3.1549E-05	109.98	219.97	0.00E+00	3.47E-03	6.94E-03
Cs-137	9.7519E-01	109.98	219.97	0.00E+00	1.07E+02	2.15E+02
Eu-154	3.5970E-02	109.98	219.97	0.00E+00	3.96E+00	7.91E+00
Eu-155	8.1774E-04	109.98	219.97	0.00E+00	8.99E-02	1.80E-01
Fe-55	5.3940E-06	109.98	219.97	0.00E+00	5.93E-06	1.19E-05
H-3	8.6571E-04	109.98	219.97	0.00E+00	9.52E-02	1.90E-01
I-129	7.3805E-07	109.98	219.97	0.00E+00	8.12E-05	1.62E-04
Kr-85	1.3771E-02	109.98	219.97	0.00E+00	1.51E+00	3.03E+00
Np-237	1.5218E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.079E+13
0.0250	2.236E+12
0.0375	2.018E+12
0.0575	2.112E+12
0.0850	1.260E+12
0.1250	9.348E+11
0.2250	1.106E+12
0.3750	4.770E+11
0.5750	8.009E+12
0.8500	2.181E+11
1.2500	1.844E+11
1.7500	6.611E+09
2.2500	2.242E+05
2.7500	1.059E+05
3.5000	3.053E+02
5.0000	1.285E+02
7.0000	1.450E+01
11.0000	1.649E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.26E+00	2.53E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	0.69
Bounding:	0.53	

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) MSU
SNF ID #: 878
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass: BOL=10.73kg; EOL=10.655kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 0.52

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.6842E-09	71.97	143.94	0.00E+00	6.25E-07	1.25E-06
Am-241	4.9459E-03	71.97	143.94	0.00E+00	3.56E-01	7.12E-01
Am-242m	1.6241E-06	71.97	143.94	0.00E+00	1.17E-04	2.34E-04
Am-243	2.3233E-07	71.97	143.94	0.00E+00	1.67E-05	3.34E-05
C-14	4.3083E-05	71.97	143.94	0.00E+00	3.10E-03	6.20E-03
Cl-36	4.3023E-08	71.97	143.94	0.00E+00	3.10E-06	6.19E-06
Cm-243	9.1880E-08	71.97	143.94	0.00E+00	6.61E-06	1.32E-05
Cm-244	5.6346E-07	71.97	143.94	0.00E+00	4.06E-05	8.11E-05
Co-60	8.3699E-05	71.97	143.94	0.00E+00	6.02E-03	1.20E-02
Cs-134	2.8211E-08	71.97	143.94	0.00E+00	2.03E-06	4.06E-06
Cs-135	3.1549E-05	71.97	143.94	0.00E+00	2.27E-03	4.54E-03
Cs-137	9.7519E-01	71.97	143.94	0.00E+00	7.02E+01	1.40E+02
Eu-154	3.5970E-02	71.97	143.94	0.00E+00	2.59E+00	5.18E+00
Eu-155	8.1774E-04	71.97	143.94	0.00E+00	5.89E-02	1.18E-01
Fe-55	5.3940E-08	71.97	143.94	0.00E+00	3.88E-06	7.76E-06
H-3	8.6571E-04	71.97	143.94	0.00E+00	6.23E-02	1.25E-01
I-129	7.3805E-07	71.97	143.94	0.00E+00	5.31E-05	1.06E-04
Kr-85	1.3771E-02	71.97	143.94	0.00E+00	9.91E-01	1.98E+00
Np-237	1.5218E-06	71.97	143.94	0.00E+00	1.10E-04	2.19E-04
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-79	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.058E+12
0.0250	1.463E+12
0.0375	1.321E+12
0.0575	1.382E+12
0.0850	8.244E+11
0.1250	6.117E+11
0.2250	7.235E+11
0.3750	3.122E+11
0.5750	5.241E+12
0.8500	1.427E+11
1.2500	1.206E+11
1.7500	4.326E+09
2.2500	1.467E+05
2.7500	6.933E+04
3.5000	2.046E+02
5.0000	8.619E+01
7.0000	9.729E+00
11.0000	1.106E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.28E-01	1.65E+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)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

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

[1]Fuel decay start date: 2026
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%. U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 16"x10'
0.52

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	53.25	106.50	0.00E+00	4.29E-08	8.59E-08
Am-241	2.2586E-03	53.25	106.50	0.00E+00	1.20E-01	2.41E-01
Am-242m	1.9925E-06	53.25	106.50	0.00E+00	1.06E-04	2.12E-04
Am-243	2.3323E-07	53.25	106.50	0.00E+00	1.24E-05	2.48E-05
C-14	4.3308E-05	53.25	106.50	0.00E+00	2.31E-03	4.61E-03
Cl-36	4.3023E-08	53.25	106.50	0.00E+00	2.29E-06	4.58E-06
Cm-243	2.7429E-07	53.25	106.50	0.00E+00	1.46E-05	2.92E-05
Cm-244	3.1504E-06	53.25	106.50	0.00E+00	1.68E-04	3.36E-04
Co-60	3.1008E-02	53.25	106.50	0.00E+00	1.65E+00	3.30E+00
Cs-134	1.0367E-01	53.25	106.50	0.00E+00	5.52E+00	1.10E+01
Cs-135	3.1549E-05	53.25	106.50	0.00E+00	1.68E-03	3.36E-03
Cs-137	2.7564E+00	53.25	106.50	0.00E+00	1.47E+02	2.94E+02
Eu-154	1.3490E+00	53.25	106.50	0.00E+00	7.18E+01	1.44E+02
Eu-155	4.3880E-01	53.25	106.50	0.00E+00	2.34E+01	4.67E+01
Fe-55	8.6782E-03	53.25	106.50	0.00E+00	4.62E-01	9.24E-01
H-3	1.0805E-02	53.25	106.50	0.00E+00	5.75E-01	1.15E+00
I-129	7.3805E-07	53.25	106.50	0.00E+00	3.93E-05	7.86E-05
Kr-85	2.5218E-01	53.25	106.50	0.00E+00	1.34E+01	2.69E+01
Np-237	1.4463E-06	53.25	106.50	0.00E+00	7.70E-05	1.54E-04
Pa-231	3.5970E-09	53.25	106.50	0.00E+00	1.92E-07	3.83E-07
Pb-210	8.2511E-15	53.25	106.50	0.00E+00	4.39E-13	8.79E-13
Pm-147	2.0767E+00	53.25	106.50	0.00E+00	1.11E+02	2.21E+02
Pu-238	1.3514E-03	53.25	106.50	0.00E+00	7.20E-02	1.44E-01
Pu-239	5.6947E-03	53.25	106.50	0.00E+00	3.03E-01	6.06E-01
Pu-240	2.2647E-03	53.25	106.50	0.00E+00	1.21E-01	2.41E-01
Pu-241	1.2574E-01	53.25	106.50	0.00E+00	6.70E+00	1.34E+01
Pu-242	3.0602E-07	53.25	106.50	0.00E+00	1.63E-05	3.26E-05
Ra-226	5.7353E-14	53.25	106.50	0.00E+00	3.05E-12	6.11E-12
Ra-228	1.8150E-10	53.25	106.50	0.00E+00	9.66E-09	1.93E-08
Ru-106	9.3744E-02	53.25	106.50	0.00E+00	4.99E+00	9.98E+00
Se-79	1.2938E-05	53.25	106.50	0.00E+00	6.89E-04	1.38E-03
Sn-126	1.2239E-05	53.25	106.50	0.00E+00	6.52E-04	1.30E-03
Sr-90	2.6000E+00	53.25	106.50	0.00E+00	1.38E+02	2.77E+02
Tc-99	4.4120E-04	53.25	106.50	0.00E+00	2.35E-02	4.70E-02
Th-229	1.4749E-10	53.25	106.50	0.00E+00	7.85E-09	1.57E-08
Th-230	1.9549E-11	53.25	106.50	0.00E+00	1.04E-09	2.08E-09
Th-232	2.3744E-10	53.25	106.50	0.00E+00	1.26E-08	2.53E-08
Tl-208	1.9459E-08	53.25	106.50	0.00E+00	1.04E-06	2.07E-06
U-232	5.6015E-08	53.25	106.50	0.00E+00	2.98E-06	5.97E-06
U-233	1.3132E-07	53.25	106.50	0.00E+00	6.99E-06	1.40E-05
U-234	1.7323E-07	53.25	106.50	0.00E+00	9.22E-06	1.84E-05
U-235	-2.6159E-06	53.25	0.00	4.70E-03	4.56E-03	4.70E-03
U-236	1.2717E-05	53.25	106.50	0.00E+00	6.77E-04	1.35E-03
U-238	-3.6857E-08	53.25	0.00	2.94E-03	2.94E-03	2.94E-03
Y-90	2.6015E+00	53.25	106.50	0.00E+00	1.39E+02	2.77E+02
Other Radionuclides					2.02E+02	4.05E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.802E+13
0.0250	3.912E+12
0.0375	4.873E+12
0.0575	3.736E+12
0.0850	2.615E+12
0.1250	3.911E+12
0.2250	2.183E+12
0.3750	9.716E+11
0.5750	1.232E+13
0.8500	3.032E+12
1.2500	3.143E+12
1.7500	8.995E+10
2.2500	1.093E+10
2.7500	8.881E+07
3.5000	1.038E+07
5.0000	6.755E+01
7.0000	7.658E+00
11.0000	8.730E-01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.89205598	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	53.25	38.75	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		106.50	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

[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) SLOVENIA
SNF ID #: 468
Fuel Units & Descr: 67 - ELEMENT
Heavy Metal Mass: BOL=11.879kg; EOL=11.531kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
0.60

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	3.8271E-09	405.21	810.42	0.00E+00	1.55E-06	3.10E-06
Am-241	4.4195E-03	405.21	810.42	0.00E+00	1.79E+00	3.58E+00
Am-242m	1.8195E-06	405.21	810.42	0.00E+00	7.37E-04	1.47E-03
Am-243	2.3278E-07	405.21	810.42	0.00E+00	9.43E-05	1.89E-04
C-14	4.3203E-05	405.21	810.42	0.00E+00	1.75E-02	3.50E-02
Cl-36	4.3023E-08	405.21	810.42	0.00E+00	1.74E-05	3.49E-05
Cm-243	1.6872E-07	405.21	810.42	0.00E+00	6.84E-05	1.37E-04
Cm-244	1.4660E-06	405.21	810.42	0.00E+00	5.94E-04	1.19E-03
Co-60	2.2376E-03	405.21	810.42	0.00E+00	9.07E-01	1.81E+00
Cs-134	1.2525E-04	405.21	810.42	0.00E+00	5.08E-02	1.02E-01
Cs-135	3.1549E-05	405.21	810.42	0.00E+00	1.28E-02	2.56E-02
Cs-137	1.7368E+00	405.21	810.42	0.00E+00	7.04E+02	1.41E+03
Eu-154	2.6947E-01	405.21	810.42	0.00E+00	1.09E+02	2.18E+02
Eu-155	2.6857E-02	405.21	810.42	0.00E+00	1.09E+01	2.18E+01
Fe-55	4.2105E-05	405.21	810.42	0.00E+00	1.71E-02	3.41E-02
H-3	3.5173E-03	405.21	810.42	0.00E+00	1.43E+00	2.85E+00
I-129	7.3805E-07	405.21	810.42	0.00E+00	2.99E-04	5.98E-04
Kr-85	6.9263E-02	405.21	810.42	0.00E+00	2.81E+01	5.61E+01
Np-237	1.4752E-06	405.21	810.42	0.00E+00	5.98E-04	1.20E-03
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
Tl-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	1.3146E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.324E+13
0.0250	1.513E+13
0.0375	1.515E+13
0.0575	1.453E+13
0.0850	8.741E+12
0.1250	8.886E+12
0.2250	7.906E+12
0.3750	3.289E+12
0.5750	5.320E+13
0.8500	4.391E+12
1.2500	4.607E+12
1.7500	1.410E+11
2.2500	2.164E+06
2.7500	4.983E+05
3.5000	1.181E+03
5.0000	4.616E+02
7.0000	5.207E+01
11.0000	5.920E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.02E+00	1.80E+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 %:	20.00337313	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	405.21	332.55	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		810.42	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

[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) SO. KOREA
SNF ID #: 483
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=13.11kg; EOL=12.958kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
0.62

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.6842E-09	383.31	766.62	0.00E+00	3.33E-06	6.66E-06
Am-241	4.9459E-03	383.31	766.62	0.00E+00	1.90E+00	3.79E+00
Am-242m	1.6241E-06	383.31	766.62	0.00E+00	6.23E-04	1.25E-03
Am-243	2.3233E-07	383.31	766.62	0.00E+00	8.91E-05	1.78E-04
C-14	4.3083E-05	383.31	766.62	0.00E+00	1.65E-02	3.30E-02
Cl-36	4.3023E-08	383.31	766.62	0.00E+00	1.65E-05	3.30E-05
Cm-243	9.1880E-08	383.31	766.62	0.00E+00	3.52E-05	7.04E-05
Cm-244	5.6346E-07	383.31	766.62	0.00E+00	2.16E-04	4.32E-04
Co-60	8.3699E-05	383.31	766.62	0.00E+00	3.21E-02	6.42E-02
Cs-134	2.8211E-08	383.31	766.62	0.00E+00	1.08E-05	2.16E-05
Cs-135	3.1549E-05	383.31	766.62	0.00E+00	1.21E-02	2.42E-02
Cs-137	9.7519E-01	383.31	766.62	0.00E+00	3.74E+02	7.48E+02
Eu-154	3.5970E-02	383.31	766.62	0.00E+00	1.38E+01	2.76E+01
Eu-155	8.1774E-04	383.31	766.62	0.00E+00	3.13E-01	6.27E-01
Fe-55	5.3940E-08	383.31	766.62	0.00E+00	2.07E-05	4.14E-05
H-3	8.6571E-04	383.31	766.62	0.00E+00	3.32E-01	6.64E-01
I-129	7.3805E-07	383.31	766.62	0.00E+00	2.83E-04	5.66E-04
Kr-85	1.3771E-02	383.31	766.62	0.00E+00	5.28E+00	1.06E+01
Np-237	1.5218E-06	383.31	766.62	0.00E+00	5.83E-04	1.17E-03
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
Tl-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
U-233	1.3164E-07	383.31	766.62	0.00E+00	5.05E-05	1.01E-04
U-234	3.3865E-07	383.31	766.62	0.00E+00	1.30E-04	2.60E-04
U-235	-2.6144E-06	383.31	0.00	5.67E-03	4.66E-03	5.67E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.759E+13
0.0250	7.793E+12
0.0375	7.033E+12
0.0575	7.360E+12
0.0850	4.391E+12
0.1250	3.258E+12
0.2250	3.853E+12
0.3750	1.863E+12
0.5750	2.791E+13
0.8500	7.801E+11
1.2500	6.425E+11
1.7500	2.304E+10
2.2500	7.812E+05
2.7500	3.692E+05
3.5000	1.026E+03
5.0000	4.317E+02
7.0000	4.867E+01
11.0000	5.530E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.41E+00	8.81E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	383.31	144.90	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		766.62	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF IL
SNF ID #: 447
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass: BOL=10.44kg; EOL=10.057kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.52

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	365.39	730.78	0.00E+00	2.95E-07	5.89E-07
Am-241	2.2586E-03	365.39	730.78	0.00E+00	8.25E-01	1.65E+00
Am-242m	1.9925E-06	365.39	730.78	0.00E+00	7.28E-04	1.46E-03
Am-243	2.3323E-07	365.39	730.78	0.00E+00	8.52E-05	1.70E-04
C-14	4.3306E-05	365.39	730.78	0.00E+00	1.58E-02	3.16E-02
Cl-36	4.3023E-06	365.39	730.78	0.00E+00	1.57E-05	3.14E-05
Cm-243	2.7429E-07	365.39	730.78	0.00E+00	1.00E-04	2.00E-04
Cm-244	3.1504E-06	365.39	730.78	0.00E+00	1.15E-03	2.30E-03
Co-60	3.1008E-02	365.39	730.78	0.00E+00	1.13E+01	2.27E+01
Cs-134	1.0367E-01	365.39	730.78	0.00E+00	3.79E+01	7.58E+01
Cs-135	3.1549E-05	365.39	730.78	0.00E+00	1.15E-02	2.31E-02
Cs-137	2.7564E+00	365.39	730.78	0.00E+00	1.01E+03	2.01E+03
Eu-154	1.3490E+00	365.39	730.78	0.00E+00	4.93E+02	9.86E+02
Eu-155	4.3880E-01	365.39	730.78	0.00E+00	1.60E+02	3.21E+02
Fe-55	8.6782E-03	365.39	730.78	0.00E+00	3.17E+00	6.34E+00
H-3	1.0805E-02	365.39	730.78	0.00E+00	3.95E+00	7.90E+00
I-129	7.3805E-07	365.39	730.78	0.00E+00	2.70E-04	5.39E-04
Kr-85	2.5218E-01	365.39	730.78	0.00E+00	9.21E+01	1.84E+02
Np-237	1.4463E-06	365.39	730.78	0.00E+00	5.28E-04	1.06E-03
Pa-231	3.5970E-09	365.39	730.78	0.00E+00	1.31E-06	2.63E-06
Pb-210	8.2511E-15	365.39	730.78	0.00E+00	3.01E-12	6.03E-12
Pm-147	2.0767E+00	365.39	730.78	0.00E+00	7.59E+02	1.52E+03
Pu-238	1.3514E-03	365.39	730.78	0.00E+00	4.94E-01	9.88E-01
Pu-239	5.6947E-03	365.39	730.78	0.00E+00	2.08E+00	4.16E+00
Pu-240	2.2647E-03	365.39	730.78	0.00E+00	8.27E-01	1.65E+00
Pu-241	1.2574E-01	365.39	730.78	0.00E+00	4.59E+01	9.19E+01
Pu-242	3.0602E-07	365.39	730.78	0.00E+00	1.12E-04	2.24E-04
Ra-226	5.7353E-14	365.39	730.78	0.00E+00	2.10E-11	4.19E-11
Ra-228	1.8150E-10	365.39	730.78	0.00E+00	6.63E-08	1.33E-07
Ru-106	9.3744E-02	365.39	730.78	0.00E+00	3.43E+01	6.85E+01
Se-79	1.2938E-05	365.39	730.78	0.00E+00	4.73E-03	9.46E-03
Sn-126	1.2239E-05	365.39	730.78	0.00E+00	4.47E-03	8.94E-03
Sr-90	2.6000E+00	365.39	730.78	0.00E+00	9.50E+02	1.90E+03
Tc-99	4.4120E-04	365.39	730.78	0.00E+00	1.61E-01	3.22E-01
Th-229	1.4749E-10	365.39	730.78	0.00E+00	5.39E-08	1.08E-07
Th-230	1.9549E-11	365.39	730.78	0.00E+00	7.14E-09	1.43E-08
Th-232	2.3744E-10	365.39	730.78	0.00E+00	8.68E-08	1.74E-07
Tl-208	1.9459E-08	365.39	730.78	0.00E+00	7.11E-06	1.42E-05
U-232	5.6015E-08	365.39	730.78	0.00E+00	2.05E-05	4.09E-05
U-233	1.3132E-07	365.39	730.78	0.00E+00	4.80E-05	9.60E-05
U-234	1.7323E-07	365.39	730.78	0.00E+00	6.33E-05	1.27E-04
U-235	-2.6159E-06	365.39	0.00	4.51E-03	3.56E-03	4.51E-03
U-236	1.2717E-05	365.39	730.78	0.00E+00	4.65E-03	9.29E-03
U-238	-3.8857E-08	365.39	0.00	2.81E-03	2.79E-03	2.81E-03
Y-90	2.6015E+00	365.39	730.78	0.00E+00	9.51E+02	1.90E+03
Other Radionuclides					1.39E+03	2.78E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.236E+14
0.0250	2.884E+13
0.0375	3.344E+13
0.0575	2.563E+13
0.0850	1.794E+13
0.1250	2.684E+13
0.2250	1.498E+13
0.3750	6.667E+12
0.5750	8.452E+13
0.8500	2.081E+13
1.2500	2.157E+13
1.7500	6.172E+11
2.2500	7.503E+10
2.7500	6.094E+08
3.5000	7.123E+07
5.0000	4.234E+02
7.0000	4.792E+01
11.0000	5.458E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+01	3.67E+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 %:	19.99999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	203.50	365.39
Bounding:		730.78

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.95	1.80
Bounding:	1.89	

Estimated EOL HM/Given EOL HM: 1.00

[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 #: 501
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.18kg; EOL=0.173kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	6.30	12.60	0.00E+00	5.37E-09	1.07E-08
Am-241	1.8331E-03	6.30	12.60	0.00E+00	1.15E-02	2.31E-02
Am-242m	1.4129E-06	6.30	12.60	0.00E+00	8.90E-06	1.78E-05
Am-243	1.4774E-07	6.30	12.60	0.00E+00	9.31E-07	1.86E-06
C-14	1.2871E-04	6.30	12.60	0.00E+00	8.11E-04	1.62E-03
Cl-36	2.8120E-06	6.30	12.60	0.00E+00	1.77E-05	3.54E-05
Cm-243	1.7940E-07	6.30	12.60	0.00E+00	1.13E-06	2.26E-06
Cm-244	1.6962E-06	6.30	12.60	0.00E+00	1.07E-05	2.14E-05
Co-60	1.2839E+00	6.30	12.60	0.00E+00	8.09E+00	1.62E+01
Cs-134	9.0541E-02	6.30	12.60	0.00E+00	5.70E-01	1.14E+00
Cs-135	3.2195E-05	6.30	12.60	0.00E+00	2.03E-04	4.06E-04
Cs-137	2.7564E+00	6.30	12.60	0.00E+00	1.74E+01	3.47E+01
Eu-154	1.5368E-02	6.30	12.60	0.00E+00	9.68E-02	1.94E-01
Eu-155	2.9293E-02	6.30	12.60	0.00E+00	1.85E-01	3.69E-01
Fe-55	7.7158E-01	6.30	12.60	0.00E+00	4.86E+00	9.72E+00
H-3	1.1111E-02	6.30	12.60	0.00E+00	7.00E-02	1.40E-01
I-129	7.3684E-07	6.30	12.60	0.00E+00	4.64E-06	9.28E-06
Kr-85	2.5263E-01	6.30	12.60	0.00E+00	1.59E+00	3.18E+00
Np-237	1.2427E-06	6.30	12.60	0.00E+00	7.83E-06	1.57E-05
Pa-231	3.8511E-09	6.30	12.60	0.00E+00	2.43E-08	4.85E-08
Pb-210	7.3880E-15	6.30	12.60	0.00E+00	4.65E-14	9.31E-14
Pm-147	2.1023E+00	6.30	12.60	0.00E+00	1.32E+01	2.65E+01
Pu-238	1.0383E-03	6.30	12.60	0.00E+00	6.54E-03	1.31E-02
Pu-239	5.5293E-03	6.30	12.60	0.00E+00	3.48E-02	6.97E-02
Pu-240	2.1278E-03	6.30	12.60	0.00E+00	1.34E-02	2.68E-02
Pu-241	1.0195E-01	6.30	12.60	0.00E+00	6.42E-01	1.28E+00
Pu-242	2.3128E-07	6.30	12.60	0.00E+00	1.46E-06	2.91E-06
Ra-226	5.2782E-14	6.30	12.60	0.00E+00	3.33E-13	6.65E-13
Ra-228	1.9338E-10	6.30	12.60	0.00E+00	1.22E-09	2.44E-09
Ru-106	9.1684E-02	6.30	12.60	0.00E+00	5.78E-01	1.16E+00
Se-79	1.3018E-05	6.30	12.60	0.00E+00	8.20E-05	1.64E-04
Sn-126	1.2167E-05	6.30	12.60	0.00E+00	7.67E-05	1.53E-04
Sr-90	2.6045E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01
Tc-99	4.4241E-04	6.30	12.60	0.00E+00	2.79E-03	5.57E-03
Th-229	1.3713E-10	6.30	12.60	0.00E+00	8.64E-10	1.73E-09
Th-230	1.8090E-11	6.30	12.60	0.00E+00	1.14E-10	2.28E-10
Th-232	2.5278E-10	6.30	12.60	0.00E+00	1.59E-09	3.19E-09
Tl-208	1.6947E-08	6.30	12.60	0.00E+00	1.07E-07	2.14E-07
U-232	4.8737E-08	6.30	12.60	0.00E+00	3.07E-07	6.14E-07
U-233	1.2203E-07	6.30	12.60	0.00E+00	7.69E-07	1.54E-06
U-234	1.5925E-07	6.30	12.60	0.00E+00	1.00E-06	2.01E-06
U-235	-2.6194E-06	6.30	0.00	7.78E-05	6.13E-05	7.78E-05
U-236	1.2693E-05	6.30	12.60	0.00E+00	8.00E-05	1.60E-04
U-238	-3.6331E-08	6.30	0.00	4.84E-05	4.82E-05	4.84E-05
Y-90	2.6060E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01
Other Radionuclides					2.27E+01	4.54E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.037E+12
0.0250	4.481E+11
0.0375	3.816E+11
0.0575	3.917E+11
0.0850	2.427E+11
0.1250	1.762E+11
0.2250	2.059E+11
0.3750	1.045E+11
0.5750	1.389E+12
0.8500	5.961E+10
1.2500	1.211E+12
1.7500	8.069E+08
2.2500	1.301E+09
2.7500	1.032E+07
3.5000	1.201E+06
5.0000	6.716E+00
7.0000	7.602E-01
11.0000	8.661E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.67E-01	7.33E-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 %:	19.99999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3.51	6.30	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		12.60	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

[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 UTAH
SNF ID #: 699
Fuel Units & Descr: 63 - ELEMENT
Heavy Metal Mass: BOL=11kg; EOL=10.723kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: $18^{\circ}x10^{\circ}$ 0.57

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	264.59	529.19	0.00E+00	2.13E-07	4.27E-07
Am-241	2.2586E-03	264.59	529.19	0.00E+00	5.98E-01	1.20E+00
Am-242m	1.9925E-06	264.59	529.19	0.00E+00	5.27E-04	1.05E-03
Am-243	2.3323E-07	264.59	529.19	0.00E+00	6.17E-05	1.23E-04
C-14	4.3308E-05	264.59	529.19	0.00E+00	1.15E-02	2.29E-02
Cl-36	4.3023E-08	264.59	529.19	0.00E+00	1.14E-05	2.28E-05
Cm-243	2.7429E-07	264.59	529.19	0.00E+00	7.26E-05	1.45E-04
Cm-244	3.1504E-06	264.59	529.19	0.00E+00	8.34E-04	1.67E-03
Co-60	3.1008E-02	264.59	529.19	0.00E+00	8.20E+00	1.64E+01
Cs-134	1.0367E-01	264.59	529.19	0.00E+00	2.74E+01	5.49E+01
Cs-135	3.1549E-05	264.59	529.19	0.00E+00	8.35E-03	1.67E-02
Cs-137	2.7564E+00	264.59	529.19	0.00E+00	7.29E+02	1.46E+03
Eu-154	1.3490E+00	264.59	529.19	0.00E+00	3.57E+02	7.14E+02
Eu-155	4.3880E-01	264.59	529.19	0.00E+00	1.16E+02	2.32E+02
Fe-55	8.6782E-03	264.59	529.19	0.00E+00	2.30E+00	4.59E+00
H-3	1.0805E-02	264.59	529.19	0.00E+00	2.86E+00	5.72E+00
I-129	7.3805E-07	264.59	529.19	0.00E+00	1.95E-04	3.91E-04
Kr-85	2.5218E-01	264.59	529.19	0.00E+00	6.67E+01	1.33E+02
Np-237	1.4463E-06	264.59	529.19	0.00E+00	3.83E-04	7.65E-04
Pa-231	3.5970E-09	264.59	529.19	0.00E+00	9.52E-07	1.90E-06
Pb-210	8.2511E-15	264.59	529.19	0.00E+00	2.18E-12	4.37E-12
Pm-147	2.0767E+00	264.59	529.19	0.00E+00	5.49E+02	1.10E+03
Pu-238	1.3514E-03	264.59	529.19	0.00E+00	3.58E-01	7.15E-01
Pu-239	5.6947E-03	264.59	529.19	0.00E+00	1.51E+00	3.01E+00
Pu-240	2.2647E-03	264.59	529.19	0.00E+00	5.99E-01	1.20E+00
Pu-241	1.2574E-01	264.59	529.19	0.00E+00	3.33E+01	6.65E+01
Pu-242	3.0602E-07	264.59	529.19	0.00E+00	8.10E-05	1.62E-04
Ra-226	5.7353E-14	264.59	529.19	0.00E+00	1.52E-11	3.04E-11
Ra-228	1.8150E-10	264.59	529.19	0.00E+00	4.80E-08	9.60E-08
Ru-106	9.3744E-02	264.59	529.19	0.00E+00	2.48E+01	4.96E+01
Se-79	1.2938E-05	264.59	529.19	0.00E+00	3.42E-03	6.85E-03
Sn-126	1.2239E-05	264.59	529.19	0.00E+00	3.24E-03	6.48E-03
Sr-90	2.6000E+00	264.59	529.19	0.00E+00	6.88E+02	1.38E+03
Tc-99	4.4120E-04	264.59	529.19	0.00E+00	1.17E-01	2.33E-01
Th-229	1.4749E-10	264.59	529.19	0.00E+00	3.90E-08	7.80E-08
Th-230	1.9549E-11	264.59	529.19	0.00E+00	5.17E-09	1.03E-08
Th-232	2.3744E-10	264.59	529.19	0.00E+00	6.28E-08	1.26E-07
Tl-208	1.9459E-08	264.59	529.19	0.00E+00	5.15E-08	1.03E-06
U-232	5.6015E-08	264.59	529.19	0.00E+00	1.48E-05	2.96E-05
U-233	1.3132E-07	264.59	529.19	0.00E+00	3.47E-05	6.95E-05
U-234	1.7323E-07	264.59	529.19	0.00E+00	4.58E-05	9.17E-05
U-235	-2.6159E-06	264.59	0.00	4.73E-03	4.04E-03	4.73E-03
U-236	1.2717E-05	264.59	529.19	0.00E+00	3.36E-03	6.73E-03
U-238	-3.8857E-08	264.59	0.00	2.96E-03	2.95E-03	2.96E-03
Y-90	2.6015E+00	264.59	529.19	0.00E+00	6.88E+02	1.38E+03
Other Radionuclides					1.01E+03	2.01E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.954E+13
0.0250	1.944E+13
0.0375	2.421E+13
0.0575	1.856E+13
0.0850	1.299E+13
0.1250	1.943E+13
0.2250	1.085E+13
0.3750	4.828E+12
0.5750	6.121E+13
0.8500	1.507E+13
1.2500	1.562E+13
1.7500	4.470E+11
2.2500	5.433E+10
2.7500	4.413E+08
3.5000	5.158E+07
5.0000	3.087E+02
7.0000	3.495E+01
11.0000	3.981E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.33E+01	2.66E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	19.89699819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.65	1.23
Bounding:	1.30	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1973
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
0.62

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.6842E-09	85.62	171.24	0.00E+00	7.44E-07	1.49E-06
Am-241	4.9459E-03	85.62	171.24	0.00E+00	4.23E-01	8.47E-01
Am-242m	1.6241E-06	85.62	171.24	0.00E+00	1.39E-04	2.78E-04
Am-243	2.3233E-07	85.62	171.24	0.00E+00	1.99E-05	3.98E-05
C-14	4.3083E-05	85.62	171.24	0.00E+00	3.69E-03	7.38E-03
Cl-36	4.3023E-08	85.62	171.24	0.00E+00	3.68E-06	7.37E-06
Cm-243	9.1880E-08	85.62	171.24	0.00E+00	7.87E-06	1.57E-05
Cm-244	5.6346E-07	85.62	171.24	0.00E+00	4.82E-05	9.65E-05
Co-60	8.3699E-05	85.62	171.24	0.00E+00	7.17E-03	1.43E-02
Cs-134	2.8211E-08	85.62	171.24	0.00E+00	2.42E-06	4.83E-06
Cs-135	3.1549E-05	85.62	171.24	0.00E+00	2.70E-03	5.40E-03
Cs-137	9.7519E-01	85.62	171.24	0.00E+00	8.35E+01	1.67E+02
Eu-154	3.5970E-02	85.62	171.24	0.00E+00	3.08E+00	6.16E+00
Eu-155	8.1774E-04	85.62	171.24	0.00E+00	7.00E-02	1.40E-01
Fe-55	5.3940E-08	85.62	171.24	0.00E+00	4.62E-06	9.24E-06
H-3	8.6571E-04	85.62	171.24	0.00E+00	7.41E-02	1.48E-01
I-129	7.3805E-07	85.62	171.24	0.00E+00	6.32E-05	1.26E-04
Kr-85	1.3771E-02	85.62	171.24	0.00E+00	1.18E+00	2.36E+00
Np-237	1.5218E-06	85.62	171.24	0.00E+00	1.30E-04	2.61E-04
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	1.93E-01	3.86E-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	2.98E-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
Tl-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	3.3865E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.397E+12
0.0250	1.741E+12
0.0375	1.571E+12
0.0575	1.644E+12
0.0850	9.807E+11
0.1250	7.278E+11
0.2250	8.607E+11
0.3750	3.714E+11
0.5750	6.234E+12
0.8500	1.698E+11
1.2500	1.435E+11
1.7500	5.146E+09
2.2500	1.745E+05
2.7500	8.247E+04
3.5000	2.434E+02
5.0000	1.025E+02
7.0000	1.157E+01
11.0000	1.316E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.84E-01	1.97E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	62.20	85.62	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		171.24	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

[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) USGS
SNF ID #: 267
Fuel Units & Descr: 222 - ELEMENT
Heavy Metal Mass: BOL=42.224kg; EOL=41.292kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
2.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	889.99	1,779.99	0.00E+00	7.18E-07	1.44E-06
Am-241	2.2586E-03	889.99	1,779.99	0.00E+00	2.01E+00	4.02E+00
Am-242m	1.9925E-06	889.99	1,779.99	0.00E+00	1.77E-03	3.55E-03
Am-243	2.3323E-07	889.99	1,779.99	0.00E+00	2.08E-04	4.15E-04
C-14	4.3308E-05	889.99	1,779.99	0.00E+00	3.85E-02	7.71E-02
Cl-36	4.3023E-06	889.99	1,779.99	0.00E+00	3.83E-05	7.66E-05
Cm-243	2.7429E-07	889.99	1,779.99	0.00E+00	2.44E-04	4.88E-04
Cm-244	3.1504E-06	889.99	1,779.99	0.00E+00	2.80E-03	5.61E-03
Co-60	3.1008E-02	889.99	1,779.99	0.00E+00	2.76E+01	5.52E+01
Cs-134	1.0367E-01	889.99	1,779.99	0.00E+00	9.23E+01	1.85E+02
Cs-135	3.1549E-05	889.99	1,779.99	0.00E+00	2.81E-02	5.62E-02
Cs-137	2.7564E+00	889.99	1,779.99	0.00E+00	2.45E+03	4.91E+03
Eu-154	1.3490E+00	889.99	1,779.99	0.00E+00	1.20E+03	2.40E+03
Eu-155	4.3880E-01	889.99	1,779.99	0.00E+00	3.91E+02	7.81E+02
Fe-55	8.6782E-03	889.99	1,779.99	0.00E+00	7.72E+00	1.54E+01
H-3	1.0805E-02	889.99	1,779.99	0.00E+00	9.62E+00	1.92E+01
I-129	7.3805E-07	889.99	1,779.99	0.00E+00	6.57E-04	1.31E-03
Kr-85	2.5218E-01	889.99	1,779.99	0.00E+00	2.24E+02	4.49E+02
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
Tl-208	1.9459E-06	889.99	1,779.99	0.00E+00	1.73E-05	3.46E-05
U-232	5.6015E-08	889.99	1,779.99	0.00E+00	4.99E-05	9.97E-05
U-233	1.3132E-07	889.99	1,779.99	0.00E+00	1.17E-04	2.34E-04
U-234	1.7323E-07	889.99	1,779.99	0.00E+00	1.54E-04	3.08E-04
U-235	-2.6159E-06	889.99	0.00	1.82E-02	1.58E-02	1.82E-02
U-236	1.2717E-05	889.99	1,779.99	0.00E+00	1.13E-02	2.26E-02
U-238	-3.8857E-08	889.99	0.00	1.14E-02	1.13E-02	1.14E-02
Y-90	2.6015E+00	889.99	1,779.99	0.00E+00	2.32E+03	4.63E+03
Other Radionuclides					3.38E+03	6.77E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.012E+14
0.0250	6.539E+13
0.0375	8.145E+13
0.0575	8.244E+13
0.0850	4.371E+13
0.1250	6.537E+13
0.2250	3.649E+13
0.3750	1.624E+13
0.5750	2.059E+14
0.8500	5.068E+13
1.2500	5.253E+13
1.7500	1.503E+12
2.2500	1.827E+11
2.7500	1.484E+09
3.5000	1.735E+08
5.0000	1.042E+03
7.0000	1.179E+02
11.0000	1.343E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+01	8.94E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	102.86	889.99	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,779.99	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

[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) ZAIRE
SNF ID #: 487
Fuel Units & Descr: 56 - ELEMENT
Heavy Metal Mass: BOL=10.08kg; EOL=10.052kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
0.50

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	147.36	294.72	0.00E+00	3.62E-07	7.24E-07
Am-241	3.8752E-03	147.36	294.72	0.00E+00	5.71E-01	1.14E+00
Am-242m	1.8617E-06	147.36	294.72	0.00E+00	2.74E-04	5.49E-04
Am-243	2.3293E-07	147.36	294.72	0.00E+00	3.43E-05	6.86E-05
C-14	4.3233E-05	147.36	294.72	0.00E+00	6.37E-03	1.27E-02
Cl-36	4.3023E-08	147.36	294.72	0.00E+00	6.34E-06	1.27E-05
Cm-243	1.9053E-07	147.36	294.72	0.00E+00	2.81E-05	5.62E-05
Cm-244	1.7744E-06	147.36	294.72	0.00E+00	2.61E-04	5.23E-04
Co-60	4.3188E-03	147.36	294.72	0.00E+00	6.36E-01	1.27E+00
Cs-134	6.7188E-04	147.36	294.72	0.00E+00	9.90E-02	1.98E-01
Cs-135	3.1549E-05	147.36	294.72	0.00E+00	4.65E-03	9.30E-03
Cs-137	1.9489E+00	147.36	294.72	0.00E+00	2.87E+02	5.74E+02
Eu-154	4.0301E-01	147.36	294.72	0.00E+00	5.94E+01	1.19E+02
Eu-155	5.4000E-02	147.36	294.72	0.00E+00	7.96E+00	1.59E+01
Fe-55	1.5955E-04	147.36	294.72	0.00E+00	2.35E-02	4.70E-02
H-3	4.6571E-03	147.36	294.72	0.00E+00	6.86E-01	1.37E+00
I-129	7.3805E-07	147.36	294.72	0.00E+00	1.09E-04	2.18E-04
Kr-85	9.5684E-02	147.36	294.72	0.00E+00	1.41E+01	2.82E+01
Np-237	1.4618E-06	147.36	294.72	0.00E+00	2.15E-04	4.31E-04
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	4.6526E-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
Tl-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
U-233	1.3140E-07	147.36	294.72	0.00E+00	1.94E-05	3.87E-05
U-234	2.2571E-07	147.36	294.72	0.00E+00	3.33E-05	6.65E-05
U-235	-2.6159E-06	147.36	0.00	4.36E-03	3.97E-03	4.36E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.025E+13
0.0250	6.245E+12
0.0375	6.537E+12
0.0575	6.042E+12
0.0650	3.679E+12
0.1250	4.129E+12
0.2250	3.334E+12
0.3750	1.370E+12
0.5750	2.182E+13
0.8500	2.322E+12
1.2500	2.501E+12
1.7500	7.493E+10
2.2500	1.188E+06
2.7500	1.977E+05
3.5000	1.367E+03
5.0000	1.719E+02
7.0000	1.942E+01
11.0000	2.209E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.83E+00	7.65E+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)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	0.18
Bounding:	0.79	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 12/20 ROMANIA
SNF ID #: 1078
Fuel Units & Descr: 498 - ELEMENT
Heavy Metal Mass: BOL=124.5kg; EOL=121.462kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	2,899.91	5,799.81	0.00E+00	7.67E-06	1.53E-05
Am-241	3.1429E-03	2,899.91	5,799.81	0.00E+00	9.11E+00	1.82E+01
Am-242m	1.3195E-06	2,899.91	5,799.81	0.00E+00	3.83E-03	7.65E-03
Am-243	1.4753E-07	2,899.91	5,799.81	0.00E+00	4.28E-04	8.56E-04
C-14	1.2847E-04	2,899.91	5,799.81	0.00E+00	3.73E-01	7.45E-01
Cl-36	2.8120E-06	2,899.91	5,799.81	0.00E+00	8.15E-03	1.63E-02
Cm-243	1.2465E-07	2,899.91	5,799.81	0.00E+00	3.61E-04	7.23E-04
Cm-244	9.5564E-07	2,899.91	5,799.81	0.00E+00	2.77E-03	5.54E-03
Co-60	1.7880E-01	2,899.91	5,799.81	0.00E+00	5.18E+02	1.04E+03
Cs-134	5.8692E-04	2,899.91	5,799.81	0.00E+00	1.70E+00	3.40E+00
Cs-135	3.2195E-05	2,899.91	5,799.81	0.00E+00	9.34E-02	1.87E-01
Cs-137	1.9489E+00	2,899.91	5,799.81	0.00E+00	5.65E+03	1.13E+04
Eu-154	4.5895E-03	2,899.91	5,799.81	0.00E+00	1.33E+01	2.66E+01
Eu-155	3.6045E-03	2,899.91	5,799.81	0.00E+00	1.05E+01	2.09E+01
Fe-55	1.4185E-02	2,899.91	5,799.81	0.00E+00	4.11E+01	8.23E+01
H-3	4.7895E-03	2,899.91	5,799.81	0.00E+00	1.39E+01	2.78E+01
I-129	7.3684E-07	2,899.91	5,799.81	0.00E+00	2.14E-03	4.27E-03
Kr-85	9.5820E-02	2,899.91	5,799.81	0.00E+00	2.78E+02	5.56E+02
Np-237	1.2552E-06	2,899.91	5,799.81	0.00E+00	3.64E-03	7.28E-03
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	3.0602E-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
Tl-208	1.5820E-08	2,899.91	5,799.81	0.00E+00	4.59E-05	9.18E-05
U-232	4.2647E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.812E+14
0.0250	1.210E+14
0.0375	1.048E+14
0.0575	1.128E+14
0.0850	6.807E+13
0.1250	4.449E+13
0.2250	5.845E+13
0.3750	2.562E+13
0.5750	4.213E+14
0.8500	4.749E+12
1.2500	7.870E+13
1.7500	1.220E+11
2.2500	4.203E+08
2.7500	4.630E+06
3.5000	2.578E+04
5.0000	3.091E+03
7.0000	3.492E+02
11.0000	3.973E+01

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

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	2.39
Bounding:	1.37	

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 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	10.63	21.27	0.00E+00	2.81E-08	5.62E-08
Am-241	3.1429E-03	10.63	21.27	0.00E+00	3.34E-02	6.68E-02
Am-242m	1.3195E-06	10.63	21.27	0.00E+00	1.40E-05	2.81E-05
Am-243	1.4753E-07	10.63	21.27	0.00E+00	1.57E-06	3.14E-06
C-14	1.2847E-04	10.63	21.27	0.00E+00	1.37E-03	2.73E-03
Cl-36	2.8120E-06	10.63	21.27	0.00E+00	2.99E-05	5.98E-05
Cm-243	1.2465E-07	10.63	21.27	0.00E+00	1.33E-06	2.65E-06
Cm-244	9.5564E-07	10.63	21.27	0.00E+00	1.02E-05	2.03E-05
Co-60	1.7880E-01	10.63	21.27	0.00E+00	1.90E+00	3.80E+00
Cs-134	5.8692E-04	10.63	21.27	0.00E+00	6.24E-03	1.25E-02
Cs-135	3.2195E-05	10.63	21.27	0.00E+00	3.42E-04	6.85E-04
Cs-137	1.9489E+00	10.63	21.27	0.00E+00	2.07E+01	4.14E+01
Eu-154	4.5895E-03	10.63	21.27	0.00E+00	4.88E-02	9.76E-02
Eu-155	3.6045E-03	10.63	21.27	0.00E+00	3.83E-02	7.67E-02
Fe-55	1.4185E-02	10.63	21.27	0.00E+00	1.51E-01	3.02E-01
H-3	4.7895E-03	10.63	21.27	0.00E+00	5.09E-02	1.02E-01
I-129	7.3684E-07	10.63	21.27	0.00E+00	7.84E-06	1.57E-05
Kr-85	9.5820E-02	10.63	21.27	0.00E+00	1.02E+00	2.04E+00
Np-237	1.2552E-06	10.63	21.27	0.00E+00	1.33E-05	2.67E-05
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
Tl-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
U-234	1.9955E-07	10.63	21.27	0.00E+00	2.12E-06	4.24E-06
U-235	-2.6194E-06	10.63	0.00	1.62E-04	1.34E-04	1.62E-04
U-236	1.2693E-05	10.63	21.27	0.00E+00	1.35E-04	2.70E-04
U-238	-3.6331E-08	10.63	0.00	1.01E-04	1.01E-04	1.01E-04
Y-90	1.8241E+00	10.63	21.27	0.00E+00	1.94E+01	3.88E+01
Other Radionuclides					2.05E+01	4.10E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.131E+12
0.0250	4.437E+11
0.0375	3.843E+11
0.0575	4.135E+11
0.0850	2.496E+11
0.1250	1.631E+11
0.2250	2.143E+11
0.3750	9.394E+10
0.5750	1.545E+12
0.8500	1.741E+10
1.2500	2.886E+11
1.7500	4.474E+08
2.2500	1.541E+06
2.7500	1.698E+04
3.5000	9.443E+01
5.0000	1.128E+01
7.0000	1.275E+00
11.0000	1.450E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.86E-01	5.32E-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 %:	19.94680851	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	10.63	8.97	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		21.27	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

[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 20/20 ARRR
SNF ID #: 780
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=10.275kg; EOL=6.179kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	2,000.38	4,000.76	0.00E+00	1.70E-06	3.41E-06
Am-241	1.8331E-03	2,000.38	4,000.76	0.00E+00	3.67E+00	7.33E+00
Am-242m	1.4129E-06	2,000.38	4,000.76	0.00E+00	2.83E-03	5.65E-03
Am-243	1.4774E-07	2,000.38	4,000.76	0.00E+00	2.96E-04	5.91E-04
C-14	1.2871E-04	2,000.38	4,000.76	0.00E+00	2.57E-01	5.15E-01
Cl-36	2.8120E-06	2,000.38	4,000.76	0.00E+00	5.63E-03	1.13E-02
Cm-243	1.7940E-07	2,000.38	4,000.76	0.00E+00	3.59E-04	7.18E-04
Cm-244	1.6962E-06	2,000.38	4,000.76	0.00E+00	3.39E-03	6.79E-03
Co-60	1.2839E+00	2,000.38	4,000.76	0.00E+00	2.57E+03	5.14E+03
Cs-134	9.0541E-02	2,000.38	4,000.76	0.00E+00	1.81E+02	3.62E+02
Cs-135	3.2195E-05	2,000.38	4,000.76	0.00E+00	6.44E-02	1.29E-01
Cs-137	2.7564E+00	2,000.38	4,000.76	0.00E+00	5.51E+03	1.10E+04
Eu-154	1.5368E-02	2,000.38	4,000.76	0.00E+00	3.07E+01	6.15E+01
Eu-155	2.9293E-02	2,000.38	4,000.76	0.00E+00	5.86E+01	1.17E+02
Fe-55	7.7158E-01	2,000.38	4,000.76	0.00E+00	1.54E+03	3.09E+03
H-3	1.1111E-02	2,000.38	4,000.76	0.00E+00	2.22E+01	4.45E+01
I-129	7.3684E-07	2,000.38	4,000.76	0.00E+00	1.47E-03	2.95E-03
Kr-85	2.5263E-01	2,000.38	4,000.76	0.00E+00	5.05E+02	1.01E+03
Np-237	1.2427E-06	2,000.38	4,000.76	0.00E+00	2.49E-03	4.97E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.466E+14
0.0250	1.423E+14
0.0375	1.212E+14
0.0575	1.244E+14
0.0850	7.705E+13
0.1250	5.595E+13
0.2250	6.536E+13
0.3750	3.317E+13
0.5750	4.410E+14
0.8500	1.893E+13
1.2500	3.843E+14
1.7500	2.562E+11
2.2500	4.129E+11
2.7500	3.277E+09
3.5000	3.814E+08
5.0000	2.103E+03
7.0000	2.390E+02
11.0000	2.711E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.16E+02	2.33E+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 %:	19.64963504	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	581.16	2,000.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,000.76	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 MNRC
SNF ID #: 1053
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=3.962kg; EOL=3.962kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.193E+07
0.0250	0.000E+00
0.0375	5.713E+04
0.0575	3.498E+04
0.0850	4.881E+06
0.1250	9.636E+06
0.2250	3.410E+07
0.3750	8.510E+04
0.5750	4.186E+03
0.8500	6.537E+02
1.2500	3.906E+01
1.7500	1.911E+01
2.2500	1.107E+01
2.7500	6.433E+00
3.5000	5.751E+00
5.0000	2.471E+00
7.0000	2.844E-01
11.0000	3.270E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.14E-05	7.14E-05
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 %:	19.74990819	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

[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 20/20 MNRC
SNF ID #: 1054
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=41.605kg; EOL=40.555kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	1,002.34	2,004.68	0.00E+00	8.54E-07	1.71E-06
Am-241	1.8331E-03	1,002.34	2,004.68	0.00E+00	1.84E+00	3.67E+00
Am-242m	1.4129E-06	1,002.34	2,004.68	0.00E+00	1.42E-03	2.83E-03
Am-243	1.4774E-07	1,002.34	2,004.68	0.00E+00	1.48E-04	2.96E-04
C-14	1.2871E-04	1,002.34	2,004.68	0.00E+00	1.29E-01	2.58E-01
Cl-36	2.8120E-06	1,002.34	2,004.68	0.00E+00	2.82E-03	5.64E-03
Cm-243	1.7940E-07	1,002.34	2,004.68	0.00E+00	1.80E-04	3.60E-04
Cm-244	1.6962E-06	1,002.34	2,004.68	0.00E+00	1.70E-03	3.40E-03
Co-60	1.2839E+00	1,002.34	2,004.68	0.00E+00	1.29E+03	2.57E+03
Cs-134	9.0541E-02	1,002.34	2,004.68	0.00E+00	9.08E+01	1.82E+02
Cs-135	3.2195E-05	1,002.34	2,004.68	0.00E+00	3.23E-02	6.45E-02
Cs-137	2.7564E+00	1,002.34	2,004.68	0.00E+00	2.76E+03	5.53E+03
Eu-154	1.5368E-02	1,002.34	2,004.68	0.00E+00	1.54E+01	3.08E+01
Eu-155	2.9293E-02	1,002.34	2,004.68	0.00E+00	2.94E+01	5.87E+01
Fe-55	7.7158E-01	1,002.34	2,004.68	0.00E+00	7.73E+02	1.55E+03
H-3	1.1111E-02	1,002.34	2,004.68	0.00E+00	1.11E+01	2.23E+01
I-129	7.3684E-07	1,002.34	2,004.68	0.00E+00	7.39E-04	1.48E-03
Kr-85	2.5263E-01	1,002.34	2,004.68	0.00E+00	2.53E+02	5.06E+02
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-06	7.72E-06
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.240E+14
0.0250	7.129E+13
0.0375	6.071E+13
0.0575	6.232E+13
0.0850	3.861E+13
0.1250	2.804E+13
0.2250	3.275E+13
0.3750	1.662E+13
0.5750	2.210E+14
0.8500	9.483E+12
1.2500	1.926E+14
1.7500	1.284E+11
2.2500	2.069E+11
2.7500	1.642E+09
3.5000	1.911E+08
5.0000	1.077E+03
7.0000	1.219E+02
11.0000	1.389E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.83E+01	1.17E+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 %:	19.74990819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	784.42	1,002.34	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,004.68	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

[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 20/20 SOLVENIA
SNF ID #: 731
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=4.949kg; EOL=4.754kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 16"x10' 0.09

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	186.62	373.23	0.00E+00	4.93E-07	9.87E-07
Am-241	3.1429E-03	186.62	373.23	0.00E+00	5.87E-01	1.17E+00
Am-242m	1.3195E-06	186.62	373.23	0.00E+00	2.46E-04	4.93E-04
Am-243	1.4753E-07	186.62	373.23	0.00E+00	2.75E-05	5.51E-05
C-14	1.2847E-04	186.62	373.23	0.00E+00	2.40E-02	4.79E-02
Cl-36	2.8120E-06	186.62	373.23	0.00E+00	5.25E-04	1.05E-03
Cm-243	1.2465E-07	186.62	373.23	0.00E+00	2.33E-05	4.65E-05
Cm-244	9.5564E-07	186.62	373.23	0.00E+00	1.78E-04	3.57E-04
Co-60	1.7880E-01	186.62	373.23	0.00E+00	3.34E+01	6.67E+01
Cs-134	5.8692E-04	186.62	373.23	0.00E+00	1.10E-01	2.19E-01
Cs-135	3.2195E-05	186.62	373.23	0.00E+00	6.01E-03	1.20E-02
Cs-137	1.9489E+00	186.62	373.23	0.00E+00	3.64E+02	7.27E+02
Eu-154	4.5895E-03	186.62	373.23	0.00E+00	8.56E-01	1.71E+00
Eu-155	3.6045E-03	186.62	373.23	0.00E+00	6.73E-01	1.35E+00
Fe-55	1.4185E-02	186.62	373.23	0.00E+00	2.65E+00	5.29E+00
H-3	4.7895E-03	186.62	373.23	0.00E+00	8.94E-01	1.79E+00
I-129	7.3684E-07	186.62	373.23	0.00E+00	1.38E-04	2.75E-04
Kr-85	9.5820E-02	186.62	373.23	0.00E+00	1.79E+01	3.58E+01
Np-237	1.2552E-06	186.62	373.23	0.00E+00	2.34E-04	4.68E-04
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	8.26E-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
Tl-206	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.740E+13
0.0250	7.786E+12
0.0375	6.745E+12
0.0575	7.256E+12
0.0850	4.381E+12
0.1250	2.863E+12
0.2250	3.761E+12
0.3750	1.649E+12
0.5750	2.711E+13
0.8500	3.056E+11
1.2500	5.064E+12
1.7500	7.852E+09
2.2500	2.704E+07
2.7500	2.980E+05
3.5000	1.855E+03
5.0000	1.970E+02
7.0000	2.225E+01
11.0000	2.532E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.67E+00	9.34E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76747705	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	186.62	186.15	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		373.23	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 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 30/20
SNF ID #: 995
Fuel Units & Descr: 19 - ELEMENT
Heavy Metal Mass: BOL=16.625kg; EOL=16.433kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.17

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	183.19	366.38	0.00E+00	1.56E-07	3.12E-07
Am-241	1.8331E-03	183.19	366.38	0.00E+00	3.36E-01	6.72E-01
Am-242m	1.4129E-06	183.19	366.38	0.00E+00	2.59E-04	5.18E-04
Am-243	1.4774E-07	183.19	366.38	0.00E+00	2.71E-05	5.41E-05
C-14	1.2871E-04	183.19	366.38	0.00E+00	2.36E-02	4.72E-02
Cl-36	2.8120E-06	183.19	366.38	0.00E+00	5.15E-04	1.03E-03
Cm-243	1.7940E-07	183.19	366.38	0.00E+00	3.29E-05	6.57E-05
Cm-244	1.6962E-06	183.19	366.38	0.00E+00	3.11E-04	6.21E-04
Co-60	1.2839E+00	183.19	366.38	0.00E+00	2.35E+02	4.70E+02
Cs-134	9.0541E-02	183.19	366.38	0.00E+00	1.66E+01	3.32E+01
Cs-135	3.2195E-05	183.19	366.38	0.00E+00	5.90E-03	1.18E-02
Cs-137	2.7564E+00	183.19	366.38	0.00E+00	5.05E+02	1.01E+03
Eu-154	1.5368E-02	183.19	366.38	0.00E+00	2.82E+00	5.63E+00
Eu-155	2.9293E-02	183.19	366.38	0.00E+00	5.37E+00	1.07E+01
Fe-55	7.7158E-01	183.19	366.38	0.00E+00	1.41E+02	2.83E+02
H-3	1.1111E-02	183.19	366.38	0.00E+00	2.04E+00	4.07E+00
I-129	7.3684E-07	183.19	366.38	0.00E+00	1.35E-04	2.70E-04
Kr-85	2.5263E-01	183.19	366.38	0.00E+00	4.63E+01	9.26E+01
Np-237	1.2427E-06	183.19	366.38	0.00E+00	2.28E-04	4.55E-04
Pa-231	3.8511E-09	183.19	366.38	0.00E+00	7.05E-07	1.41E-06
Pb-210	7.3880E-15	183.19	366.38	0.00E+00	1.35E-12	2.71E-12
Pm-147	2.1023E+00	183.19	366.38	0.00E+00	3.85E+02	7.70E+02
Pu-238	1.0383E-03	183.19	366.38	0.00E+00	1.90E-01	3.80E-01
Pu-239	5.5293E-03	183.19	366.38	0.00E+00	1.01E+00	2.03E+00
Pu-240	2.1278E-03	183.19	366.38	0.00E+00	3.90E-01	7.80E-01
Pu-241	1.0195E-01	183.19	366.38	0.00E+00	1.87E+01	3.74E+01
Pu-242	2.3128E-07	183.19	366.38	0.00E+00	4.24E-05	8.47E-05
Ra-226	5.2782E-14	183.19	366.38	0.00E+00	9.67E-12	1.93E-11
Ra-228	1.9338E-10	183.19	366.38	0.00E+00	3.54E-08	7.09E-08
Ru-106	9.1684E-02	183.19	366.38	0.00E+00	1.68E+01	3.36E+01
Se-79	1.3018E-05	183.19	366.38	0.00E+00	2.38E-03	4.77E-03
Sn-126	1.2167E-05	183.19	366.38	0.00E+00	2.23E-03	4.46E-03
Sr-90	2.6045E+00	183.19	366.38	0.00E+00	4.77E+02	9.54E+02
Tc-99	4.4241E-04	183.19	366.38	0.00E+00	8.10E-02	1.62E-01
Th-229	1.3713E-10	183.19	366.38	0.00E+00	2.51E-08	5.02E-08
Th-230	1.8090E-11	183.19	366.38	0.00E+00	3.31E-09	6.63E-09
Th-232	2.5278E-10	183.19	366.38	0.00E+00	4.63E-08	9.26E-08
Tl-208	1.6947E-08	183.19	366.38	0.00E+00	3.10E-06	6.21E-06
U-232	4.8737E-08	183.19	366.38	0.00E+00	8.93E-06	1.79E-05
U-233	1.2203E-07	183.19	366.38	0.00E+00	2.24E-05	4.47E-05
U-234	1.5925E-07	183.19	366.38	0.00E+00	2.92E-05	5.83E-05
U-235	-2.6194E-06	183.19	0.00	7.19E-03	6.71E-03	7.19E-03
U-236	1.2693E-05	183.19	366.38	0.00E+00	2.33E-03	4.65E-03
U-238	-3.6331E-08	183.19	0.00	4.47E-03	4.46E-03	4.47E-03
Y-90	2.6060E+00	183.19	366.38	0.00E+00	4.77E+02	9.55E+02
Other Radionuclides					6.60E+02	1.32E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.922E+13
0.0250	1.303E+13
0.0375	1.110E+13
0.0575	1.139E+13
0.0850	7.056E+12
0.1250	5.124E+12
0.2250	5.986E+12
0.3750	3.038E+12
0.5750	4.038E+13
0.8500	1.733E+12
1.2500	3.520E+13
1.7500	2.346E+10
2.2500	3.782E+10
2.7500	3.001E+08
3.5000	3.493E+07
5.0000	2.023E+02
7.0000	2.292E+01
11.0000	2.612E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+01	2.13E+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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		183.19
Bounding:		366.38

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:	0.32	
Bounding:	0.65	

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 30/20 MNRC
SNF ID #: 704
Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=4.974kg; EOL=4.974kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.05

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.6737E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.280E+07
0.0250	0.000E+00
0.0375	7.199E+04
0.0575	4.394E+04
0.0850	6.150E+06
0.1250	1.214E+07
0.2250	4.297E+07
0.3750	1.072E+05
0.5750	5.275E+03
0.8500	8.232E+02
1.2500	4.899E+01
1.7500	2.397E+01
2.2500	1.389E+01
2.7500	8.068E+00
3.5000	7.213E+00
5.0000	3.099E+00
7.0000	3.567E-01
11.0000	4.101E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.98E-05	8.98E-05
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 %:	19.82495894	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	286.38	572.76	0.00E+00	2.44E-07	4.88E-07
Am-241	1.8331E-03	286.38	572.76	0.00E+00	5.25E-01	1.05E+00
Am-242m	1.4129E-06	286.38	572.76	0.00E+00	4.05E-04	8.09E-04
Am-243	1.4774E-07	286.38	572.76	0.00E+00	4.23E-05	8.46E-05
C-14	1.2871E-04	286.38	572.76	0.00E+00	3.69E-02	7.37E-02
Cl-36	2.8120E-06	286.38	572.76	0.00E+00	8.05E-04	1.61E-03
Cm-243	1.7940E-07	286.38	572.76	0.00E+00	5.14E-05	1.03E-04
Cm-244	1.6962E-06	286.38	572.76	0.00E+00	4.86E-04	9.72E-04
Co-60	1.2839E+00	286.38	572.76	0.00E+00	3.68E+02	7.35E+02
Cs-134	9.0541E-02	286.38	572.76	0.00E+00	2.59E+01	5.19E+01
Cs-135	3.2195E-05	286.38	572.76	0.00E+00	9.22E-03	1.84E-02
Cs-137	2.7564E+00	286.38	572.76	0.00E+00	7.89E+02	1.58E+03
Eu-154	1.5368E-02	286.38	572.76	0.00E+00	4.40E+00	8.80E+00
Eu-155	2.9293E-02	286.38	572.76	0.00E+00	8.39E+00	1.68E+01
Fe-55	7.7158E-01	286.38	572.76	0.00E+00	2.21E+02	4.42E+02
H-3	1.1111E-02	286.38	572.76	0.00E+00	3.18E+00	6.36E+00
I-129	7.3684E-07	286.38	572.76	0.00E+00	2.11E-04	4.22E-04
Kr-85	2.5263E-01	286.38	572.76	0.00E+00	7.23E+01	1.45E+02
Np-237	1.2427E-06	286.38	572.76	0.00E+00	3.56E-04	7.12E-04
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
Tl-208	1.6947E-08	286.38	572.76	0.00E+00	4.85E-06	9.71E-06
U-232	4.8737E-08	286.38	572.76	0.00E+00	1.40E-05	2.79E-05
U-233	1.2203E-07	286.38	572.76	0.00E+00	3.49E-05	6.99E-05
U-234	1.5925E-07	286.38	572.76	0.00E+00	4.56E-05	9.12E-05
U-235	-2.6194E-06	286.38	0.00	3.95E-03	3.20E-03	3.95E-03
U-236	1.2693E-05	286.38	572.76	0.00E+00	3.64E-03	7.27E-03
U-238	-3.6331E-08	286.38	0.00	2.54E-03	2.53E-03	2.54E-03
Y-90	2.6060E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03
Other Radionuclides					1.03E+03	2.06E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.257E+13
0.0250	2.037E+13
0.0375	1.735E+13
0.0575	1.781E+13
0.0850	1.103E+13
0.1250	8.010E+12
0.2250	9.357E+12
0.3750	4.749E+12
0.5750	6.313E+13
0.8500	2.709E+12
1.2500	5.502E+13
1.7500	3.668E+10
2.2500	5.912E+10
2.7500	4.691E+08
3.5000	5.460E+07
5.0000	3.060E+02
7.0000	3.465E+01
11.0000	3.947E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	3.33E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 %:	19.49184744	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.90	1.05
Bounding:	1.79	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) ITALY
SNF ID #: 929
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.383kg; EOL=0.372kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
0.02

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	13.06	26.13	0.00E+00	5.42E-08	1.08E-07
Am-241	3.5850E-03	13.06	26.13	0.00E+00	4.68E-02	9.37E-02
Am-242m	1.2899E-06	13.06	26.13	0.00E+00	1.69E-05	3.37E-05
Am-243	1.4747E-07	13.06	26.13	0.00E+00	1.93E-06	3.85E-06
C-14	1.2839E-04	13.06	26.13	0.00E+00	1.68E-03	3.35E-03
Cl-36	2.8120E-06	13.06	26.13	0.00E+00	3.67E-05	7.35E-05
Cm-243	1.1038E-07	13.06	26.13	0.00E+00	1.44E-06	2.88E-06
Cm-244	7.8917E-07	13.06	26.13	0.00E+00	1.03E-05	2.06E-05
Co-60	9.2647E-02	13.06	26.13	0.00E+00	1.21E+00	2.42E+00
Cs-134	1.0940E-04	13.06	26.13	0.00E+00	1.43E-03	2.86E-03
Cs-135	3.2195E-05	13.06	26.13	0.00E+00	4.21E-04	8.41E-04
Cs-137	1.7368E+00	13.06	26.13	0.00E+00	2.27E+01	4.54E+01
Eu-154	3.0677E-03	13.06	26.13	0.00E+00	4.01E-02	8.02E-02
Eu-155	1.7925E-03	13.06	26.13	0.00E+00	2.34E-02	4.68E-02
Fe-55	3.7444E-03	13.06	26.13	0.00E+00	4.89E-02	9.78E-02
H-3	3.6180E-03	13.06	26.13	0.00E+00	4.73E-02	9.45E-02
I-129	7.3684E-07	13.06	26.13	0.00E+00	9.63E-06	1.93E-05
Kr-85	6.9368E-02	13.06	26.13	0.00E+00	9.06E-01	1.81E+00
Np-237	1.2662E-06	13.06	26.13	0.00E+00	1.65E-05	3.31E-05
Pa-231	9.1654E-09	13.06	26.13	0.00E+00	1.20E-07	2.39E-07
Pb-210	1.3728E-13	13.06	26.13	0.00E+00	1.79E-12	3.59E-12
Pm-147	1.0702E-02	13.06	26.13	0.00E+00	1.40E-01	2.80E-01
Pu-238	8.8692E-04	13.06	26.13	0.00E+00	1.16E-02	2.32E-02
Pu-239	5.5263E-03	13.06	26.13	0.00E+00	7.22E-02	1.44E-01
Pu-240	2.1233E-03	13.06	26.13	0.00E+00	2.77E-02	5.55E-02
Pu-241	3.8962E-02	13.06	26.13	0.00E+00	5.09E-01	1.02E+00
Pu-242	2.3128E-07	13.06	26.13	0.00E+00	3.02E-06	6.04E-06
Ra-226	4.6752E-13	13.06	26.13	0.00E+00	6.11E-12	1.22E-11
Ra-228	2.4827E-10	13.06	26.13	0.00E+00	3.24E-09	6.49E-09
Ru-106	9.8526E-08	13.06	26.13	0.00E+00	1.29E-06	2.57E-06
Se-79	1.3015E-05	13.06	26.13	0.00E+00	1.70E-04	3.40E-04
Sn-126	1.2165E-05	13.06	26.13	0.00E+00	1.59E-04	3.18E-04
Sr-90	1.6195E+00	13.06	26.13	0.00E+00	2.12E+01	4.23E+01
Tc-99	4.4241E-04	13.06	26.13	0.00E+00	5.78E-03	1.16E-02
Th-229	4.2451E-10	13.06	26.13	0.00E+00	5.55E-09	1.11E-08
Th-230	6.1398E-11	13.06	26.13	0.00E+00	8.02E-10	1.60E-09
Th-232	2.5278E-10	13.06	26.13	0.00E+00	3.30E-09	6.60E-09
Tl-208	1.5098E-08	13.06	26.13	0.00E+00	1.97E-07	3.94E-07
U-232	4.0662E-08	13.06	26.13	0.00E+00	5.31E-07	1.06E-06
U-233	1.2217E-07	13.06	26.13	0.00E+00	1.60E-06	3.19E-06
U-234	2.2391E-07	13.06	26.13	0.00E+00	2.93E-06	5.85E-06
U-235	-2.6194E-06	13.06	0.00	1.66E-04	1.32E-04	1.66E-04
U-236	1.2695E-05	13.06	26.13	0.00E+00	1.66E-04	3.32E-04
U-238	-3.6331E-08	13.06	0.00	1.03E-04	1.02E-04	1.03E-04
Y-90	1.6195E+00	13.06	26.13	0.00E+00	2.12E+01	4.23E+01
Other Radionuclides					2.25E+01	4.50E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.319E+12
0.0250	4.822E+11
0.0375	4.183E+11
0.0575	4.505E+11
0.0850	2.715E+11
0.1250	1.772E+11
0.2250	2.335E+11
0.3750	1.020E+11
0.5750	1.691E+12
0.8500	1.815E+10
1.2500	1.864E+11
1.7500	4.725E+08
2.2500	9.963E+05
2.7500	1.685E+04
3.5000	3.541E+01
5.0000	1.379E+01
7.0000	1.557E+00
11.0000	1.771E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.77E-01	5.55E-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 %:	20.10443864	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (very close to 20%)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	13.06	10.50
Bounding:		26.13

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:	1.00	0.80
Bounding:	2.00	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2025
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	9.55	19.09	0.00E+00	8.13E-09	1.63E-08
Am-241	1.8331E-03	9.55	19.09	0.00E+00	1.75E-02	3.50E-02
Am-242m	1.4129E-06	9.55	19.09	0.00E+00	1.35E-05	2.70E-05
Am-243	1.4774E-07	9.55	19.09	0.00E+00	1.41E-06	2.82E-06
C-14	1.2871E-04	9.55	19.09	0.00E+00	1.23E-03	2.46E-03
Cl-36	2.8120E-06	9.55	19.09	0.00E+00	2.68E-05	5.37E-05
Cm-243	1.7940E-07	9.55	19.09	0.00E+00	1.71E-06	3.43E-06
Cm-244	1.6962E-06	9.55	19.09	0.00E+00	1.62E-05	3.24E-05
Co-60	1.2839E+00	9.55	19.09	0.00E+00	1.23E+01	2.45E+01
Cs-134	9.0541E-02	9.55	19.09	0.00E+00	8.64E-01	1.73E+00
Cs-135	3.2195E-05	9.55	19.09	0.00E+00	3.07E-04	6.15E-04
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01
Eu-154	1.5368E-02	9.55	19.09	0.00E+00	1.47E-01	2.93E-01
Eu-155	2.9293E-02	9.55	19.09	0.00E+00	2.80E-01	5.59E-01
Fe-55	7.7158E-01	9.55	19.09	0.00E+00	7.37E+00	1.47E+01
H-3	1.1111E-02	9.55	19.09	0.00E+00	1.06E-01	2.12E-01
I-129	7.3684E-07	9.55	19.09	0.00E+00	7.03E-06	1.41E-05
Kr-85	2.5263E-01	9.55	19.09	0.00E+00	2.41E+00	4.82E+00
Np-237	1.2427E-06	9.55	19.09	0.00E+00	1.19E-05	2.37E-05
Pa-231	3.8511E-09	9.55	19.09	0.00E+00	3.68E-08	7.35E-08
Pb-210	7.3880E-15	9.55	19.09	0.00E+00	7.05E-14	1.41E-13
Pm-147	2.1023E+00	9.55	19.09	0.00E+00	2.01E+01	4.01E+01
Pu-238	1.0383E-03	9.55	19.09	0.00E+00	9.91E-03	1.98E-02
Pu-239	5.5293E-03	9.55	19.09	0.00E+00	5.28E-02	1.06E-01
Pu-240	2.1278E-03	9.55	19.09	0.00E+00	2.03E-02	4.06E-02
Pu-241	1.0195E-01	9.55	19.09	0.00E+00	9.73E-01	1.95E+00
Pu-242	2.3128E-07	9.55	19.09	0.00E+00	2.21E-06	4.42E-06
Ra-226	5.2782E-14	9.55	19.09	0.00E+00	5.04E-13	1.01E-12
Ra-228	1.9338E-10	9.55	19.09	0.00E+00	1.85E-09	3.69E-09
Ru-106	9.1684E-02	9.55	19.09	0.00E+00	8.75E-01	1.75E+00
Se-79	1.3018E-05	9.55	19.09	0.00E+00	1.24E-04	2.49E-04
Sn-126	1.2167E-05	9.55	19.09	0.00E+00	1.16E-04	2.32E-04
Sr-90	2.6045E+00	9.55	19.09	0.00E+00	2.49E+01	4.97E+01
Tc-99	4.4241E-04	9.55	19.09	0.00E+00	4.22E-03	8.45E-03
Th-229	1.3713E-10	9.55	19.09	0.00E+00	1.31E-09	2.62E-09
Th-230	1.8090E-11	9.55	19.09	0.00E+00	1.73E-10	3.45E-10
Th-232	2.5278E-10	9.55	19.09	0.00E+00	2.41E-09	4.83E-09
Tl-208	1.6947E-06	9.55	19.09	0.00E+00	1.62E-07	3.24E-07
U-232	4.8737E-06	9.55	19.09	0.00E+00	4.65E-07	9.30E-07
U-233	1.2203E-07	9.55	19.09	0.00E+00	1.16E-06	2.33E-06
U-234	1.5925E-07	9.55	19.09	0.00E+00	1.52E-06	3.04E-06
U-235	-2.6194E-06	9.55	0.00	1.68E-04	1.43E-04	1.68E-04
U-236	1.2693E-05	9.55	19.09	0.00E+00	1.21E-04	2.42E-04
U-238	-3.6331E-08	9.55	0.00	1.05E-04	1.05E-04	1.05E-04
Y-90	2.6060E+00	9.55	19.09	0.00E+00	2.49E+01	4.98E+01
Other Radionuclides					3.44E+01	6.88E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.086E+12
0.0250	6.790E+11
0.0375	5.782E+11
0.0575	5.935E+11
0.0850	3.677E+11
0.1250	2.670E+11
0.2250	3.119E+11
0.3750	1.583E+11
0.5750	2.104E+12
0.8500	9.031E+10
1.2500	1.834E+12
1.7500	1.223E+09
2.2500	1.971E+09
2.7500	1.564E+07
3.5000	1.820E+06
5.0000	1.025E+01
7.0000	1.160E+00
11.0000	1.322E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.56E-01	1.11E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	3.80	9.55
Bounding:		19.09

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF AZ
SNF ID #: 972
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.195kg; EOL=0.188kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	6.68	13.36	0.00E+00	2.77E-08	5.54E-08
Am-241	3.5850E-03	6.68	13.36	0.00E+00	2.40E-02	4.79E-02
Am-242m	1.2899E-06	6.68	13.36	0.00E+00	8.62E-06	1.72E-05
Am-243	1.4747E-07	6.68	13.36	0.00E+00	9.85E-07	1.97E-06
C-14	1.2839E-04	6.68	13.36	0.00E+00	8.58E-04	1.72E-03
Cl-36	2.8120E-06	6.68	13.36	0.00E+00	1.88E-05	3.76E-05
Cm-243	1.1038E-07	6.68	13.36	0.00E+00	7.38E-07	1.48E-06
Cm-244	7.8917E-07	6.68	13.36	0.00E+00	5.27E-06	1.05E-05
Co-60	9.2647E-02	6.68	13.36	0.00E+00	6.19E-01	1.24E+00
Cs-134	1.0940E-04	6.68	13.36	0.00E+00	7.31E-04	1.46E-03
Cs-135	3.2195E-05	6.68	13.36	0.00E+00	2.15E-04	4.30E-04
Cs-137	1.7368E+00	6.68	13.36	0.00E+00	1.16E+01	2.32E+01
Eu-154	3.0677E-03	6.68	13.36	0.00E+00	2.05E-02	4.10E-02
Eu-155	1.7925E-03	6.68	13.36	0.00E+00	1.20E-02	2.40E-02
Fe-55	3.7444E-03	6.68	13.36	0.00E+00	2.50E-02	5.00E-02
H-3	3.6180E-03	6.68	13.36	0.00E+00	2.42E-02	4.84E-02
I-129	7.3684E-07	6.68	13.36	0.00E+00	4.92E-06	9.85E-06
Kr-85	6.9368E-02	6.68	13.36	0.00E+00	4.64E-01	9.27E-01
Np-237	1.2662E-06	6.68	13.36	0.00E+00	8.46E-06	1.69E-05
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	1.2165E-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
Tl-208	1.5098E-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	-3.6331E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.186E+12
0.0250	2.466E+11
0.0375	2.140E+11
0.0575	2.304E+11
0.0850	1.389E+11
0.1250	9.062E+10
0.2250	1.194E+11
0.3750	5.217E+10
0.5750	8.648E+11
0.8500	9.285E+09
1.2500	9.534E+10
1.7500	2.417E+08
2.2500	5.096E+05
2.7500	8.617E+03
3.5000	1.811E+01
5.0000	7.053E+00
7.0000	7.962E-01
11.0000	9.055E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.42E-01	2.84E-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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	3.52
Bounding:	2.01	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	11.46	22.91	0.00E+00	9.76E-09	1.95E-08
Am-241	1.8331E-03	11.46	22.91	0.00E+00	2.10E-02	4.20E-02
Am-242m	1.4129E-06	11.46	22.91	0.00E+00	1.62E-05	3.24E-05
Am-243	1.4774E-07	11.46	22.91	0.00E+00	1.69E-06	3.38E-06
C-14	1.2871E-04	11.46	22.91	0.00E+00	1.47E-03	2.95E-03
Cl-36	2.8120E-06	11.46	22.91	0.00E+00	3.22E-05	6.44E-05
Cm-243	1.7940E-07	11.46	22.91	0.00E+00	2.06E-06	4.11E-06
Cm-244	1.6962E-06	11.46	22.91	0.00E+00	1.94E-05	3.89E-05
Co-60	1.2839E+00	11.46	22.91	0.00E+00	1.47E+01	2.94E+01
Cs-134	9.0541E-02	11.46	22.91	0.00E+00	1.04E+00	2.07E+00
Cs-135	3.2195E-05	11.46	22.91	0.00E+00	3.69E-04	7.38E-04
Cs-137	2.7564E+00	11.46	22.91	0.00E+00	3.16E+01	6.32E+01
Eu-154	1.5368E-02	11.46	22.91	0.00E+00	1.76E-01	3.52E-01
Eu-155	2.9293E-02	11.46	22.91	0.00E+00	3.36E-01	6.71E-01
Fe-55	7.7158E-01	11.46	22.91	0.00E+00	8.84E+00	1.77E+01
H-3	1.1111E-02	11.46	22.91	0.00E+00	1.27E-01	2.55E-01
I-129	7.3684E-07	11.46	22.91	0.00E+00	8.44E-06	1.69E-05
Kr-85	2.5263E-01	11.46	22.91	0.00E+00	2.89E+00	5.79E+00
Np-237	1.2427E-06	11.46	22.91	0.00E+00	1.42E-05	2.85E-05
Pa-231	3.8511E-09	11.46	22.91	0.00E+00	4.41E-08	8.82E-08
Pb-210	7.3880E-15	11.46	22.91	0.00E+00	8.46E-14	1.69E-13
Pm-147	2.1023E+00	11.46	22.91	0.00E+00	2.41E+01	4.82E+01
Pu-238	1.0383E-03	11.46	22.91	0.00E+00	1.19E-02	2.38E-02
Pu-239	5.5293E-03	11.46	22.91	0.00E+00	6.33E-02	1.27E-01
Pu-240	2.1278E-03	11.46	22.91	0.00E+00	2.44E-02	4.87E-02
Pu-241	1.0195E-01	11.46	22.91	0.00E+00	1.17E+00	2.34E+00
Pu-242	2.3128E-07	11.46	22.91	0.00E+00	2.65E-06	5.30E-06
Ra-226	5.2782E-14	11.46	22.91	0.00E+00	6.05E-13	1.21E-12
Ra-228	1.9338E-10	11.46	22.91	0.00E+00	2.22E-09	4.43E-09
Ru-106	9.1684E-02	11.46	22.91	0.00E+00	1.05E+00	2.10E+00
Se-79	1.3018E-05	11.46	22.91	0.00E+00	1.49E-04	2.98E-04
Sn-126	1.2167E-05	11.46	22.91	0.00E+00	1.39E-04	2.79E-04
Sr-90	2.6045E+00	11.46	22.91	0.00E+00	2.98E+01	5.97E+01
Tc-99	4.4241E-04	11.46	22.91	0.00E+00	5.07E-03	1.01E-02
Th-229	1.3713E-10	11.46	22.91	0.00E+00	1.57E-09	3.14E-09
Th-230	1.8090E-11	11.46	22.91	0.00E+00	2.07E-10	4.14E-10
Th-232	2.5278E-10	11.46	22.91	0.00E+00	2.90E-09	5.79E-09
Tl-208	1.6947E-08	11.46	22.91	0.00E+00	1.94E-07	3.88E-07
U-232	4.8737E-08	11.46	22.91	0.00E+00	5.58E-07	1.12E-06
U-233	1.2203E-07	11.46	22.91	0.00E+00	1.40E-06	2.80E-06
U-234	1.5925E-07	11.46	22.91	0.00E+00	1.82E-06	3.65E-06
U-235	-2.6194E-06	11.46	0.00	1.69E-04	1.39E-04	1.69E-04
U-236	1.2693E-05	11.46	22.91	0.00E+00	1.45E-04	2.91E-04
U-238	-3.6331E-08	11.46	0.00	1.05E-04	1.04E-04	1.05E-04
Y-90	2.6060E+00	11.46	22.91	0.00E+00	2.99E+01	5.97E+01
Other Radionuclides					4.13E+01	8.26E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.703E+12
0.0250	8.148E+11
0.0375	6.939E+11
0.0575	7.122E+11
0.0850	4.412E+11
0.1250	3.204E+11
0.2250	3.743E+11
0.3750	1.899E+11
0.5750	2.525E+12
0.8500	1.084E+11
1.2500	2.201E+12
1.7500	1.467E+09
2.2500	2.365E+09
2.7500	1.877E+07
3.5000	2.184E+06
5.0000	1.225E+01
7.0000	1.387E+00
11.0000	1.580E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.57E-01	1.33E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1.90	11.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		22.91	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.88	6.03
Bounding:	1.72	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (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

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

Estimated Canister usage: 16"x10'
0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	38.18	76.37	0.00E+00	3.25E-08	6.50E-08
Am-241	1.8331E-03	38.18	76.37	0.00E+00	7.00E-02	1.40E-01
Am-242m	1.4129E-06	38.18	76.37	0.00E+00	5.40E-05	1.08E-04
Am-243	1.4774E-07	38.18	76.37	0.00E+00	5.64E-06	1.13E-05
C-14	1.2871E-04	38.18	76.37	0.00E+00	4.91E-03	9.83E-03
Cl-36	2.8120E-06	38.18	76.37	0.00E+00	1.07E-04	2.15E-04
Cm-243	1.7940E-07	38.18	76.37	0.00E+00	6.85E-06	1.37E-05
Cm-244	1.6962E-06	38.18	76.37	0.00E+00	6.48E-05	1.30E-04
Co-60	1.2839E+00	38.18	76.37	0.00E+00	4.90E+01	9.81E+01
Cs-134	9.0541E-02	38.18	76.37	0.00E+00	3.46E+00	6.91E+00
Cs-135	3.2195E-05	38.18	76.37	0.00E+00	1.23E-03	2.46E-03
Cs-137	2.7564E+00	38.18	76.37	0.00E+00	1.05E+02	2.11E+02
Eu-154	1.5368E-02	38.18	76.37	0.00E+00	5.87E-01	1.17E+00
Eu-155	2.9293E-02	38.18	76.37	0.00E+00	1.12E+00	2.24E+00
Fe-55	7.7158E-01	38.18	76.37	0.00E+00	2.95E+01	5.89E+01
H-3	1.1111E-02	38.18	76.37	0.00E+00	4.24E-01	8.49E-01
I-129	7.3684E-07	38.18	76.37	0.00E+00	2.81E-05	5.63E-05
Kr-85	2.5263E-01	38.18	76.37	0.00E+00	9.65E+00	1.93E+01
Np-237	1.2427E-06	38.18	76.37	0.00E+00	4.75E-05	9.49E-05
Pa-231	3.8511E-09	38.18	76.37	0.00E+00	1.47E-07	2.94E-07
Pb-210	7.3880E-15	38.18	76.37	0.00E+00	2.82E-13	5.64E-13
Pm-147	2.1023E+00	38.18	76.37	0.00E+00	8.03E+01	1.61E+02
Pu-238	1.0383E-03	38.18	76.37	0.00E+00	3.96E-02	7.93E-02
Pu-239	5.5293E-03	38.18	76.37	0.00E+00	2.11E-01	4.22E-01
Pu-240	2.1278E-03	38.18	76.37	0.00E+00	8.12E-02	1.62E-01
Pu-241	1.0195E-01	38.18	76.37	0.00E+00	3.89E+00	7.79E+00
Pu-242	2.3128E-07	38.18	76.37	0.00E+00	8.83E-06	1.77E-05
Ra-226	5.2782E-14	38.18	76.37	0.00E+00	2.02E-12	4.03E-12
Ra-228	1.9338E-10	38.18	76.37	0.00E+00	7.38E-09	1.48E-08
Ru-106	9.1684E-02	38.18	76.37	0.00E+00	3.50E+00	7.00E+00
Se-79	1.3018E-05	38.18	76.37	0.00E+00	4.97E-04	9.94E-04
Sn-126	1.2167E-05	38.18	76.37	0.00E+00	4.65E-04	9.29E-04
Sr-90	2.6045E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02
Tc-99	4.4241E-04	38.18	76.37	0.00E+00	1.69E-02	3.38E-02
Th-229	1.3713E-10	38.18	76.37	0.00E+00	5.24E-09	1.05E-08
Th-230	1.8090E-11	38.18	76.37	0.00E+00	6.91E-10	1.38E-09
Th-232	2.5278E-10	38.18	76.37	0.00E+00	9.65E-09	1.93E-08
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.234E+13
0.0250	2.716E+12
0.0375	2.313E+12
0.0575	2.374E+12
0.0850	1.471E+12
0.1250	1.068E+12
0.2250	1.248E+12
0.3750	6.331E+11
0.5750	8.417E+12
0.8500	3.613E+11
1.2500	7.336E+12
1.7500	4.890E+09
2.2500	7.883E+09
2.7500	6.256E+07
3.5000	7.280E+06
5.0000	4.099E+01
7.0000	4.641E+00
11.0000	5.268E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.22E+00	4.44E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	30.41	38.18	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		76.37	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

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

Estimated Canister usage: 18"x10'
0.05

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
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
Tl-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-08	0.00	0.00	3.96E-04	3.96E-04	3.96E-04
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	2.46E-04	2.46E-04	2.46E-04
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.804E+06
0.0250	0.000E+00
0.0375	1.338E+04
0.0575	8.107E+03
0.0850	1.143E+06
0.1250	2.257E+06
0.2250	7.988E+06
0.3750	1.993E+04
0.5750	9.805E+02
0.8500	1.528E+02
1.2500	9.009E+00
1.7500	4.406E+00
2.2500	2.553E+00
2.7500	1.484E+00
3.5000	1.326E+00
5.0000	5.698E-01
7.0000	6.559E-02
11.0000	7.541E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E-06	1.66E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99996708	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) UNIV. OF CAL-IRVINE
SNF ID #: 1051
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.192kg; EOL=0.19kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.5173E-10	1.87	3.73	0.00E+00	1.59E-09	3.18E-09
Am-241	1.8331E-03	1.87	3.73	0.00E+00	3.42E-03	6.85E-03
Am-242m	1.4129E-06	1.87	3.73	0.00E+00	2.64E-06	5.28E-06
Am-243	1.4774E-07	1.87	3.73	0.00E+00	2.76E-07	5.52E-07
C-14	1.2871E-04	1.87	3.73	0.00E+00	2.40E-04	4.81E-04
Cl-36	2.8120E-06	1.87	3.73	0.00E+00	5.25E-06	1.05E-05
Cm-243	1.7940E-07	1.87	3.73	0.00E+00	3.35E-07	6.70E-07
Cm-244	1.6962E-06	1.87	3.73	0.00E+00	3.17E-06	6.33E-06
Co-60	1.2839E+00	1.87	3.73	0.00E+00	2.40E+00	4.79E+00
Cs-134	9.0541E-02	1.87	3.73	0.00E+00	1.69E-01	3.38E-01
Cs-135	3.2195E-05	1.87	3.73	0.00E+00	6.01E-05	1.20E-04
Cs-137	2.7564E+00	1.87	3.73	0.00E+00	5.15E+00	1.03E+01
Eu-154	1.5368E-02	1.87	3.73	0.00E+00	2.87E-02	5.74E-02
Eu-155	2.9293E-02	1.87	3.73	0.00E+00	5.47E-02	1.09E-01
Fe-55	7.7158E-01	1.87	3.73	0.00E+00	1.44E+00	2.88E+00
H-3	1.1111E-02	1.87	3.73	0.00E+00	2.07E-02	4.15E-02
I-129	7.3684E-07	1.87	3.73	0.00E+00	1.38E-06	2.75E-06
Kr-85	2.5263E-01	1.87	3.73	0.00E+00	4.72E-01	9.43E-01
Np-237	1.2427E-06	1.87	3.73	0.00E+00	2.32E-06	4.64E-06
Pa-231	3.8511E-09	1.87	3.73	0.00E+00	7.19E-09	1.44E-08
Pb-210	7.3880E-15	1.87	3.73	0.00E+00	1.38E-14	2.76E-14
Pm-147	2.1023E+00	1.87	3.73	0.00E+00	3.93E+00	7.85E+00
Pu-238	1.0383E-03	1.87	3.73	0.00E+00	1.94E-03	3.88E-03
Pu-239	5.5293E-03	1.87	3.73	0.00E+00	1.03E-02	2.07E-02
Pu-240	2.1278E-03	1.87	3.73	0.00E+00	3.97E-03	7.95E-03
Pu-241	1.0195E-01	1.87	3.73	0.00E+00	1.90E-01	3.81E-01
Pu-242	2.3128E-07	1.87	3.73	0.00E+00	4.32E-07	8.64E-07
Ra-226	5.2782E-14	1.87	3.73	0.00E+00	9.86E-14	1.97E-13
Ra-228	1.9338E-10	1.87	3.73	0.00E+00	3.61E-10	7.22E-10
Ru-106	9.1684E-02	1.87	3.73	0.00E+00	1.71E-01	3.42E-01
Se-79	1.3018E-05	1.87	3.73	0.00E+00	2.43E-05	4.86E-05
Sn-126	1.2167E-05	1.87	3.73	0.00E+00	2.27E-05	4.54E-05
Sr-90	2.6045E+00	1.87	3.73	0.00E+00	4.86E+00	9.73E+00
Tc-99	4.4241E-04	1.87	3.73	0.00E+00	8.26E-04	1.65E-03
Th-229	1.3713E-10	1.87	3.73	0.00E+00	2.56E-10	5.12E-10
Th-230	1.8090E-11	1.87	3.73	0.00E+00	3.38E-11	6.76E-11
Th-232	2.5278E-10	1.87	3.73	0.00E+00	4.72E-10	9.44E-10
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.036E+11
0.0250	1.328E+11
0.0375	1.131E+11
0.0575	1.161E+11
0.0850	7.192E+10
0.1250	5.223E+10
0.2250	6.101E+10
0.3750	3.096E+10
0.5750	4.116E+11
0.8500	1.767E+10
1.2500	3.588E+11
1.7500	2.392E+08
2.2500	3.855E+08
2.7500	3.059E+06
3.5000	3.560E+05
5.0000	2.076E+00
7.0000	2.352E-01
11.0000	2.681E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E-01	2.17E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00002068	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	1.87	1.43
Bounding:		3.73

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 AFRRI
SNF ID #: 250
Fuel Units & Descr: 95 - ELEMENT
Heavy Metal Mass: BOL=18.525kg; EOL=18.012kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2019
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.3731E-09	489.71	979.43	0.00E+00	6.72E-07	1.34E-06
Am-241	2.3865E-03	489.71	979.43	0.00E+00	1.17E+00	2.34E+00
Am-242m	1.3812E-06	489.71	979.43	0.00E+00	6.76E-04	1.35E-03
Am-243	1.4767E-07	489.71	979.43	0.00E+00	7.23E-05	1.45E-04
C-14	1.2863E-04	489.71	979.43	0.00E+00	6.30E-02	1.26E-01
Cl-36	2.8120E-06	489.71	979.43	0.00E+00	1.38E-03	2.75E-03
Cm-243	1.5895E-07	489.71	979.43	0.00E+00	7.78E-05	1.56E-04
Cm-244	1.4008E-06	489.71	979.43	0.00E+00	6.86E-04	1.37E-03
Co-60	6.6541E-01	489.71	979.43	0.00E+00	3.26E+02	6.52E+02
Cs-134	1.6887E-02	489.71	979.43	0.00E+00	8.27E+00	1.65E+01
Cs-135	3.2195E-05	489.71	979.43	0.00E+00	1.58E-02	3.15E-02
Cs-137	2.4556E+00	489.71	979.43	0.00E+00	1.20E+03	2.41E+03
Eu-154	1.0268E-02	489.71	979.43	0.00E+00	5.03E+00	1.01E+01
Eu-155	1.4570E-02	489.71	979.43	0.00E+00	7.14E+00	1.43E+01
Fe-55	2.0361E-01	489.71	979.43	0.00E+00	9.97E+01	1.99E+02
H-3	8.3940E-03	489.71	979.43	0.00E+00	4.11E+00	8.22E+00
I-129	7.3684E-07	489.71	979.43	0.00E+00	3.61E-04	7.22E-04
Kr-85	1.8286E-01	489.71	979.43	0.00E+00	8.95E+01	1.79E+02
Np-237	1.2462E-06	489.71	979.43	0.00E+00	6.10E-04	1.22E-03
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
Tl-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					1.20E+03	2.40E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.265E+14
0.0250	2.681E+13
0.0375	2.289E+13
0.0575	2.440E+13
0.0850	1.480E+13
0.1250	9.732E+12
0.2250	1.263E+13
0.3750	5.800E+12
0.5750	9.086E+13
0.8500	1.622E+12
1.2500	4.877E+13
1.7500	2.935E+10
2.2500	1.533E+09
2.7500	2.538E+07
3.5000	3.007E+06
5.0000	5.226E+02
7.0000	5.912E+01
11.0000	6.731E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.92E+01	3.84E+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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	90.27	489.71	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		979.43	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ANL-W
SNF ID #: 353
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.39kg; EOL=0.17kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	209.82	372.30	0.00E+00	1.41E-06	2.50E-06
Am-241	3.9068E-03	209.82	372.30	0.00E+00	8.20E-01	1.45E+00
Am-242m	1.2325E-06	209.82	372.30	0.00E+00	2.59E-04	4.59E-04
Am-243	1.4732E-07	209.82	372.30	0.00E+00	3.09E-05	5.48E-05
C-14	1.2824E-04	209.82	372.30	0.00E+00	2.69E-02	4.77E-02
Cl-36	2.8120E-06	209.82	372.30	0.00E+00	5.90E-04	1.05E-03
Cm-243	8.6556E-08	209.82	372.30	0.00E+00	1.82E-05	3.22E-05
Cm-244	5.3835E-07	209.82	372.30	0.00E+00	1.13E-04	2.00E-04
Co-60	2.4887E-02	209.82	372.30	0.00E+00	5.22E+00	9.27E+00
Cs-134	3.8030E-06	209.82	372.30	0.00E+00	7.98E-04	1.42E-03
Cs-135	3.2195E-05	209.82	372.30	0.00E+00	6.76E-03	1.20E-02
Cs-137	1.3788E+00	209.82	372.30	0.00E+00	2.89E+02	5.13E+02
Eu-154	1.3711E-03	209.82	372.30	0.00E+00	2.88E-01	5.10E-01
Eu-155	4.4361E-04	209.82	372.30	0.00E+00	9.31E-02	1.65E-01
Fe-55	2.6075E-04	209.82	372.30	0.00E+00	5.47E-02	9.71E-02
H-3	2.0647E-03	209.82	372.30	0.00E+00	4.33E-01	7.69E-01
I-129	7.3684E-07	209.82	372.30	0.00E+00	1.55E-04	2.74E-04
Kr-85	3.6346E-02	209.82	372.30	0.00E+00	7.63E+00	1.35E+01
Np-237	1.2844E-06	209.82	372.30	0.00E+00	2.69E-04	4.78E-04
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	5.9684E-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
Tl-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	1.69E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.599E+13
0.0250	5.400E+12
0.0375	4.891E+12
0.0575	5.054E+12
0.0850	3.041E+12
0.1250	1.979E+12
0.2250	2.620E+12
0.3750	1.142E+12
0.5750	1.911E+13
0.8500	1.955E+11
1.2500	7.588E+11
1.7500	5.075E+09
2.2500	4.159E+06
2.7500	1.912E+05
3.5000	4.573E+02
5.0000	1.925E+02
7.0000	2.171E+01
11.0000	2.468E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.37E+00	8.99E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	13.30	209.82	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	15.99	372.30	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ANL-W
SNF ID #: 370
Fuel Units & Descr: 40 - ELEMENT
Heavy Metal Mass: BOL=7.12kg; EOL=6.86kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	248.20	496.40	0.00E+00	1.66E-06	3.33E-06
Am-241	3.9068E-03	248.20	496.40	0.00E+00	9.70E-01	1.94E+00
Am-242m	1.2325E-06	248.20	496.40	0.00E+00	3.06E-04	6.12E-04
Am-243	1.4732E-07	248.20	496.40	0.00E+00	3.66E-05	7.31E-05
C-14	1.2824E-04	248.20	496.40	0.00E+00	3.18E-02	6.37E-02
Cl-36	2.8120E-06	248.20	496.40	0.00E+00	6.98E-04	1.40E-03
Cm-243	8.6556E-06	248.20	496.40	0.00E+00	2.15E-05	4.30E-05
Cm-244	5.3835E-07	248.20	496.40	0.00E+00	1.34E-04	2.67E-04
Co-60	2.4887E-02	248.20	496.40	0.00E+00	6.18E+00	1.24E+01
Cs-134	3.8030E-06	248.20	496.40	0.00E+00	9.44E-04	1.89E-03
Cs-135	3.2195E-05	248.20	496.40	0.00E+00	7.99E-03	1.60E-02
Cs-137	1.3788E+00	248.20	496.40	0.00E+00	3.42E+02	6.84E+02
Eu-154	1.3711E-03	248.20	496.40	0.00E+00	3.40E-01	6.81E-01
Eu-155	4.4361E-04	248.20	496.40	0.00E+00	1.10E-01	2.20E-01
Fe-55	2.6075E-04	248.20	496.40	0.00E+00	6.47E-02	1.29E-01
H-3	2.0647E-03	248.20	496.40	0.00E+00	5.12E-01	1.02E+00
I-129	7.3684E-07	248.20	496.40	0.00E+00	1.83E-04	3.66E-04
Kr-85	3.6346E-02	248.20	496.40	0.00E+00	9.02E+00	1.80E+01
Np-237	1.2844E-06	248.20	496.40	0.00E+00	3.19E-04	6.38E-04
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
Tl-208	1.3723E-06	248.20	496.40	0.00E+00	3.41E-06	6.81E-06
U-232	3.6932E-06	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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.465E+13
0.0250	7.199E+12
0.0375	6.255E+12
0.0575	6.739E+12
0.0850	4.055E+12
0.1250	2.639E+12
0.2250	3.493E+12
0.3750	1.523E+12
0.5750	2.548E+13
0.8500	2.607E+11
1.2500	1.012E+12
1.7500	6.767E+09
2.2500	5.545E+06
2.7500	2.549E+05
3.5000	6.193E+02
5.0000	2.608E+02
7.0000	2.942E+01
11.0000	3.346E+00

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

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.66292135	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.02	1.43
Bounding:	2.04	1.70

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 AUSTRIA
SNF ID #: 469
Fuel Units & Descr: 30 - ELEMENT
Heavy Metal Mass: BOL=5.85kg; EOL=5.643kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10"
0.27

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	197.60	395.21	0.00E+00	5.22E-07	1.04E-06
Am-241	3.1429E-03	197.60	395.21	0.00E+00	6.21E-01	1.24E+00
Am-242m	1.3195E-06	197.60	395.21	0.00E+00	2.61E-04	5.21E-04
Am-243	1.4753E-07	197.60	395.21	0.00E+00	2.92E-05	5.83E-05
C-14	1.2847E-04	197.60	395.21	0.00E+00	2.54E-02	5.08E-02
Cl-36	2.8120E-06	197.60	395.21	0.00E+00	5.56E-04	1.11E-03
Cm-243	1.2465E-07	197.60	395.21	0.00E+00	2.46E-05	4.93E-05
Cm-244	9.5564E-07	197.60	395.21	0.00E+00	1.89E-04	3.78E-04
Co-60	1.7880E-01	197.60	395.21	0.00E+00	3.53E+01	7.07E+01
Cs-134	5.8692E-04	197.60	395.21	0.00E+00	1.16E-01	2.32E-01
Cs-135	3.2195E-05	197.60	395.21	0.00E+00	6.36E-03	1.27E-02
Cs-137	1.9489E+00	197.60	395.21	0.00E+00	3.85E+02	7.70E+02
Eu-154	4.5895E-03	197.60	395.21	0.00E+00	9.07E-01	1.81E+00
Eu-155	3.6045E-03	197.60	395.21	0.00E+00	7.12E-01	1.42E+00
Fe-55	1.4185E-02	197.60	395.21	0.00E+00	2.80E+00	5.61E+00
H-3	4.7895E-03	197.60	395.21	0.00E+00	9.46E-01	1.89E+00
I-129	7.3684E-07	197.60	395.21	0.00E+00	1.46E-04	2.91E-04
Kr-85	9.5820E-02	197.60	395.21	0.00E+00	1.89E+01	3.79E+01
Np-237	1.2552E-06	197.60	395.21	0.00E+00	2.48E-04	4.96E-04
Pa-231	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	7.92E+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	1.09E+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	1.96E+01
Pu-242	2.3128E-07	197.60	395.21	0.00E+00	4.57E-05	9.14E-05
Ra-226	2.4526E-13	197.60	395.21	0.00E+00	4.85E-11	9.69E-11
Ra-228	2.4015E-10	197.60	395.21	0.00E+00	4.75E-08	9.49E-08
Ru-106	3.0602E-06	197.60	395.21	0.00E+00	6.05E-04	1.21E-03
Se-79	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
Sr-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-229	3.0962E-10	197.60	395.21	0.00E+00	6.12E-08	1.22E-07
Th-230	4.2346E-11	197.60	395.21	0.00E+00	8.37E-09	1.67E-08
Th-232	2.5278E-10	197.60	395.21	0.00E+00	5.00E-08	9.99E-08
Tl-208	1.5820E-08	197.60	395.21	0.00E+00	3.13E-06	6.25E-06
U-232	4.2647E-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	4.83E-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	1.2693E-05	197.60	395.21	0.00E+00	2.51E-03	5.02E-03
U-238	-3.6331E-08	197.60	0.00	1.57E-03	1.57E-03	1.57E-03
Y-90	1.8241E+00	197.60	395.21	0.00E+00	3.60E+02	7.21E+02
Other Radionuclides					3.81E+02	7.61E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.961E+13
0.0250	8.244E+12
0.0375	7.142E+12
0.0575	7.684E+12
0.0850	4.638E+12
0.1250	3.032E+12
0.2250	3.983E+12
0.3750	1.746E+12
0.5750	2.871E+13
0.8500	3.236E+11
1.2500	5.362E+12
1.7500	8.314E+09
2.2500	2.864E+07
2.7500	3.155E+05
3.5000	1.753E+03
5.0000	2.090E+02
7.0000	2.361E+01
11.0000	2.686E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.94E+00	9.89E+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	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
Nominal:	0.99	3.47
Bounding:	1.98	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 BRAZIL
SNF ID #: 1063
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1.755kg; EOL=1.741kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.6436E-09	17.10	34.21	0.00E+00	4.52E-08	9.04E-08
Am-241	3.1429E-03	17.10	34.21	0.00E+00	5.38E-02	1.08E-01
Am-242m	1.3195E-06	17.10	34.21	0.00E+00	2.26E-05	4.51E-05
Am-243	1.4753E-07	17.10	34.21	0.00E+00	2.52E-06	5.05E-06
C-14	1.2847E-04	17.10	34.21	0.00E+00	2.20E-03	4.39E-03
Cl-36	2.8120E-06	17.10	34.21	0.00E+00	4.81E-05	9.62E-05
Cm-243	1.2465E-07	17.10	34.21	0.00E+00	2.13E-06	4.26E-06
Cm-244	9.5564E-07	17.10	34.21	0.00E+00	1.63E-05	3.27E-05
Co-60	1.7880E-01	17.10	34.21	0.00E+00	3.06E+00	6.12E+00
Cs-134	5.8692E-04	17.10	34.21	0.00E+00	1.00E-02	2.01E-02
Cs-135	3.2195E-05	17.10	34.21	0.00E+00	5.51E-04	1.10E-03
Cs-137	1.9489E+00	17.10	34.21	0.00E+00	3.33E+01	6.67E+01
Eu-154	4.5895E-03	17.10	34.21	0.00E+00	7.85E-02	1.57E-01
Eu-155	3.6045E-03	17.10	34.21	0.00E+00	6.17E-02	1.23E-01
Fe-55	1.4185E-02	17.10	34.21	0.00E+00	2.43E-01	4.85E-01
H-3	4.7895E-03	17.10	34.21	0.00E+00	8.19E-02	1.64E-01
I-129	7.3684E-07	17.10	34.21	0.00E+00	1.26E-05	2.52E-05
Kr-85	9.5820E-02	17.10	34.21	0.00E+00	1.64E+00	3.28E+00
Np-237	1.2552E-06	17.10	34.21	0.00E+00	2.15E-05	4.29E-05
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.428E+12
0.0250	7.136E+11
0.0375	6.182E+11
0.0575	6.651E+11
0.0850	4.015E+11
0.1250	2.624E+11
0.2250	3.447E+11
0.3750	1.511E+11
0.5750	2.485E+12
0.8500	2.801E+10
1.2500	4.642E+11
1.7500	7.197E+08
2.2500	2.479E+06
2.7500	2.731E+04
3.5000	1.535E+02
5.0000	1.886E+01
7.0000	2.133E+00
11.0000	2.428E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.28E-01	8.56E-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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	17.10	13.75	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		34.21	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 CORNELL
SNF ID #: 246
Fuel Units & Descr: 115 - ELEMENT
Heavy Metal Mass: BOL=21.896kg; EOL=21.586kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 1.04

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	320.10	640.20	0.00E+00	2.73E-07	5.45E-07
Am-241	1.8331E-03	320.10	640.20	0.00E+00	5.87E-01	1.17E+00
Am-242m	1.4129E-06	320.10	640.20	0.00E+00	4.52E-04	9.05E-04
Am-243	1.4774E-07	320.10	640.20	0.00E+00	4.73E-05	9.46E-05
C-14	1.2871E-04	320.10	640.20	0.00E+00	4.12E-02	8.24E-02
Cl-36	2.8120E-06	320.10	640.20	0.00E+00	9.00E-04	1.80E-03
Cm-243	1.7940E-07	320.10	640.20	0.00E+00	5.74E-05	1.15E-04
Cm-244	1.6962E-06	320.10	640.20	0.00E+00	5.43E-04	1.09E-03
Co-60	1.2839E+00	320.10	640.20	0.00E+00	4.11E+02	8.22E+02
Cs-134	9.0541E-02	320.10	640.20	0.00E+00	2.90E+01	5.80E+01
Cs-135	3.2195E-05	320.10	640.20	0.00E+00	1.03E-02	2.06E-02
Cs-137	2.7564E+00	320.10	640.20	0.00E+00	8.82E+02	1.76E+03
Eu-154	1.5368E-02	320.10	640.20	0.00E+00	4.92E+00	9.84E+00
Eu-155	2.9293E-02	320.10	640.20	0.00E+00	9.38E+00	1.88E+01
Fe-55	7.7158E-01	320.10	640.20	0.00E+00	2.47E+02	4.94E+02
H-3	1.1111E-02	320.10	640.20	0.00E+00	3.56E+00	7.11E+00
I-129	7.3684E-07	320.10	640.20	0.00E+00	2.36E-04	4.72E-04
Kr-85	2.5263E-01	320.10	640.20	0.00E+00	8.09E+01	1.62E+02
Np-237	1.2427E-06	320.10	640.20	0.00E+00	3.98E-04	7.96E-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-03	320.10	640.20	0.00E+00	6.81E-01	1.36E+00
Pu-241	1.0195E-01	320.10	640.20	0.00E+00	3.26E+01	6.53E+01
Pu-242	2.3128E-07	320.10	640.20	0.00E+00	7.40E-05	1.48E-04
Ra-226	5.2782E-14	320.10	640.20	0.00E+00	1.69E-11	3.38E-11
Ra-228	1.9338E-10	320.10	640.20	0.00E+00	6.19E-08	1.24E-07
Ru-106	9.1684E-02	320.10	640.20	0.00E+00	2.93E+01	5.87E+01
Se-79	1.3018E-05	320.10	640.20	0.00E+00	4.17E-03	8.33E-03
Sn-126	1.2167E-05	320.10	640.20	0.00E+00	3.89E-03	7.79E-03
Sr-90	2.6045E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03
Tc-99	4.4241E-04	320.10	640.20	0.00E+00	1.42E-01	2.83E-01
Th-229	1.3713E-10	320.10	640.20	0.00E+00	4.39E-08	8.78E-08
Th-230	1.8090E-11	320.10	640.20	0.00E+00	5.79E-09	1.16E-08
Th-232	2.5278E-10	320.10	640.20	0.00E+00	8.09E-08	1.62E-07
Tl-208	1.6947E-08	320.10	640.20	0.00E+00	5.42E-06	1.08E-05
U-232	4.8737E-08	320.10	640.20	0.00E+00	1.56E-05	3.12E-05
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

Gamma Sources: Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.035E+14
0.0250	2.277E+13
0.0375	1.939E+13
0.0575	1.990E+13
0.0850	1.233E+13
0.1250	8.953E+12
0.2250	1.046E+13
0.3750	5.308E+12
0.5750	7.056E+13
0.8500	3.028E+12
1.2500	6.150E+13
1.7500	4.100E+10
2.2500	6.606E+10
2.7500	5.244E+08
3.5000	6.103E+07
5.0000	3.491E+02
7.0000	3.954E+01
11.0000	4.505E+00

Thermal Power: Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.86E+01	3.73E+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 %:	19.97350572	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	320.10	296.41	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		640.20	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 DOW
SNF ID #: 251
Fuel Units & Descr: 77 - ELEMENT
Heavy Metal Mass: BOL=15.015kg; EOL=14.63kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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 Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	367.52	735.05	0.00E+00	3.13E-07	6.26E-07
Am-241	1.8331E-03	367.52	735.05	0.00E+00	6.74E-01	1.35E+00
Am-242m	1.4129E-06	367.52	735.05	0.00E+00	5.19E-04	1.04E-03
Am-243	1.4774E-07	367.52	735.05	0.00E+00	5.43E-05	1.09E-04
C-14	1.2871E-04	367.52	735.05	0.00E+00	4.73E-02	9.46E-02
Cl-36	2.8120E-06	367.52	735.05	0.00E+00	1.03E-03	2.07E-03
Cm-243	1.7940E-07	367.52	735.05	0.00E+00	6.59E-05	1.32E-04
Cm-244	1.6962E-06	367.52	735.05	0.00E+00	6.23E-04	1.25E-03
Co-60	1.2839E+00	367.52	735.05	0.00E+00	4.72E+02	9.44E+02
Cs-134	9.0541E-02	367.52	735.05	0.00E+00	3.33E+01	6.66E+01
Cs-135	3.2195E-05	367.52	735.05	0.00E+00	1.18E-02	2.37E-02
Cs-137	2.7564E+00	367.52	735.05	0.00E+00	1.01E+03	2.03E+03
Eu-154	1.5368E-02	367.52	735.05	0.00E+00	5.65E+00	1.13E+01
Eu-155	2.9293E-02	367.52	735.05	0.00E+00	1.08E+01	2.15E+01
Fe-55	7.7158E-01	367.52	735.05	0.00E+00	2.84E+02	5.67E+02
H-3	1.1111E-02	367.52	735.05	0.00E+00	4.08E+00	8.17E+00
I-129	7.3684E-07	367.52	735.05	0.00E+00	2.71E-04	5.42E-04
Kr-85	2.5263E-01	367.52	735.05	0.00E+00	9.28E+01	1.86E+02
Np-237	1.2427E-06	367.52	735.05	0.00E+00	4.57E-04	9.13E-04
Pa-231	3.8511E-09	367.52	735.05	0.00E+00	1.42E-06	2.83E-06
Pb-210	7.3880E-15	367.52	735.05	0.00E+00	2.72E-12	5.43E-12
Pm-147	2.1023E+00	367.52	735.05	0.00E+00	7.73E+02	1.55E+03
Pu-238	1.0383E-03	367.52	735.05	0.00E+00	3.82E-01	7.63E-01
Pu-239	5.5293E-03	367.52	735.05	0.00E+00	2.03E+00	4.06E+00
Pu-240	2.1278E-03	367.52	735.05	0.00E+00	7.82E-01	1.56E+00
Pu-241	1.0195E-01	367.52	735.05	0.00E+00	3.75E+01	7.49E+01
Pu-242	2.3128E-07	367.52	735.05	0.00E+00	8.50E-05	1.70E-04
Ra-226	5.2782E-14	367.52	735.05	0.00E+00	1.94E-11	3.88E-11
Ra-228	1.9338E-10	367.52	735.05	0.00E+00	7.11E-08	1.42E-07
Ru-106	9.1684E-02	367.52	735.05	0.00E+00	3.37E+01	6.74E+01
Se-79	1.3018E-05	367.52	735.05	0.00E+00	4.78E-03	9.57E-03
Sn-126	1.2167E-05	367.52	735.05	0.00E+00	4.47E-03	8.94E-03
Sr-90	2.6045E+00	367.52	735.05	0.00E+00	9.57E+02	1.91E+03
Tc-99	4.4241E-04	367.52	735.05	0.00E+00	1.63E-01	3.25E-01
Th-229	1.3713E-10	367.52	735.05	0.00E+00	5.04E-08	1.01E-07
Th-230	1.8090E-11	367.52	735.05	0.00E+00	6.65E-09	1.33E-08
Th-232	2.5278E-10	367.52	735.05	0.00E+00	9.29E-08	1.86E-07
Tl-208	1.6947E-08	367.52	735.05	0.00E+00	6.23E-06	1.25E-05
U-232	4.8737E-08	367.52	735.05	0.00E+00	1.79E-05	3.58E-05
U-233	1.2203E-07	367.52	735.05	0.00E+00	4.48E-05	8.97E-05
U-234	1.5925E-07	367.52	735.05	0.00E+00	5.85E-05	1.17E-04
U-235	-2.6194E-06	367.52	0.00	6.49E-03	5.53E-03	6.49E-03
U-236	1.2693E-05	367.52	735.05	0.00E+00	4.67E-03	9.33E-03
U-238	-3.6331E-08	367.52	0.00	4.04E-03	4.02E-03	4.04E-03
Y-90	2.6060E+00	367.52	735.05	0.00E+00	9.58E+02	1.92E+03
Other Radionuclides					1.33E+03	2.65E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.188E+14
0.0250	2.614E+13
0.0375	2.226E+13
0.0575	2.285E+13
0.0850	1.416E+13
0.1250	1.028E+13
0.2250	1.201E+13
0.3750	6.094E+12
0.5750	8.102E+13
0.8500	3.477E+12
1.2500	7.061E+13
1.7500	4.707E+10
2.2500	7.587E+10
2.7500	6.021E+08
3.5000	7.007E+07
5.0000	3.946E+02
7.0000	4.467E+01
11.0000	5.069E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E+01	4.28E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:	219.50	367.52	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		735.05	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ENGLAND
SNF ID #: 485
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16.187kg; EOL=15.826kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.6436E-09	394.39	788.78	0.00E+00	1.04E-06	2.09E-06
Am-241	3.1429E-03	394.39	788.78	0.00E+00	1.24E+00	2.48E+00
Am-242m	1.3195E-06	394.39	788.78	0.00E+00	5.20E-04	1.04E-03
Am-243	1.4753E-07	394.39	788.78	0.00E+00	5.82E-05	1.16E-04
C-14	1.2847E-04	394.39	788.78	0.00E+00	5.07E-02	1.01E-01
Cl-36	2.8120E-06	394.39	788.78	0.00E+00	1.11E-03	2.22E-03
Cm-243	1.2465E-07	394.39	788.78	0.00E+00	4.92E-05	9.83E-05
Cm-244	9.5564E-07	394.39	788.78	0.00E+00	3.77E-04	7.54E-04
Co-60	1.7880E-01	394.39	788.78	0.00E+00	7.05E+01	1.41E+02
Cs-134	5.8692E-04	394.39	788.78	0.00E+00	2.31E-01	4.63E-01
Cs-135	3.2195E-05	394.39	788.78	0.00E+00	1.27E-02	2.54E-02
Cs-137	1.9489E+00	394.39	788.78	0.00E+00	7.69E+02	1.54E+03
Eu-154	4.5895E-03	394.39	788.78	0.00E+00	1.81E+00	3.62E+00
Eu-155	3.6045E-03	394.39	788.78	0.00E+00	1.42E+00	2.84E+00
Fe-55	1.4185E-02	394.39	788.78	0.00E+00	5.59E+00	1.12E+01
H-3	4.7895E-03	394.39	788.78	0.00E+00	1.89E+00	3.78E+00
I-129	7.3684E-07	394.39	788.78	0.00E+00	2.91E-04	5.81E-04
Kr-85	9.5820E-02	394.39	788.78	0.00E+00	3.78E+01	7.56E+01
Np-237	1.2552E-06	394.39	788.78	0.00E+00	4.95E-04	9.90E-04
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
Tl-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
U-234	1.9955E-07	394.39	788.78	0.00E+00	7.87E-05	1.57E-04
U-235	-2.6194E-06	394.39	0.00	6.93E-03	5.90E-03	6.93E-03
U-236	1.2693E-05	394.39	788.78	0.00E+00	5.01E-03	1.00E-02
U-238	-3.6331E-08	394.39	0.00	4.36E-03	4.35E-03	4.36E-03
Y-90	1.8241E+00	394.39	788.78	0.00E+00	7.19E+02	1.44E+03
Other Radionuclides					7.59E+02	1.52E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.905E+13
0.0250	1.645E+13
0.0375	1.425E+13
0.0575	1.534E+13
0.0850	9.258E+12
0.1250	6.051E+12
0.2250	7.949E+12
0.3750	3.484E+12
0.5750	5.730E+13
0.8500	6.459E+11
1.2500	1.070E+13
1.7500	1.659E+10
2.2500	5.716E+07
2.7500	6.297E+05
3.5000	3.505E+03
5.0000	4.199E+02
7.0000	4.744E+01
11.0000	5.398E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.87E+00	1.97E+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 %:	19.80853811	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	394.39	344.80	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		788.78	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	0.87
Bounding:	1.43	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 FINLAND
SNF ID #: 472
Fuel Units & Descr: 102 - ELEMENT
Heavy Metal Mass: BOL=19.89kg; EOL=19.686kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	194.74	389.48	0.00E+00	5.15E-07	1.03E-06
Am-241	3.1429E-03	194.74	389.48	0.00E+00	6.12E-01	1.22E+00
Am-242m	1.3195E-06	194.74	389.48	0.00E+00	2.57E-04	5.14E-04
Am-243	1.4753E-07	194.74	389.48	0.00E+00	2.87E-05	5.75E-05
C-14	1.2847E-04	194.74	389.48	0.00E+00	2.50E-02	5.00E-02
Cl-36	2.8120E-06	194.74	389.48	0.00E+00	5.48E-04	1.10E-03
Cm-243	1.2465E-07	194.74	389.48	0.00E+00	2.43E-05	4.85E-05
Cm-244	9.5564E-07	194.74	389.48	0.00E+00	1.86E-04	3.72E-04
Co-60	1.7880E-01	194.74	389.48	0.00E+00	3.48E+01	6.96E+01
Cs-134	5.8692E-04	194.74	389.48	0.00E+00	1.14E-01	2.29E-01
Cs-135	3.2195E-05	194.74	389.48	0.00E+00	6.27E-03	1.25E-02
Cs-137	1.9489E+00	194.74	389.48	0.00E+00	3.80E+02	7.59E+02
Eu-154	4.5895E-03	194.74	389.48	0.00E+00	8.94E-01	1.79E+00
Eu-155	3.6045E-03	194.74	389.48	0.00E+00	7.02E-01	1.40E+00
Fe-55	1.4185E-02	194.74	389.48	0.00E+00	2.76E+00	5.52E+00
H-3	4.7895E-03	194.74	389.48	0.00E+00	9.33E-01	1.87E+00
I-129	7.3684E-07	194.74	389.48	0.00E+00	1.43E-04	2.87E-04
Kr-85	9.5820E-02	194.74	389.48	0.00E+00	1.87E+01	3.73E+01
Np-237	1.2552E-06	194.74	389.48	0.00E+00	2.44E-04	4.89E-04
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	8.62E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.903E+13
0.0250	8.125E+12
0.0375	7.039E+12
0.0575	7.572E+12
0.0850	4.571E+12
0.1250	2.988E+12
0.2250	3.925E+12
0.3750	1.720E+12
0.5750	2.829E+13
0.8500	3.189E+11
1.2500	5.285E+12
1.7500	8.194E+09
2.2500	2.822E+07
2.7500	3.110E+05
3.5000	1.748E+03
5.0000	2.147E+02
7.0000	2.427E+01
11.0000	2.763E+00

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	Basis for burnup used in estimate:
Nominal:	193.85	194.74	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		389.48	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 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

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	2,426.80	4,853.61	0.00E+00	1.63E-05	3.25E-05
Am-241	3.9068E-03	2,426.80	4,853.61	0.00E+00	9.48E+00	1.90E+01
Am-242m	1.2325E-06	2,426.80	4,853.61	0.00E+00	2.99E-03	5.98E-03
Am-243	1.4732E-07	2,426.80	4,853.61	0.00E+00	3.58E-04	7.15E-04
C-14	1.2824E-04	2,426.80	4,853.61	0.00E+00	3.11E-01	6.22E-01
Cl-36	2.8120E-06	2,426.80	4,853.61	0.00E+00	6.82E-03	1.36E-02
Cm-243	8.6556E-08	2,426.80	4,853.61	0.00E+00	2.10E-04	4.20E-04
Cm-244	5.3835E-07	2,426.80	4,853.61	0.00E+00	1.31E-03	2.61E-03
Co-60	2.4887E-02	2,426.80	4,853.61	0.00E+00	6.04E+01	1.21E+02
Cs-134	3.8030E-06	2,426.80	4,853.61	0.00E+00	9.23E-03	1.85E-02
Cs-135	3.2195E-05	2,426.80	4,853.61	0.00E+00	7.81E-02	1.56E-01
Cs-137	1.3788E+00	2,426.80	4,853.61	0.00E+00	3.35E+03	6.69E+03
Eu-154	1.3711E-03	2,426.80	4,853.61	0.00E+00	3.33E+00	6.65E+00
Eu-155	4.4361E-04	2,426.80	4,853.61	0.00E+00	1.08E+00	2.15E+00
Fe-55	2.6075E-04	2,426.80	4,853.61	0.00E+00	6.33E-01	1.27E+00
H-3	2.0647E-03	2,426.80	4,853.61	0.00E+00	5.01E+00	1.00E+01
I-129	7.3684E-07	2,426.80	4,853.61	0.00E+00	1.79E-03	3.58E-03
Kr-85	3.6346E-02	2,426.80	4,853.61	0.00E+00	8.82E+01	1.76E+02
Np-237	1.2844E-06	2,426.80	4,853.61	0.00E+00	3.12E-03	6.23E-03
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	5.61E-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
Tl-208	1.3723E-08	2,426.80	4,853.61	0.00E+00	3.33E-05	6.66E-05
U-232	3.6932E-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-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.388E+14
0.0250	7.039E+13
0.0375	6.116E+13
0.0575	6.589E+13
0.0850	3.965E+13
0.1250	2.580E+13
0.2250	3.415E+13
0.3750	1.489E+13
0.5750	2.491E+14
0.8500	2.549E+12
1.2500	9.893E+12
1.7500	6.616E+10
2.2500	5.422E+07
2.7500	2.492E+06
3.5000	5.987E+03
5.0000	2.520E+03
7.0000	2.843E+02
11.0000	3.232E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.90E+01	7.80E+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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	758.29	2,426.80	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,853.61	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GERMANY
SNF ID #: 305
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=2.925kg; EOL=2.883kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_a: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	40.09	80.19	0.00E+00	1.06E-07	2.12E-07
Am-241	3.1429E-03	40.09	80.19	0.00E+00	1.26E-01	2.52E-01
Am-242m	1.3195E-06	40.09	80.19	0.00E+00	5.29E-05	1.06E-04
Am-243	1.4753E-07	40.09	80.19	0.00E+00	5.92E-06	1.18E-05
C-14	1.2847E-04	40.09	80.19	0.00E+00	5.15E-03	1.03E-02
Cl-36	2.8120E-06	40.09	80.19	0.00E+00	1.13E-04	2.25E-04
Cm-243	1.2465E-07	40.09	80.19	0.00E+00	5.00E-06	1.00E-05
Cm-244	9.5564E-07	40.09	80.19	0.00E+00	3.83E-05	7.66E-05
Co-60	1.7880E-01	40.09	80.19	0.00E+00	7.17E+00	1.43E+01
Cs-134	5.8692E-04	40.09	80.19	0.00E+00	2.35E-02	4.71E-02
Cs-135	3.2195E-05	40.09	80.19	0.00E+00	1.29E-03	2.58E-03
Cs-137	1.9489E+00	40.09	80.19	0.00E+00	7.81E+01	1.56E+02
Eu-154	4.5895E-03	40.09	80.19	0.00E+00	1.84E-01	3.68E-01
Eu-155	3.6045E-03	40.09	80.19	0.00E+00	1.45E-01	2.89E-01
Fe-55	1.4185E-02	40.09	80.19	0.00E+00	5.69E-01	1.14E+00
H-3	4.7895E-03	40.09	80.19	0.00E+00	1.92E-01	3.84E-01
I-129	7.3684E-07	40.09	80.19	0.00E+00	2.95E-05	5.91E-05
Kr-85	9.5820E-02	40.09	80.19	0.00E+00	3.84E+00	7.68E+00
Np-237	1.2552E-06	40.09	80.19	0.00E+00	5.03E-05	1.01E-04
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-06	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
Tl-208	1.5820E-06	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	-2.6194E-06	40.09	0.00	1.26E-03	1.16E-03	1.26E-03
U-236	1.2693E-05	40.09	80.19	0.00E+00	5.09E-04	1.02E-03
U-238	-3.6331E-08	40.09	0.00	7.86E-04	7.85E-04	7.86E-04
Y-90	1.8241E+00	40.09	80.19	0.00E+00	7.31E+01	1.46E+02
Other Radionuclides					7.72E+01	1.54E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.036E+12
0.0250	1.673E+12
0.0375	1.449E+12
0.0575	1.559E+12
0.0850	9.411E+11
0.1250	6.151E+11
0.2250	8.081E+11
0.3750	3.542E+11
0.5750	5.825E+12
0.8500	6.566E+10
1.2500	1.088E+12
1.7500	1.687E+09
2.2500	5.810E+06
2.7500	6.402E+04
3.5000	3.582E+02
5.0000	4.348E+01
7.0000	4.914E+00
11.0000	5.592E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.00E+00	2.01E+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	Basis for burnup used in estimate:
Nominal:	28.51	40.09	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		80.19	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	1.41
Bounding:	0.80	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GERMANY
SNF ID #: 474
Fuel Units & Descr: 70 - ELEMENT
Heavy Metal Mass: BOL=13.65kg; EOL=13.377kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	260.61	521.22	0.00E+00	6.89E-07	1.38E-06
Am-241	3.1429E-03	260.61	521.22	0.00E+00	8.19E-01	1.64E+00
Am-242m	1.3195E-06	260.61	521.22	0.00E+00	3.44E-04	6.88E-04
Am-243	1.4753E-07	260.61	521.22	0.00E+00	3.84E-05	7.69E-05
C-14	1.2847E-04	260.61	521.22	0.00E+00	3.35E-02	6.70E-02
Cl-36	2.8120E-06	260.61	521.22	0.00E+00	7.33E-04	1.47E-03
Cm-243	1.2465E-07	260.61	521.22	0.00E+00	3.25E-05	6.50E-05
Cm-244	9.5564E-07	260.61	521.22	0.00E+00	2.49E-04	4.98E-04
Co-60	1.7880E-01	260.61	521.22	0.00E+00	4.66E+01	9.32E+01
Cs-134	5.8692E-04	260.61	521.22	0.00E+00	1.53E-01	3.06E-01
Cs-135	3.2195E-05	260.61	521.22	0.00E+00	8.39E-03	1.68E-02
Cs-137	1.9489E+00	260.61	521.22	0.00E+00	5.08E+02	1.02E+03
Eu-154	4.5895E-03	260.61	521.22	0.00E+00	1.20E+00	2.39E+00
Eu-155	3.6045E-03	260.61	521.22	0.00E+00	9.39E-01	1.88E+00
Fe-55	1.4185E-02	260.61	521.22	0.00E+00	3.70E+00	7.39E+00
H-3	4.7895E-03	260.61	521.22	0.00E+00	1.25E+00	2.50E+00
I-129	7.3684E-07	260.61	521.22	0.00E+00	1.92E-04	3.84E-04
Kr-85	9.5820E-02	260.61	521.22	0.00E+00	2.50E+01	4.99E+01
Np-237	1.2552E-06	260.61	521.22	0.00E+00	3.27E-04	6.54E-04
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
Tl-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	1.9955E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.223E+13
0.0250	1.087E+13
0.0375	9.419E+12
0.0575	1.013E+13
0.0850	6.117E+12
0.1250	3.998E+12
0.2250	5.253E+12
0.3750	2.302E+12
0.5750	3.786E+13
0.8500	4.268E+11
1.2500	7.072E+12
1.7500	1.097E+10
2.2500	3.777E+07
2.7500	4.161E+05
3.5000	2.321E+03
5.0000	2.793E+02
7.0000	3.156E+01
11.0000	3.591E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.82E+00	1.30E+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 %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	133.03	260.61	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		521.22	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 HANNOVER
SNF ID #: 473
Fuel Units & Descr: 5 - ELEMENT
Heavy Metal Mass: BOL=0.972kg; EOL=0.95kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	21.48	42.96	0.00E+00	8.90E-08	1.78E-07
Am-241	3.5850E-03	21.48	42.96	0.00E+00	7.70E-02	1.54E-01
Am-242m	1.2899E-06	21.48	42.96	0.00E+00	2.77E-05	5.54E-05
Am-243	1.4747E-07	21.48	42.96	0.00E+00	3.17E-06	6.34E-06
C-14	1.2839E-04	21.48	42.96	0.00E+00	2.76E-03	5.52E-03
Cl-36	2.8120E-06	21.48	42.96	0.00E+00	6.04E-05	1.21E-04
Cm-243	1.1038E-07	21.48	42.96	0.00E+00	2.37E-06	4.74E-06
Cm-244	7.8917E-07	21.48	42.96	0.00E+00	1.70E-05	3.39E-05
Co-60	9.2647E-02	21.48	42.96	0.00E+00	1.99E+00	3.98E+00
Cs-134	1.0940E-04	21.48	42.96	0.00E+00	2.35E-03	4.70E-03
Cs-135	3.2195E-05	21.48	42.96	0.00E+00	6.92E-04	1.38E-03
Cs-137	1.7368E+00	21.48	42.96	0.00E+00	3.73E+01	7.46E+01
Eu-154	3.0677E-03	21.48	42.96	0.00E+00	6.59E-02	1.32E-01
Eu-155	1.7925E-03	21.48	42.96	0.00E+00	3.85E-02	7.70E-02
Fe-55	3.7444E-03	21.48	42.96	0.00E+00	8.04E-02	1.61E-01
H-3	3.6180E-03	21.48	42.96	0.00E+00	7.77E-02	1.55E-01
I-129	7.3684E-07	21.48	42.96	0.00E+00	1.58E-05	3.17E-05
Kr-85	6.9368E-02	21.48	42.96	0.00E+00	1.49E+00	2.98E+00
Np-237	1.2662E-06	21.48	42.96	0.00E+00	2.72E-05	5.44E-05
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
Tl-208	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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.813E+12
0.0250	7.927E+11
0.0375	6.877E+11
0.0575	7.406E+11
0.0850	4.464E+11
0.1250	2.913E+11
0.2250	3.839E+11
0.3750	1.677E+11
0.5750	2.780E+12
0.8500	2.984E+10
1.2500	3.064E+11
1.7500	7.768E+08
2.2500	1.638E+06
2.7500	2.770E+04
3.5000	5.871E+01
5.0000	2.289E+01
7.0000	2.584E+00
11.0000	2.939E-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	Basis for burnup used in estimate:
Nominal:	2.37	21.48	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		42.96	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 HEIDELBERG
SNF ID #: 1044
Fuel Units & Descr: 56 - ELEMENT
Heavy Metal Mass: BOL=10.713kg; EOL=10.556kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
0.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	208.81	417.63	0.00E+00	5.52E-07	1.10E-06
Am-241	3.1429E-03	208.81	417.63	0.00E+00	6.56E-01	1.31E+00
Am-242m	1.3195E-06	208.81	417.63	0.00E+00	2.76E-04	5.51E-04
Am-243	1.4753E-07	208.81	417.63	0.00E+00	3.08E-05	6.16E-05
C-14	1.2847E-04	208.81	417.63	0.00E+00	2.68E-02	5.37E-02
Cl-36	2.8120E-06	208.81	417.63	0.00E+00	5.87E-04	1.17E-03
Cm-243	1.2465E-07	208.81	417.63	0.00E+00	2.60E-05	5.21E-05
Cm-244	9.5564E-07	208.81	417.63	0.00E+00	2.00E-04	3.99E-04
Co-60	1.7880E-01	208.81	417.63	0.00E+00	3.73E+01	7.47E+01
Cs-134	5.8692E-04	208.81	417.63	0.00E+00	1.23E-01	2.45E-01
Cs-135	3.2195E-05	208.81	417.63	0.00E+00	6.72E-03	1.34E-02
Cs-137	1.9489E+00	208.81	417.63	0.00E+00	4.07E+02	8.14E+02
Eu-154	4.5895E-03	208.81	417.63	0.00E+00	9.58E-01	1.92E+00
Eu-155	3.6045E-03	208.81	417.63	0.00E+00	7.53E-01	1.51E+00
Fe-55	1.4185E-02	208.81	417.63	0.00E+00	2.96E+00	5.92E+00
H-3	4.7895E-03	208.81	417.63	0.00E+00	1.00E+00	2.00E+00
I-129	7.3684E-07	208.81	417.63	0.00E+00	1.54E-04	3.08E-04
Kr-85	9.5820E-02	208.81	417.63	0.00E+00	2.00E+01	4.00E+01
Np-237	1.2552E-06	208.81	417.63	0.00E+00	2.62E-04	5.24E-04
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
Tl-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-90	1.8241E+00	208.81	417.63	0.00E+00	3.81E+02	7.62E+02
Other Radionuclides					4.02E+02	8.04E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.185E+13
0.0250	8.712E+12
0.0375	7.547E+12
0.0575	8.119E+12
0.0850	4.902E+12
0.1250	3.204E+12
0.2250	4.209E+12
0.3750	1.845E+12
0.5750	3.034E+13
0.8500	3.420E+11
1.2500	5.667E+12
1.7500	8.786E+09
2.2500	3.026E+07
2.7500	3.334E+05
3.5000	1.859E+03
5.0000	2.236E+02
7.0000	2.527E+01
11.0000	2.876E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.22E+00	1.64E+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 %:	19.72849245	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	208.81	149.68	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		417.63	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	0.72
Bounding:	1.14	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	647.80	1,295.59	0.00E+00	1.71E-06	3.43E-06
Am-241	3.1429E-03	647.80	1,295.59	0.00E+00	2.04E+00	4.07E+00
Am-242m	1.3195E-06	647.80	1,295.59	0.00E+00	8.55E-04	1.71E-03
Am-243	1.4753E-07	647.80	1,295.59	0.00E+00	9.56E-05	1.91E-04
C-14	1.2847E-04	647.80	1,295.59	0.00E+00	8.32E-02	1.66E-01
Cl-36	2.8120E-06	647.80	1,295.59	0.00E+00	1.82E-03	3.64E-03
Cm-243	1.2465E-07	647.80	1,295.59	0.00E+00	8.07E-05	1.61E-04
Cm-244	9.5564E-07	647.80	1,295.59	0.00E+00	6.19E-04	1.24E-03
Co-60	1.7880E-01	647.80	1,295.59	0.00E+00	1.16E+02	2.32E+02
Cs-134	5.8692E-04	647.80	1,295.59	0.00E+00	3.80E-01	7.60E-01
Cs-135	3.2195E-05	647.80	1,295.59	0.00E+00	2.09E-02	4.17E-02
Cs-137	1.9489E+00	647.80	1,295.59	0.00E+00	1.26E+03	2.52E+03
Eu-154	4.5895E-03	647.80	1,295.59	0.00E+00	2.97E+00	5.95E+00
Eu-155	3.6045E-03	647.80	1,295.59	0.00E+00	2.33E+00	4.67E+00
Fe-55	1.4185E-02	647.80	1,295.59	0.00E+00	9.19E+00	1.84E+01
H-3	4.7895E-03	647.80	1,295.59	0.00E+00	3.10E+00	6.21E+00
I-129	7.3684E-07	647.80	1,295.59	0.00E+00	4.77E-04	9.55E-04
Kr-85	9.5820E-02	647.80	1,295.59	0.00E+00	6.21E+01	1.24E+02
Np-237	1.2552E-06	647.80	1,295.59	0.00E+00	8.13E-04	1.63E-03
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
Tl-208	1.5820E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.298E+14
0.0250	2.703E+13
0.0375	2.341E+13
0.0575	2.519E+13
0.0850	1.521E+13
0.1250	9.938E+12
0.2250	1.306E+13
0.3750	5.723E+12
0.5750	9.411E+13
0.8500	1.061E+12
1.2500	1.758E+13
1.7500	2.726E+10
2.2500	9.388E+07
2.7500	1.034E+06
3.5000	5.768E+03
5.0000	6.942E+02
7.0000	7.844E+01
11.0000	8.926E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.62E+01	3.24E+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 %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	330.68	647.80	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,295.59	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 INDONESIA
SNF ID #: 476
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.645kg; EOL=13.568kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%. U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 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)[2]	Bounding 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	2.354E+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-06	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	5.98E-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.61E+00	1.32E+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 %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	134.93	264.33	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		528.66	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ITALY
SNF ID #: 477
Fuel Units & Descr: 48 - ELEMENT
Heavy Metal Mass: BOL=9.36kg; EOL=9.173kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	178.70	357.41	0.00E+00	4.72E-07	9.45E-07
Am-241	3.1429E-03	178.70	357.41	0.00E+00	5.62E-01	1.12E+00
Am-242m	1.3195E-06	178.70	357.41	0.00E+00	2.36E-04	4.72E-04
Am-243	1.4753E-07	178.70	357.41	0.00E+00	2.64E-05	5.27E-05
C-14	1.2847E-04	178.70	357.41	0.00E+00	2.30E-02	4.59E-02
Cl-36	2.8120E-06	178.70	357.41	0.00E+00	5.03E-04	1.01E-03
Cm-243	1.2465E-07	178.70	357.41	0.00E+00	2.23E-05	4.45E-05
Cm-244	9.5564E-07	178.70	357.41	0.00E+00	1.71E-04	3.42E-04
Co-60	1.7880E-01	178.70	357.41	0.00E+00	3.20E+01	6.39E+01
Cs-134	5.8692E-04	178.70	357.41	0.00E+00	1.05E-01	2.10E-01
Cs-135	3.2195E-05	178.70	357.41	0.00E+00	5.75E-03	1.15E-02
Cs-137	1.9489E+00	178.70	357.41	0.00E+00	3.48E+02	6.97E+02
Eu-154	4.5895E-03	178.70	357.41	0.00E+00	8.20E-01	1.64E+00
Eu-155	3.6045E-03	178.70	357.41	0.00E+00	6.44E-01	1.29E+00
Fe-55	1.4185E-02	178.70	357.41	0.00E+00	2.53E+00	5.07E+00
H-3	4.7895E-03	178.70	357.41	0.00E+00	8.56E-01	1.71E+00
I-129	7.3684E-07	178.70	357.41	0.00E+00	1.32E-04	2.63E-04
Kr-85	9.5820E-02	178.70	357.41	0.00E+00	1.71E+01	3.42E+01
Np-237	1.2552E-06	178.70	357.41	0.00E+00	2.24E-04	4.49E-04
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
Tl-208	1.5820E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.582E+13
0.0250	7.456E+12
0.0375	6.459E+12
0.0575	6.949E+12
0.0850	4.195E+12
0.1250	2.742E+12
0.2250	3.602E+12
0.3750	1.579E+12
0.5750	2.596E+13
0.8500	2.926E+11
1.2500	4.849E+12
1.7500	7.519E+09
2.2500	2.590E+07
2.7500	2.853E+05
3.5000	1.591E+03
5.0000	1.915E+02
7.0000	2.164E+01
11.0000	2.462E+00

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	91.22	178.70	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		357.41	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	765.88	1,531.76	0.00E+00	3.18E-06	6.35E-06
Am-241	3.5850E-03	765.88	1,531.76	0.00E+00	2.75E+00	5.49E+00
Am-242m	1.2899E-06	765.88	1,531.76	0.00E+00	9.88E-04	1.98E-03
Am-243	1.4747E-07	765.88	1,531.76	0.00E+00	1.13E-04	2.26E-04
C-14	1.2839E-04	765.88	1,531.76	0.00E+00	9.83E-02	1.97E-01
Cl-36	2.8120E-06	765.88	1,531.76	0.00E+00	2.15E-03	4.31E-03
Cm-243	1.1038E-07	765.88	1,531.76	0.00E+00	8.45E-05	1.69E-04
Cm-244	7.8917E-07	765.88	1,531.76	0.00E+00	6.04E-04	1.21E-03
Co-60	9.2647E-02	765.88	1,531.76	0.00E+00	7.10E+01	1.42E+02
Cs-134	1.0940E-04	765.88	1,531.76	0.00E+00	8.38E-02	1.68E-01
Cs-135	3.2195E-05	765.88	1,531.76	0.00E+00	2.47E-02	4.93E-02
Cs-137	1.7368E+00	765.88	1,531.76	0.00E+00	1.33E+03	2.66E+03
Eu-154	3.0677E-03	765.88	1,531.76	0.00E+00	2.35E+00	4.70E+00
Eu-155	1.7925E-03	765.88	1,531.76	0.00E+00	1.37E+00	2.75E+00
Fe-55	3.7444E-03	765.88	1,531.76	0.00E+00	2.87E+00	5.74E+00
H-3	3.6180E-03	765.88	1,531.76	0.00E+00	2.77E+00	5.54E+00
I-129	7.3684E-07	765.88	1,531.76	0.00E+00	5.64E-04	1.13E-03
Kr-85	6.9368E-02	765.88	1,531.76	0.00E+00	5.31E+01	1.06E+02
Np-237	1.2662E-06	765.88	1,531.76	0.00E+00	9.70E-04	1.94E-03
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	3.6962E-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
Sn-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.360E+14
0.0250	2.827E+13
0.0375	2.452E+13
0.0575	2.641E+13
0.0850	1.592E+13
0.1250	1.039E+13
0.2250	1.369E+13
0.3750	5.979E+12
0.5750	9.912E+13
0.8500	1.064E+12
1.2500	1.093E+13
1.7500	2.770E+10
2.2500	5.841E+07
2.7500	9.876E+05
3.5000	2.063E+03
5.0000	8.029E+02
7.0000	9.063E+01
11.0000	1.031E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+01	3.25E+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 %:	20.02640698	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	1,510.19	3,020.38	0.00E+00	3.99E-06	7.98E-06
Am-241	3.1429E-03	1,510.19	3,020.38	0.00E+00	4.75E+00	9.49E+00
Am-242m	1.3195E-06	1,510.19	3,020.38	0.00E+00	1.99E-03	3.99E-03
Am-243	1.4753E-07	1,510.19	3,020.38	0.00E+00	2.23E-04	4.46E-04
C-14	1.2847E-04	1,510.19	3,020.38	0.00E+00	1.94E-01	3.88E-01
Cl-36	2.8120E-06	1,510.19	3,020.38	0.00E+00	4.25E-03	8.49E-03
Cm-243	1.2465E-07	1,510.19	3,020.38	0.00E+00	1.88E-04	3.76E-04
Cm-244	9.5564E-07	1,510.19	3,020.38	0.00E+00	1.44E-03	2.89E-03
Co-60	1.7880E-01	1,510.19	3,020.38	0.00E+00	2.70E+02	5.40E+02
Cs-134	5.8692E-04	1,510.19	3,020.38	0.00E+00	8.86E-01	1.77E+00
Cs-135	3.2195E-05	1,510.19	3,020.38	0.00E+00	4.86E-02	9.72E-02
Cs-137	1.9489E+00	1,510.19	3,020.38	0.00E+00	2.94E+03	5.89E+03
Eu-154	4.5895E-03	1,510.19	3,020.38	0.00E+00	6.93E+00	1.39E+01
Eu-155	3.6045E-03	1,510.19	3,020.38	0.00E+00	5.44E+00	1.09E+01
Fe-55	1.4185E-02	1,510.19	3,020.38	0.00E+00	2.14E+01	4.28E+01
H-3	4.7895E-03	1,510.19	3,020.38	0.00E+00	7.23E+00	1.45E+01
I-129	7.3684E-07	1,510.19	3,020.38	0.00E+00	1.11E-03	2.23E-03
Kr-85	9.5820E-02	1,510.19	3,020.38	0.00E+00	1.45E+02	2.89E+02
Np-237	1.2552E-06	1,510.19	3,020.38	0.00E+00	1.90E-03	3.79E-03
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
Tl-208	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-06	1,510.19	0.00	1.16E-02	7.68E-03	1.16E-02
U-236	1.2693E-05	1,510.19	3,020.38	0.00E+00	1.92E-02	3.83E-02
U-238	-3.6331E-08	1,510.19	0.00	7.23E-03	7.17E-03	7.23E-03
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.027E+14
0.0250	6.301E+13
0.0375	5.458E+13
0.0575	5.872E+13
0.0850	3.545E+13
0.1250	2.317E+13
0.2250	3.044E+13
0.3750	1.334E+13
0.5750	2.194E+14
0.8500	2.473E+12
1.2500	4.098E+13
1.7500	6.354E+10
2.2500	2.189E+08
2.7500	2.411E+06
3.5000	1.337E+04
5.0000	1.586E+03
7.0000	1.791E+02
11.0000	2.038E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.78E+01	7.56E+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 %:	20.026	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 JAPAN
SNF ID #: 479
Fuel Units & Descr: 73 - ELEMENT
Heavy Metal Mass: BOL=14.235kg; EOL=14.089kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.66

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	139.37	278.75	0.00E+00	3.68E-07	7.37E-07
Am-241	3.1429E-03	139.37	278.75	0.00E+00	4.38E-01	8.76E-01
Am-242m	1.3195E-06	139.37	278.75	0.00E+00	1.84E-04	3.68E-04
Am-243	1.4753E-07	139.37	278.75	0.00E+00	2.06E-05	4.11E-05
C-14	1.2847E-04	139.37	278.75	0.00E+00	1.79E-02	3.58E-02
Cl-36	2.8120E-06	139.37	278.75	0.00E+00	3.92E-04	7.84E-04
Cm-243	1.2465E-07	139.37	278.75	0.00E+00	1.74E-05	3.47E-05
Cm-244	9.5564E-07	139.37	278.75	0.00E+00	1.33E-04	2.66E-04
Co-60	1.7880E-01	139.37	278.75	0.00E+00	2.49E+01	4.98E+01
Cs-134	5.8692E-04	139.37	278.75	0.00E+00	8.18E-02	1.64E-01
Cs-135	3.2195E-05	139.37	278.75	0.00E+00	4.49E-03	8.97E-03
Cs-137	1.9489E+00	139.37	278.75	0.00E+00	2.72E+02	5.43E+02
Eu-154	4.5895E-03	139.37	278.75	0.00E+00	6.40E-01	1.28E+00
Eu-155	3.6045E-03	139.37	278.75	0.00E+00	5.02E-01	1.00E+00
Fe-55	1.4185E-02	139.37	278.75	0.00E+00	1.98E+00	3.95E+00
H-3	4.7895E-03	139.37	278.75	0.00E+00	6.68E-01	1.34E+00
I-129	7.3684E-07	139.37	278.75	0.00E+00	1.03E-04	2.05E-04
Kr-85	9.5820E-02	139.37	278.75	0.00E+00	1.34E+01	2.67E+01
Np-237	1.2552E-06	139.37	278.75	0.00E+00	1.75E-04	3.50E-04
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.793E+13
0.0250	5.815E+12
0.0375	5.037E+12
0.0575	5.419E+12
0.0850	3.272E+12
0.1250	2.138E+12
0.2250	2.809E+12
0.3750	1.231E+12
0.5750	2.025E+13
0.8500	2.282E+11
1.2500	3.782E+12
1.7500	5.864E+09
2.2500	2.020E+07
2.7500	2.226E+05
3.5000	1.251E+03
5.0000	1.537E+02
7.0000	1.737E+01
11.0000	1.977E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.49E+00	6.97E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	138.73	139.37
Bounding:		278.75

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 KANSAS STATE UNIV
SNF ID #: 253
Fuel Units & Descr: 163 - ELEMENT
Heavy Metal Mass: BOL=31.785kg; EOL=30.481kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 1.47

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	1,244.81	2,489.62	0.00E+00	1.06E-06	2.12E-06
Am-241	1.8331E-03	1,244.81	2,489.62	0.00E+00	2.28E+00	4.56E+00
Am-242m	1.4129E-06	1,244.81	2,489.62	0.00E+00	1.76E-03	3.52E-03
Am-243	1.4774E-07	1,244.81	2,489.62	0.00E+00	1.84E-04	3.68E-04
C-14	1.2871E-04	1,244.81	2,489.62	0.00E+00	1.60E-01	3.20E-01
Cl-36	2.8120E-06	1,244.81	2,489.62	0.00E+00	3.50E-03	7.00E-03
Cm-243	1.7940E-07	1,244.81	2,489.62	0.00E+00	2.23E-04	4.47E-04
Cm-244	1.6962E-06	1,244.81	2,489.62	0.00E+00	2.11E-03	4.22E-03
Co-60	1.2839E+00	1,244.81	2,489.62	0.00E+00	1.60E+03	3.20E+03
Cs-134	9.0541E-02	1,244.81	2,489.62	0.00E+00	1.13E+02	2.25E+02
Cs-135	3.2195E-05	1,244.81	2,489.62	0.00E+00	4.01E-02	8.02E-02
Cs-137	2.7564E+00	1,244.81	2,489.62	0.00E+00	3.43E+03	6.86E+03
Eu-154	1.5368E-02	1,244.81	2,489.62	0.00E+00	1.91E+01	3.83E+01
Eu-155	2.9293E-02	1,244.81	2,489.62	0.00E+00	3.65E+01	7.29E+01
Fe-55	7.7158E-01	1,244.81	2,489.62	0.00E+00	9.60E+02	1.92E+03
H-3	1.1111E-02	1,244.81	2,489.62	0.00E+00	1.38E+01	2.77E+01
I-129	7.3684E-07	1,244.81	2,489.62	0.00E+00	9.17E-04	1.83E-03
Kr-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
Pa-231	3.8511E-09	1,244.81	2,489.62	0.00E+00	4.79E-06	9.59E-06
Pb-210	7.3880E-15	1,244.81	2,489.62	0.00E+00	9.20E-12	1.84E-11
Pm-147	2.1023E+00	1,244.81	2,489.62	0.00E+00	2.62E+03	5.23E+03
Pu-238	1.0383E-03	1,244.81	2,489.62	0.00E+00	1.29E+00	2.59E+00
Pu-239	5.5293E-03	1,244.81	2,489.62	0.00E+00	6.88E+00	1.38E+01
Pu-240	2.1278E-03	1,244.81	2,489.62	0.00E+00	2.65E+00	5.30E+00
Pu-241	1.0195E-01	1,244.81	2,489.62	0.00E+00	1.27E+02	2.54E+02
Pu-242	2.3128E-07	1,244.81	2,489.62	0.00E+00	2.88E-04	5.76E-04
Ra-226	5.2782E-14	1,244.81	2,489.62	0.00E+00	6.57E-11	1.31E-10
Ra-228	1.9338E-10	1,244.81	2,489.62	0.00E+00	2.41E-07	4.81E-07
Ru-106	9.1684E-02	1,244.81	2,489.62	0.00E+00	1.14E+02	2.28E+02
Se-79	1.3018E-05	1,244.81	2,489.62	0.00E+00	1.62E-02	3.24E-02
Sn-126	1.2167E-05	1,244.81	2,489.62	0.00E+00	1.51E-02	3.03E-02
Sr-90	2.6045E+00	1,244.81	2,489.62	0.00E+00	3.24E+03	6.48E+03
Tc-99	4.4241E-04	1,244.81	2,489.62	0.00E+00	5.51E-01	1.10E+00
Th-229	1.3713E-10	1,244.81	2,489.62	0.00E+00	1.71E-07	3.41E-07
Th-230	1.8090E-11	1,244.81	2,489.62	0.00E+00	2.25E-08	4.50E-08
Th-232	2.5278E-10	1,244.81	2,489.62	0.00E+00	3.15E-07	6.29E-07
Tl-208	1.6947E-08	1,244.81	2,489.62	0.00E+00	2.11E-05	4.22E-05
U-232	4.8737E-08	1,244.81	2,489.62	0.00E+00	6.07E-05	1.21E-04
U-233	1.2203E-07	1,244.81	2,489.62	0.00E+00	1.52E-04	3.04E-04
U-234	1.5925E-07	1,244.81	2,489.62	0.00E+00	1.98E-04	3.96E-04
U-235	-2.6194E-06	1,244.81	0.00	1.37E-02	1.05E-02	1.37E-02
U-236	1.2693E-05	1,244.81	2,489.62	0.00E+00	1.58E-02	3.16E-02
U-238	-3.6331E-08	1,244.81	0.00	8.55E-03	8.50E-03	8.55E-03
Y-90	2.6060E+00	1,244.81	2,489.62	0.00E+00	3.24E+03	6.49E+03
Other Radionuclides					4.49E+03	8.98E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.024E+14
0.0250	8.854E+13
0.0375	7.540E+13
0.0575	7.739E+13
0.0850	4.795E+13
0.1250	3.482E+13
0.2250	4.067E+13
0.3750	2.064E+13
0.5750	2.744E+14
0.8500	1.178E+13
1.2500	2.392E+14
1.7500	1.594E+11
2.2500	2.570E+11
2.7500	2.039E+09
3.5000	2.373E+08
5.0000	1.324E+03
7.0000	1.499E+02
11.0000	1.708E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.24E+01	1.45E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:	774.44	1,244.81
Bounding:		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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.15	1.61
Bounding:	2.30	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MEXICO
SNF ID #: 482
Fuel Units & Descr: 151 - ELEMENT
Heavy Metal Mass: BOL=29.445kg; EOL=28.403kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	994.60	1,989.21	0.00E+00	2.63E-06	5.26E-06
Am-241	3.1429E-03	994.60	1,989.21	0.00E+00	3.13E+00	6.25E+00
Am-242m	1.3195E-06	994.60	1,989.21	0.00E+00	1.31E-03	2.62E-03
Am-243	1.4753E-07	994.60	1,989.21	0.00E+00	1.47E-04	2.93E-04
C-14	1.2847E-04	994.60	1,989.21	0.00E+00	1.28E-01	2.56E-01
Cl-36	2.8120E-06	994.60	1,989.21	0.00E+00	2.80E-03	5.59E-03
Cm-243	1.2465E-07	994.60	1,989.21	0.00E+00	1.24E-04	2.48E-04
Cm-244	9.5564E-07	994.60	1,989.21	0.00E+00	9.50E-04	1.90E-03
Co-60	1.7880E-01	994.60	1,989.21	0.00E+00	1.78E+02	3.56E+02
Cs-134	5.8692E-04	994.60	1,989.21	0.00E+00	5.84E-01	1.17E+00
Cs-135	3.2195E-05	994.60	1,989.21	0.00E+00	3.20E-02	6.40E-02
Cs-137	1.9489E+00	994.60	1,989.21	0.00E+00	1.94E+03	3.88E+03
Eu-154	4.5895E-03	994.60	1,989.21	0.00E+00	4.56E+00	9.13E+00
Eu-155	3.6045E-03	994.60	1,989.21	0.00E+00	3.59E+00	7.17E+00
Fe-55	1.4185E-02	994.60	1,989.21	0.00E+00	1.41E+01	2.82E+01
H-3	4.7895E-03	994.60	1,989.21	0.00E+00	4.76E+00	9.53E+00
I-129	7.3684E-07	994.60	1,989.21	0.00E+00	7.33E-04	1.47E-03
Kr-85	9.5820E-02	994.60	1,989.21	0.00E+00	9.53E+01	1.91E+02
Np-237	1.2552E-06	994.60	1,989.21	0.00E+00	1.25E-03	2.50E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.993E+14
0.0250	4.150E+13
0.0375	3.595E+13
0.0575	3.867E+13
0.0850	2.335E+13
0.1250	1.526E+13
0.2250	2.005E+13
0.3750	8.786E+12
0.5750	1.445E+14
0.8500	1.629E+12
1.2500	2.699E+13
1.7500	4.185E+10
2.2500	1.441E+08
2.7500	1.588E+06
3.5000	8.824E+03
5.0000	1.052E+03
7.0000	1.188E+02
11.0000	1.352E+01

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.99	
Bounding:	1.98	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MNRC
SNF ID #: 254
Fuel Units & Descr: 96 - ELEMENT
Heavy Metal Mass: BOL=17.99kg; EOL=17.933kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.86

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	350.58	701.16	0.00E+00	2.99E-07	5.97E-07
Am-241	1.8331E-03	350.58	701.16	0.00E+00	6.43E-01	1.29E+00
Am-242m	1.4129E-06	350.58	701.16	0.00E+00	4.95E-04	9.91E-04
Am-243	1.4774E-07	350.58	701.16	0.00E+00	5.18E-05	1.04E-04
C-14	1.2871E-04	350.58	701.16	0.00E+00	4.51E-02	9.02E-02
Cl-36	2.8120E-06	350.58	701.16	0.00E+00	9.86E-04	1.97E-03
Cm-243	1.7940E-07	350.58	701.16	0.00E+00	6.29E-05	1.26E-04
Cm-244	1.6962E-06	350.58	701.16	0.00E+00	5.95E-04	1.19E-03
Co-60	1.2839E+00	350.58	701.16	0.00E+00	4.50E+02	9.00E+02
Cs-134	9.0541E-02	350.58	701.16	0.00E+00	3.17E+01	6.35E+01
Cs-135	3.2195E-05	350.58	701.16	0.00E+00	1.13E-02	2.26E-02
Cs-137	2.7564E+00	350.58	701.16	0.00E+00	9.66E+02	1.93E+03
Eu-154	1.5368E-02	350.58	701.16	0.00E+00	5.39E+00	1.08E+01
Eu-155	2.9293E-02	350.58	701.16	0.00E+00	1.03E+01	2.05E+01
Fe-55	7.7158E-01	350.58	701.16	0.00E+00	2.70E+02	5.41E+02
H-3	1.1111E-02	350.58	701.16	0.00E+00	3.90E+00	7.79E+00
I-129	7.3684E-07	350.58	701.16	0.00E+00	2.58E-04	5.17E-04
Kr-85	2.5263E-01	350.58	701.16	0.00E+00	8.86E+01	1.77E+02
Np-237	1.2427E-06	350.58	701.16	0.00E+00	4.36E-04	8.71E-04
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.133E+14
0.0250	2.494E+13
0.0375	2.124E+13
0.0575	2.180E+13
0.0850	1.350E+13
0.1250	9.806E+12
0.2250	1.145E+13
0.3750	5.813E+12
0.5750	7.728E+13
0.8500	3.317E+12
1.2500	6.736E+13
1.7500	4.490E+10
2.2500	7.237E+10
2.7500	5.743E+08
3.5000	6.684E+07
5.0000	3.787E+02
7.0000	4.288E+01
11.0000	4.886E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.04E+01	4.08E+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 %:	19.48980681	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	350.58	54.99	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		701.16	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MSU
SNF ID #: 873
Fuel Units & Descr: 48 - ELEMENT
Heavy Metal Mass: BOL=9.36kg; EOL=8.29kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	1,021.81	2,043.62	0.00E+00	6.85E-06	1.37E-05
Am-241	3.9068E-03	1,021.81	2,043.62	0.00E+00	3.99E+00	7.98E+00
Am-242m	1.2325E-06	1,021.81	2,043.62	0.00E+00	1.26E-03	2.52E-03
Am-243	1.4732E-07	1,021.81	2,043.62	0.00E+00	1.51E-04	3.01E-04
C-14	1.2824E-04	1,021.81	2,043.62	0.00E+00	1.31E-01	2.62E-01
Cl-36	2.8120E-06	1,021.81	2,043.62	0.00E+00	2.87E-03	5.75E-03
Cm-243	8.6556E-08	1,021.81	2,043.62	0.00E+00	8.84E-05	1.77E-04
Cm-244	5.3835E-07	1,021.81	2,043.62	0.00E+00	5.50E-04	1.10E-03
Co-60	2.4887E-02	1,021.81	2,043.62	0.00E+00	2.54E+01	5.09E+01
Cs-134	3.8030E-06	1,021.81	2,043.62	0.00E+00	3.89E-03	7.77E-03
Cs-135	3.2195E-05	1,021.81	2,043.62	0.00E+00	3.29E-02	6.58E-02
Cs-137	1.3788E+00	1,021.81	2,043.62	0.00E+00	1.41E+03	2.82E+03
Eu-154	1.3711E-03	1,021.81	2,043.62	0.00E+00	1.40E+00	2.80E+00
Eu-155	4.4361E-04	1,021.81	2,043.62	0.00E+00	4.53E-01	9.07E-01
Fe-55	2.6075E-04	1,021.81	2,043.62	0.00E+00	2.66E-01	5.33E-01
H-3	2.0647E-03	1,021.81	2,043.62	0.00E+00	2.11E+00	4.22E+00
I-129	7.3684E-07	1,021.81	2,043.62	0.00E+00	7.53E-04	1.51E-03
Kr-85	3.6346E-02	1,021.81	2,043.62	0.00E+00	3.71E+01	7.43E+01
Np-237	1.2844E-06	1,021.81	2,043.62	0.00E+00	1.31E-03	2.62E-03
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
Tl-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	-2.6194E-06	1,021.81	0.00	4.05E-03	1.37E-03	4.05E-03
U-236	1.2695E-05	1,021.81	2,043.62	0.00E+00	1.30E-02	2.59E-02
U-238	-3.6331E-08	1,021.81	0.00	2.52E-03	2.48E-03	2.52E-03
Y-90	1.2765E+00	1,021.81	2,043.62	0.00E+00	1.30E+03	2.61E+03
Other Radionuclides					1.41E+03	2.81E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.426E+14
0.0250	2.964E+13
0.0375	2.575E+13
0.0575	2.774E+13
0.0850	1.869E+13
0.1250	1.086E+13
0.2250	1.438E+13
0.3750	6.271E+12
0.5750	1.049E+14
0.8500	1.073E+12
1.2500	4.165E+12
1.7500	2.786E+10
2.2500	2.283E+07
2.7500	1.049E+06
3.5000	2.521E+03
5.0000	1.061E+03
7.0000	1.197E+02
11.0000	1.361E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.64E+01	3.29E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,021.81	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,043.62	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 PENN. STATE UNIV.
SNF ID #: 237
Fuel Units & Descr: 203 - ELEMENT
Heavy Metal Mass: BOL=39.991kg; EOL=37.575kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	2,306.04	4,612.09	0.00E+00	1.96E-06	3.93E-06
Am-241	1.8331E-03	2,306.04	4,612.09	0.00E+00	4.23E+00	8.45E+00
Am-242m	1.4129E-06	2,306.04	4,612.09	0.00E+00	3.26E-03	6.52E-03
Am-243	1.4774E-07	2,306.04	4,612.09	0.00E+00	3.41E-04	6.81E-04
C-14	1.2871E-04	2,306.04	4,612.09	0.00E+00	2.97E-01	5.94E-01
Cl-36	2.8120E-06	2,306.04	4,612.09	0.00E+00	6.48E-03	1.30E-02
Cm-243	1.7940E-07	2,306.04	4,612.09	0.00E+00	4.14E-04	8.27E-04
Cm-244	1.6962E-06	2,306.04	4,612.09	0.00E+00	3.91E-03	7.82E-03
Co-60	1.2839E+00	2,306.04	4,612.09	0.00E+00	2.96E+03	5.92E+03
Cs-134	9.0541E-02	2,306.04	4,612.09	0.00E+00	2.09E+02	4.18E+02
Cs-135	3.2195E-05	2,306.04	4,612.09	0.00E+00	7.42E-02	1.48E-01
Cs-137	2.7564E+00	2,306.04	4,612.09	0.00E+00	6.36E+03	1.27E+04
Eu-154	1.5368E-02	2,306.04	4,612.09	0.00E+00	3.54E+01	7.09E+01
Eu-155	2.9293E-02	2,306.04	4,612.09	0.00E+00	6.76E+01	1.35E+02
Fe-55	7.7158E-01	2,306.04	4,612.09	0.00E+00	1.78E+03	3.56E+03
H-3	1.1111E-02	2,306.04	4,612.09	0.00E+00	2.56E+01	5.12E+01
I-129	7.3684E-07	2,306.04	4,612.09	0.00E+00	1.70E-03	3.40E-03
Kr-85	2.5263E-01	2,306.04	4,612.09	0.00E+00	5.83E+02	1.17E+03
Np-237	1.2427E-06	2,306.04	4,612.09	0.00E+00	2.87E-03	5.73E-03
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
Tl-208	1.6947E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.454E+14
0.0250	1.640E+14
0.0375	1.397E+14
0.0575	1.434E+14
0.0850	8.882E+13
0.1250	6.450E+13
0.2250	7.535E+13
0.3750	3.824E+13
0.5750	5.083E+14
0.8500	2.182E+13
1.2500	4.431E+14
1.7500	2.953E+11
2.2500	4.760E+11
2.7500	3.778E+09
3.5000	4.396E+08
5.0000	2.442E+03
7.0000	2.764E+02
11.0000	3.149E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.34E+02	2.68E+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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,306.04	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,612.09	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 REED COLLEGE
SNF ID #: 775
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1.719kg; EOL=1.706kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2026
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.12

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	12.89	25.77	0.00E+00	1.10E-08	2.20E-08
Am-241	1.8331E-03	12.89	25.77	0.00E+00	2.36E-02	4.72E-02
Am-242m	1.4129E-06	12.89	25.77	0.00E+00	1.82E-05	3.64E-05
Am-243	1.4774E-07	12.89	25.77	0.00E+00	1.90E-06	3.81E-06
C-14	1.2871E-04	12.89	25.77	0.00E+00	1.66E-03	3.32E-03
Cl-36	2.8120E-06	12.89	25.77	0.00E+00	3.62E-05	7.25E-05
Cm-243	1.7940E-07	12.89	25.77	0.00E+00	2.31E-06	4.62E-06
Cm-244	1.6962E-06	12.89	25.77	0.00E+00	2.19E-05	4.37E-05
Co-60	1.2839E+00	12.89	25.77	0.00E+00	1.65E+01	3.31E+01
Cs-134	9.0541E-02	12.89	25.77	0.00E+00	1.17E+00	2.33E+00
Cs-135	3.2195E-05	12.89	25.77	0.00E+00	4.15E-04	8.30E-04
Cs-137	2.7564E+00	12.89	25.77	0.00E+00	3.55E+01	7.10E+01
Eu-154	1.5368E-02	12.89	25.77	0.00E+00	1.98E-01	3.96E-01
Eu-155	2.9293E-02	12.89	25.77	0.00E+00	3.78E-01	7.55E-01
Fe-55	7.7158E-01	12.89	25.77	0.00E+00	9.94E+00	1.99E+01
H-3	1.1111E-02	12.89	25.77	0.00E+00	1.43E-01	2.86E-01
I-129	7.3684E-07	12.89	25.77	0.00E+00	9.50E-06	1.90E-05
Kr-85	2.5263E-01	12.89	25.77	0.00E+00	3.26E+00	6.51E+00
Np-237	1.2427E-06	12.89	25.77	0.00E+00	1.60E-05	3.20E-05
Pa-231	3.8511E-09	12.89	25.77	0.00E+00	4.96E-08	9.93E-08
Pb-210	7.3880E-15	12.89	25.77	0.00E+00	9.52E-14	1.90E-13
Pm-147	2.1023E+00	12.89	25.77	0.00E+00	2.71E+01	5.42E+01
Pu-238	1.0383E-03	12.89	25.77	0.00E+00	1.34E-02	2.68E-02
Pu-239	5.5293E-03	12.89	25.77	0.00E+00	7.13E-02	1.43E-01
Pu-240	2.1278E-03	12.89	25.77	0.00E+00	2.74E-02	5.48E-02
Pu-241	1.0195E-01	12.89	25.77	0.00E+00	1.31E+00	2.63E+00
Pu-242	2.3128E-07	12.89	25.77	0.00E+00	2.98E-06	5.96E-06
Ra-226	5.2782E-14	12.89	25.77	0.00E+00	6.80E-13	1.36E-12
Ra-228	1.9338E-10	12.89	25.77	0.00E+00	2.49E-09	4.98E-09
Ru-106	9.1684E-02	12.89	25.77	0.00E+00	1.18E+00	2.36E+00
Se-79	1.3018E-05	12.89	25.77	0.00E+00	1.68E-04	3.36E-04
Sn-126	1.2167E-05	12.89	25.77	0.00E+00	1.57E-04	3.14E-04
Sr-90	2.6045E+00	12.89	25.77	0.00E+00	3.36E+01	6.71E+01
Tc-99	4.4241E-04	12.89	25.77	0.00E+00	5.70E-03	1.14E-02
Th-229	1.3713E-10	12.89	25.77	0.00E+00	1.77E-09	3.53E-09
Th-230	1.8090E-11	12.89	25.77	0.00E+00	2.33E-10	4.66E-10
Th-232	2.5278E-10	12.89	25.77	0.00E+00	3.26E-09	6.52E-09
Tl-208	1.6947E-08	12.89	25.77	0.00E+00	2.18E-07	4.37E-07
U-232	4.8737E-08	12.89	25.77	0.00E+00	6.28E-07	1.26E-06
U-233	1.2203E-07	12.89	25.77	0.00E+00	1.57E-06	3.15E-06
U-234	1.5925E-07	12.89	25.77	0.00E+00	2.05E-06	4.10E-06
U-235	-2.6194E-06	12.89	0.00	7.49E-04	7.15E-04	7.49E-04
U-236	1.2693E-05	12.89	25.77	0.00E+00	1.64E-04	3.27E-04
U-238	-3.6331E-08	12.89	0.00	4.61E-04	4.61E-04	4.61E-04
Y-90	2.6060E+00	12.89	25.77	0.00E+00	3.36E+01	6.72E+01
Other Radionuclides					4.65E+01	9.29E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.166E+12
0.0250	9.166E+11
0.0375	7.806E+11
0.0575	8.012E+11
0.0850	4.964E+11
0.1250	3.605E+11
0.2250	4.211E+11
0.3750	2.137E+11
0.5750	2.841E+12
0.8500	1.219E+11
1.2500	2.476E+12
1.7500	1.650E+09
2.2500	2.660E+09
2.7500	2.111E+07
3.5000	2.457E+06
5.0000	1.457E+01
7.0000	1.651E+00
11.0000	1.882E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.50E-01	1.50E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.15706806	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (very close to 20%)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12.89
Bounding:		25.77

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.44	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SLOVENIA
SNF ID #: 488
Fuel Units & Descr: 122 - ELEMENT
Heavy Metal Mass: BOL=23.4kg; EOL=22.594kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x19" 1.10

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	768.65	1,537.30	0.00E+00	2.03E-06	4.06E-06
Am-241	3.1429E-03	768.65	1,537.30	0.00E+00	2.42E+00	4.83E+00
Am-242m	1.3195E-06	768.65	1,537.30	0.00E+00	1.01E-03	2.03E-03
Am-243	1.4753E-07	768.65	1,537.30	0.00E+00	1.13E-04	2.27E-04
C-14	1.2847E-04	768.65	1,537.30	0.00E+00	9.87E-02	1.97E-01
Cl-36	2.8120E-06	768.65	1,537.30	0.00E+00	2.16E-03	4.32E-03
Cm-243	1.2465E-07	768.65	1,537.30	0.00E+00	9.58E-05	1.92E-04
Cm-244	9.5564E-07	768.65	1,537.30	0.00E+00	7.35E-04	1.47E-03
Co-60	1.7880E-01	768.65	1,537.30	0.00E+00	1.37E+02	2.75E+02
Cs-134	5.8692E-04	768.65	1,537.30	0.00E+00	4.51E-01	9.02E-01
Cs-135	3.2195E-05	768.65	1,537.30	0.00E+00	2.47E-02	4.95E-02
Cs-137	1.9489E+00	768.65	1,537.30	0.00E+00	1.50E+03	3.00E+03
Eu-154	4.5895E-03	768.65	1,537.30	0.00E+00	3.53E+00	7.06E+00
Eu-155	3.6045E-03	768.65	1,537.30	0.00E+00	2.77E+00	5.54E+00
Fe-55	1.4185E-02	768.65	1,537.30	0.00E+00	1.09E+01	2.18E+01
H-3	4.7895E-03	768.65	1,537.30	0.00E+00	3.68E+00	7.36E+00
I-129	7.3684E-07	768.65	1,537.30	0.00E+00	5.66E-04	1.13E-03
Kr-85	9.5820E-02	768.65	1,537.30	0.00E+00	7.37E+01	1.47E+02
Np-237	1.2552E-06	768.65	1,537.30	0.00E+00	9.65E-04	1.93E-03
Pa-231	7.0406E-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	2.3128E-07	768.65	1,537.30	0.00E+00	1.78E-04	3.56E-04
Ra-226	2.4526E-13	768.65	1,537.30	0.00E+00	1.89E-10	3.77E-10
Ra-228	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
Se-79	1.3015E-05	768.65	1,537.30	0.00E+00	1.00E-02	2.00E-02
Sn-126	1.2165E-05	768.65	1,537.30	0.00E+00	9.35E-03	1.87E-02
Sr-90	1.8226E+00	768.65	1,537.30	0.00E+00	1.40E+03	2.80E+03
Tc-99	4.4241E-04	768.65	1,537.30	0.00E+00	3.40E-01	6.80E-01
Th-229	3.0962E-10	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
Tl-208	1.5820E-08	768.65	1,537.30	0.00E+00	1.22E-05	2.43E-05
U-232	4.2647E-08	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	1.9955E-07	768.65	1,537.30	0.00E+00	1.53E-04	3.07E-04
U-235	-2.6194E-06	768.65	0.00	1.01E-02	8.04E-03	1.01E-02
U-236	1.2693E-05	768.65	1,537.30	0.00E+00	9.76E-03	1.95E-02
U-238	-3.6331E-08	768.65	0.00	6.30E-03	6.27E-03	6.30E-03
Y-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.541E+14
0.0250	3.207E+13
0.0375	2.778E+13
0.0575	2.989E+13
0.0850	1.804E+13
0.1250	1.179E+13
0.2250	1.549E+13
0.3750	6.790E+12
0.5750	1.117E+14
0.8500	1.259E+12
1.2500	2.086E+13
1.7500	3.234E+10
2.2500	1.114E+08
2.7500	1.227E+06
3.5000	6.820E+03
5.0000	8.132E+02
7.0000	9.187E+01
11.0000	1.045E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.92E+01	3.85E+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 %:	19.8857762	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		768.65	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,537.30	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.96	
Bounding:	1.93	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SLOVENIA
SNF ID #: 1079
Fuel Units & Descr: 149 - ELEMENT
Heavy Metal Mass: BOL=28.578kg; EOL=27.446kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 20 years

Estimated Canister usage: 16"x10' 1.34

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	1,081.00	2,161.99	0.00E+00	2.86E-06	5.72E-06
Am-241	3.1429E-03	1,081.00	2,161.99	0.00E+00	3.40E+00	6.79E+00
Am-242m	1.3195E-06	1,081.00	2,161.99	0.00E+00	1.43E-03	2.85E-03
Am-243	1.4753E-07	1,081.00	2,161.99	0.00E+00	1.59E-04	3.19E-04
C-14	1.2847E-04	1,081.00	2,161.99	0.00E+00	1.39E-01	2.78E-01
Cl-36	2.8120E-06	1,081.00	2,161.99	0.00E+00	3.04E-03	6.08E-03
Cm-243	1.2465E-07	1,081.00	2,161.99	0.00E+00	1.35E-04	2.69E-04
Cm-244	9.5564E-07	1,081.00	2,161.99	0.00E+00	1.03E-03	2.07E-03
Co-60	1.7880E-01	1,081.00	2,161.99	0.00E+00	1.93E+02	3.87E+02
Cs-134	5.8692E-04	1,081.00	2,161.99	0.00E+00	6.34E-01	1.27E+00
Cs-135	3.2195E-05	1,081.00	2,161.99	0.00E+00	3.48E-02	6.96E-02
Cs-137	1.9489E+00	1,081.00	2,161.99	0.00E+00	2.11E+03	4.21E+03
Eu-154	4.5895E-03	1,081.00	2,161.99	0.00E+00	4.96E+00	9.92E+00
Eu-155	3.6045E-03	1,081.00	2,161.99	0.00E+00	3.90E+00	7.79E+00
Fe-55	1.4185E-02	1,081.00	2,161.99	0.00E+00	1.53E+01	3.07E+01
H-3	4.7895E-03	1,081.00	2,161.99	0.00E+00	5.18E+00	1.04E+01
I-129	7.3684E-07	1,081.00	2,161.99	0.00E+00	7.97E-04	1.59E-03
Kr-85	9.5820E-02	1,081.00	2,161.99	0.00E+00	1.04E+02	2.07E+02
Np-237	1.2552E-06	1,081.00	2,161.99	0.00E+00	1.36E-03	2.71E-03
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	5.98E+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
Tl-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
U-233	1.2211E-07	1,081.00	2,161.99	0.00E+00	1.32E-04	2.64E-04
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
U-238	-3.6331E-08	1,081.00	0.00	7.70E-03	7.66E-03	7.70E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.167E+14
0.0250	4.510E+13
0.0375	3.907E+13
0.0575	4.203E+13
0.0850	2.537E+13
0.1250	1.658E+13
0.2250	2.179E+13
0.3750	9.550E+12
0.5750	1.571E+14
0.8500	1.770E+12
1.2500	2.934E+13
1.7500	4.548E+10
2.2500	1.567E+08
2.7500	1.726E+06
3.5000	9.585E+03
5.0000	1.141E+03
7.0000	1.289E+02
11.0000	1.466E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.70E+01	5.41E+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 %:	19.886	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,081.00	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,161.99	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.11	
Bounding:	2.22	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SO. KOREA
SNF ID #: 484
Fuel Units & Decor: 104 - ELEMENT
Heavy Metal Mass: BOL=19.76kg; EOL=19.261kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%. U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	476.54	953.08	0.00E+00	1.98E-06	3.95E-06
Am-241	3.5850E-03	476.54	953.08	0.00E+00	1.71E+00	3.42E+00
Am-242m	1.2899E-06	476.54	953.08	0.00E+00	6.15E-04	1.23E-03
Am-243	1.4747E-07	476.54	953.08	0.00E+00	7.03E-05	1.41E-04
C-14	1.2839E-04	476.54	953.08	0.00E+00	6.12E-02	1.22E-01
Cl-36	2.8120E-06	476.54	953.08	0.00E+00	1.34E-03	2.68E-03
Cm-243	1.1038E-07	476.54	953.08	0.00E+00	5.26E-05	1.05E-04
Cm-244	7.8917E-07	476.54	953.08	0.00E+00	3.76E-04	7.52E-04
Co-60	9.2647E-02	476.54	953.08	0.00E+00	4.41E+01	8.83E+01
Cs-134	1.0940E-04	476.54	953.08	0.00E+00	5.21E-02	1.04E-01
Cs-135	3.2195E-05	476.54	953.08	0.00E+00	1.53E-02	3.07E-02
Cs-137	1.7368E+00	476.54	953.08	0.00E+00	8.28E+02	1.66E+03
Eu-154	3.0677E-03	476.54	953.08	0.00E+00	1.46E+00	2.92E+00
Eu-155	1.7925E-03	476.54	953.08	0.00E+00	8.54E-01	1.71E+00
Fe-55	3.7444E-03	476.54	953.08	0.00E+00	1.78E+00	3.57E+00
H-3	3.6180E-03	476.54	953.08	0.00E+00	1.72E+00	3.45E+00
I-129	7.3684E-07	476.54	953.08	0.00E+00	3.51E-04	7.02E-04
Kr-85	6.9368E-02	476.54	953.08	0.00E+00	3.31E+01	6.61E+01
Np-237	1.2662E-06	476.54	953.08	0.00E+00	6.03E-04	1.21E-03
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-06	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
Tl-208	1.5098E-06	476.54	953.08	0.00E+00	7.19E-06	1.44E-05
U-232	4.0662E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.460E+13
0.0250	1.759E+13
0.0375	1.526E+13
0.0575	1.643E+13
0.0850	9.905E+12
0.1250	6.462E+12
0.2250	8.519E+12
0.3750	3.720E+12
0.5750	6.167E+13
0.8500	6.621E+11
1.2500	6.799E+12
1.7500	1.723E+10
2.2500	3.634E+07
2.7500	6.145E+05
3.5000	1.300E+03
5.0000	5.066E+02
7.0000	5.720E+01
11.0000	6.506E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.01E+01	2.02E+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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		476.54	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		953.08	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 TEXAS A&M
SNF ID #: 258
Fuel Units & Descr: 85 - ELEMENT
Heavy Metal Mass: BOL=14.875kg; EOL=14.34kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	511.19	1,022.38	0.00E+00	4.35E-07	8.71E-07
Am-241	1.8331E-03	511.19	1,022.38	0.00E+00	9.37E-01	1.87E+00
Am-242m	1.4129E-06	511.19	1,022.38	0.00E+00	7.22E-04	1.44E-03
Am-243	1.4774E-07	511.19	1,022.38	0.00E+00	7.55E-05	1.51E-04
C-14	1.2871E-04	511.19	1,022.38	0.00E+00	6.58E-02	1.32E-01
Cl-36	2.8120E-06	511.19	1,022.38	0.00E+00	1.44E-03	2.87E-03
Cm-243	1.7940E-07	511.19	1,022.38	0.00E+00	9.17E-05	1.83E-04
Cm-244	1.6962E-06	511.19	1,022.38	0.00E+00	8.67E-04	1.73E-03
Co-60	1.2839E+00	511.19	1,022.38	0.00E+00	6.56E+02	1.31E+03
Cs-134	9.0541E-02	511.19	1,022.38	0.00E+00	4.63E+01	9.26E+01
Cs-135	3.2195E-05	511.19	1,022.38	0.00E+00	1.65E-02	3.29E-02
Cs-137	2.7564E+00	511.19	1,022.38	0.00E+00	1.41E+03	2.82E+03
Eu-154	1.5368E-02	511.19	1,022.38	0.00E+00	7.86E+00	1.57E+01
Eu-155	2.9293E-02	511.19	1,022.38	0.00E+00	1.50E+01	2.99E+01
Fe-55	7.7158E-01	511.19	1,022.38	0.00E+00	3.94E+02	7.89E+02
H-3	1.1111E-02	511.19	1,022.38	0.00E+00	5.68E+00	1.14E+01
I-129	7.3684E-07	511.19	1,022.38	0.00E+00	3.77E-04	7.53E-04
Kr-85	2.5263E-01	511.19	1,022.38	0.00E+00	1.29E+02	2.58E+02
Np-237	1.2427E-06	511.19	1,022.38	0.00E+00	6.35E-04	1.27E-03
Pa-231	3.8511E-09	511.19	1,022.38	0.00E+00	1.97E-06	3.94E-06
Pb-210	7.3880E-15	511.19	1,022.38	0.00E+00	3.78E-12	7.55E-12
Pm-147	2.1023E+00	511.19	1,022.38	0.00E+00	1.07E+03	2.15E+03
Pu-238	1.0383E-03	511.19	1,022.38	0.00E+00	5.31E-01	1.06E+00
Pu-239	5.5293E-03	511.19	1,022.38	0.00E+00	2.83E+00	5.65E+00
Pu-240	2.1278E-03	511.19	1,022.38	0.00E+00	1.09E+00	2.18E+00
Pu-241	1.0195E-01	511.19	1,022.38	0.00E+00	5.21E+01	1.04E+02
Pu-242	2.3128E-07	511.19	1,022.38	0.00E+00	1.18E-04	2.36E-04
Ra-226	5.2782E-14	511.19	1,022.38	0.00E+00	2.70E-11	5.40E-11
Ra-228	1.9338E-10	511.19	1,022.38	0.00E+00	9.89E-08	1.98E-07
Ru-106	9.1684E-02	511.19	1,022.38	0.00E+00	4.69E+01	9.37E+01
Se-79	1.3018E-05	511.19	1,022.38	0.00E+00	6.65E-03	1.33E-02
Sn-126	1.2167E-05	511.19	1,022.38	0.00E+00	6.22E-03	1.24E-02
Sr-90	2.6045E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03
Tc-99	4.4241E-04	511.19	1,022.38	0.00E+00	2.26E-01	4.52E-01
Th-229	1.3713E-10	511.19	1,022.38	0.00E+00	7.01E-08	1.40E-07
Th-230	1.8090E-11	511.19	1,022.38	0.00E+00	9.25E-09	1.85E-08
Th-232	2.5278E-10	511.19	1,022.38	0.00E+00	1.29E-07	2.58E-07
Tl-208	1.6947E-08	511.19	1,022.38	0.00E+00	8.66E-06	1.73E-05
U-232	4.8737E-08	511.19	1,022.38	0.00E+00	2.49E-05	4.98E-05
U-233	1.2203E-07	511.19	1,022.38	0.00E+00	6.24E-05	1.25E-04
U-234	1.5925E-07	511.19	1,022.38	0.00E+00	8.14E-05	1.63E-04
U-235	-2.6194E-06	511.19	0.00	6.43E-03	5.09E-03	6.43E-03
U-236	1.2693E-05	511.19	1,022.38	0.00E+00	6.49E-03	1.30E-02
U-238	-3.6331E-08	511.19	0.00	4.00E-03	3.98E-03	4.00E-03
Y-90	2.6060E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03
Other Radionuclides					1.84E+03	3.69E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.652E+14
0.0250	3.636E+13
0.0375	3.096E+13
0.0575	3.178E+13
0.0850	1.969E+13
0.1250	1.430E+13
0.2250	1.670E+13
0.3750	8.476E+12
0.5750	1.127E+14
0.8500	4.836E+12
1.2500	9.822E+13
1.7500	6.547E+10
2.2500	1.056E+11
2.7500	8.374E+08
3.5000	9.746E+07
5.0000	5.450E+02
7.0000	6.170E+01
11.0000	7.029E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.98E+01	5.95E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.01	
Bounding:	2.02	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 THAILAND
SNF ID #: 489
Fuel Units & Descr: 100 - ELEMENT
Heavy Metal Mass: BOL=19.5kg; EOL=19.3kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.6436E-09	190.92	381.84	0.00E+00	5.05E-07	1.01E-06
Am-241	3.1429E-03	190.92	381.84	0.00E+00	6.00E-01	1.20E+00
Am-242m	1.3195E-06	190.92	381.84	0.00E+00	2.52E-04	5.04E-04
Am-243	1.4753E-07	190.92	381.84	0.00E+00	2.82E-05	5.63E-05
C-14	1.2847E-04	190.92	381.84	0.00E+00	2.45E-02	4.91E-02
Cl-36	2.8120E-06	190.92	381.84	0.00E+00	5.37E-04	1.07E-03
Cm-243	1.2465E-07	190.92	381.84	0.00E+00	2.38E-05	4.76E-05
Cm-244	9.5564E-07	190.92	381.84	0.00E+00	1.82E-04	3.65E-04
Co-60	1.7880E-01	190.92	381.84	0.00E+00	3.41E+01	6.83E+01
Cs-134	5.8692E-04	190.92	381.84	0.00E+00	1.12E-01	2.24E-01
Cs-135	3.2195E-05	190.92	381.84	0.00E+00	6.15E-03	1.23E-02
Cs-137	1.9489E+00	190.92	381.84	0.00E+00	3.72E+02	7.44E+02
Eu-154	4.5895E-03	190.92	381.84	0.00E+00	8.76E-01	1.75E+00
Eu-155	3.6045E-03	190.92	381.84	0.00E+00	6.88E-01	1.38E+00
Fe-55	1.4185E-02	190.92	381.84	0.00E+00	2.71E+00	5.42E+00
H-3	4.7895E-03	190.92	381.84	0.00E+00	9.14E-01	1.83E+00
I-129	7.3684E-07	190.92	381.84	0.00E+00	1.41E-04	2.81E-04
Kr-85	9.5820E-02	190.92	381.84	0.00E+00	1.83E+01	3.66E+01
Np-237	1.2552E-06	190.92	381.84	0.00E+00	2.40E-04	4.79E-04
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	1.76E-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
Tl-208	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
U-234	1.9955E-07	190.92	381.84	0.00E+00	3.81E-05	7.62E-05
U-235	-2.6194E-06	190.92	0.00	8.43E-03	7.93E-03	8.43E-03
U-236	1.2693E-05	190.92	381.84	0.00E+00	2.42E-03	4.85E-03
U-238	-3.6331E-08	190.92	0.00	5.24E-03	5.24E-03	5.24E-03
Y-90	1.8241E+00	190.92	381.84	0.00E+00	3.48E+02	6.97E+02
Other Radionuclides					3.68E+02	7.35E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.827E+13
0.0250	7.965E+12
0.0375	6.901E+12
0.0575	7.424E+12
0.0850	4.482E+12
0.1250	2.929E+12
0.2250	3.848E+12
0.3750	1.687E+12
0.5750	2.774E+13
0.8500	3.127E+11
1.2500	5.181E+12
1.7500	8.033E+09
2.2500	2.767E+07
2.7500	3.049E+05
3.5000	1.714E+03
5.0000	2.105E+02
7.0000	2.380E+01
11.0000	2.709E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.78E+00	9.55E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		190.92	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		381.84	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 TURKEY
SNF ID #: 490
Fuel Units & Descr: 79 - ELEMENT
Heavy Metal Mass: BOL=15.405kg; EOL=15.247kg
ROD Storage Site: INEEL

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

Estimated Canister usage:
18"x10'
0.71

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	150.83	301.66	0.00E+00	3.99E-07	7.97E-07
Am-241	3.1429E-03	150.83	301.66	0.00E+00	4.74E-01	9.48E-01
Am-242m	1.3195E-06	150.83	301.66	0.00E+00	1.99E-04	3.98E-04
Am-243	1.4753E-07	150.83	301.66	0.00E+00	2.23E-05	4.45E-05
C-14	1.2847E-04	150.83	301.66	0.00E+00	1.94E-02	3.88E-02
Cl-36	2.8120E-06	150.83	301.66	0.00E+00	4.24E-04	8.48E-04
Cm-243	1.2465E-07	150.83	301.66	0.00E+00	1.88E-05	3.76E-05
Cm-244	9.5564E-07	150.83	301.66	0.00E+00	1.44E-04	2.88E-04
Co-60	1.7880E-01	150.83	301.66	0.00E+00	2.70E+01	5.39E+01
Cs-134	5.8692E-04	150.83	301.66	0.00E+00	8.85E-02	1.77E-01
Cs-135	3.2195E-05	150.83	301.66	0.00E+00	4.86E-03	9.71E-03
Cs-137	1.9489E+00	150.83	301.66	0.00E+00	2.94E+02	5.88E+02
Eu-154	4.5895E-03	150.83	301.66	0.00E+00	6.92E-01	1.38E+00
Eu-155	3.6045E-03	150.83	301.66	0.00E+00	5.44E-01	1.09E+00
Fe-55	1.4185E-02	150.83	301.66	0.00E+00	2.14E+00	4.28E+00
H-3	4.7895E-03	150.83	301.66	0.00E+00	7.22E-01	1.44E+00
I-129	7.3684E-07	150.83	301.66	0.00E+00	1.11E-04	2.22E-04
Kr-85	9.5820E-02	150.83	301.66	0.00E+00	1.45E+01	2.89E+01
Np-237	1.2552E-06	150.83	301.66	0.00E+00	1.89E-04	3.79E-04
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	4.9549E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.023E+13
0.0250	6.293E+12
0.0375	5.451E+12
0.0575	5.865E+12
0.0850	3.540E+12
0.1250	2.314E+12
0.2250	3.040E+12
0.3750	1.332E+12
0.5750	2.191E+13
0.8500	2.470E+11
1.2500	4.093E+12
1.7500	6.346E+09
2.2500	2.186E+07
2.7500	2.408E+05
3.5000	1.354E+03
5.0000	1.863E+02
7.0000	1.880E+01
11.0000	2.140E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.77E+00	7.85E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		150.83	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		301.66	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF AZ
SNF ID #: 59
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16.38kg; EOL=15.75kg
RCD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	601.40	1,202.81	0.00E+00	5.12E-07	1.02E-06
Am-241	1.8331E-03	601.40	1,202.81	0.00E+00	1.10E+00	2.20E+00
Am-242m	1.4129E-06	601.40	1,202.81	0.00E+00	8.50E-04	1.70E-03
Am-243	1.4774E-07	601.40	1,202.81	0.00E+00	8.89E-05	1.78E-04
C-14	1.2871E-04	601.40	1,202.81	0.00E+00	7.74E-02	1.55E-01
Cl-36	2.8120E-06	601.40	1,202.81	0.00E+00	1.69E-03	3.38E-03
Cm-243	1.7940E-07	601.40	1,202.81	0.00E+00	1.08E-04	2.16E-04
Cm-244	1.6962E-06	601.40	1,202.81	0.00E+00	1.02E-03	2.04E-03
Co-60	1.2839E+00	601.40	1,202.81	0.00E+00	7.72E+02	1.54E+03
Cs-134	9.0541E-02	601.40	1,202.81	0.00E+00	5.45E+01	1.09E+02
Cs-135	3.2195E-05	601.40	1,202.81	0.00E+00	1.94E-02	3.87E-02
Cs-137	2.7564E+00	601.40	1,202.81	0.00E+00	1.66E+03	3.32E+03
Eu-154	1.5368E-02	601.40	1,202.81	0.00E+00	9.24E+00	1.85E+01
Eu-155	2.9293E-02	601.40	1,202.81	0.00E+00	1.76E+01	3.52E+01
Fe-55	7.7158E-01	601.40	1,202.81	0.00E+00	4.64E+02	9.28E+02
H-3	1.1111E-02	601.40	1,202.81	0.00E+00	6.68E+00	1.34E+01
I-129	7.3684E-07	601.40	1,202.81	0.00E+00	4.43E-04	8.86E-04
Kr-85	2.5263E-01	601.40	1,202.81	0.00E+00	1.52E+02	3.04E+02
Np-237	1.2427E-06	601.40	1,202.81	0.00E+00	7.47E-04	1.49E-03
Pa-231	3.8511E-09	601.40	1,202.81	0.00E+00	2.32E-06	4.63E-06
Pb-210	7.3880E-15	601.40	1,202.81	0.00E+00	4.44E-12	8.89E-12
Pm-147	2.1023E+00	601.40	1,202.81	0.00E+00	1.26E+03	2.53E+03
Pu-238	1.0383E-03	601.40	1,202.81	0.00E+00	6.24E-01	1.25E+00
Pu-239	5.5293E-03	601.40	1,202.81	0.00E+00	3.33E+00	6.65E+00
Pu-240	2.1278E-03	601.40	1,202.81	0.00E+00	1.28E+00	2.56E+00
Pu-241	1.0195E-01	601.40	1,202.81	0.00E+00	6.13E+01	1.23E+02
Pu-242	2.3128E-07	601.40	1,202.81	0.00E+00	1.39E-04	2.78E-04
Ra-226	5.2782E-14	601.40	1,202.81	0.00E+00	3.17E-11	6.35E-11
Ra-228	1.9338E-10	601.40	1,202.81	0.00E+00	1.16E-07	2.33E-07
Ru-106	9.1684E-02	601.40	1,202.81	0.00E+00	5.51E+01	1.10E+02
Se-79	1.3018E-05	601.40	1,202.81	0.00E+00	7.83E-03	1.57E-02
Sn-126	1.2167E-05	601.40	1,202.81	0.00E+00	7.32E-03	1.46E-02
Sr-90	2.6045E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03
Tc-99	4.4241E-04	601.40	1,202.81	0.00E+00	2.66E-01	5.32E-01
Th-229	1.3713E-10	601.40	1,202.81	0.00E+00	8.25E-08	1.65E-07
Th-230	1.8090E-11	601.40	1,202.81	0.00E+00	1.09E-08	2.18E-08
Th-232	2.5278E-10	601.40	1,202.81	0.00E+00	1.52E-07	3.04E-07
Tl-208	1.6947E-08	601.40	1,202.81	0.00E+00	1.02E-05	2.04E-05
U-232	4.8737E-08	601.40	1,202.81	0.00E+00	2.93E-05	5.86E-05
U-233	1.2203E-07	601.40	1,202.81	0.00E+00	7.34E-05	1.47E-04
U-234	1.5925E-07	601.40	1,202.81	0.00E+00	9.58E-05	1.92E-04
U-235	-2.6194E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+14
0.0250	4.278E+13
0.0375	3.643E+13
0.0575	3.739E+13
0.0850	2.316E+13
0.1250	1.682E+13
0.2250	1.965E+13
0.3750	9.972E+12
0.5750	1.326E+14
0.8500	5.690E+12
1.2500	1.155E+14
1.7500	7.702E+10
2.2500	1.241E+11
2.7500	9.852E+08
3.5000	1.147E+08
5.0000	6.405E+02
7.0000	7.251E+01
11.0000	8.260E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+01	7.00E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		601.40	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,202.81	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF AZ
SNF ID #: 975
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=1.497kg; EOL=1.497kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	28.58	57.15	0.00E+00	2.43E-08	4.87E-08
Am-241	1.8331E-03	28.58	57.15	0.00E+00	5.24E-02	1.05E-01
Am-242m	1.4129E-06	28.58	57.15	0.00E+00	4.04E-05	8.08E-05
Am-243	1.4774E-07	28.58	57.15	0.00E+00	4.22E-06	8.44E-06
C-14	1.2871E-04	28.58	57.15	0.00E+00	3.68E-03	7.36E-03
Cl-36	2.8120E-06	28.58	57.15	0.00E+00	8.04E-05	1.61E-04
Cm-243	1.7940E-07	28.58	57.15	0.00E+00	5.13E-06	1.03E-05
Cm-244	1.6962E-06	28.58	57.15	0.00E+00	4.85E-05	9.69E-05
Co-60	1.2839E+00	28.58	57.15	0.00E+00	3.67E+01	7.34E+01
Cs-134	9.0541E-02	28.58	57.15	0.00E+00	2.59E+00	5.17E+00
Cs-135	3.2195E-05	28.58	57.15	0.00E+00	9.20E-04	1.84E-03
Cs-137	2.7564E+00	28.58	57.15	0.00E+00	7.88E+01	1.58E+02
Eu-154	1.5368E-02	28.58	57.15	0.00E+00	4.39E-01	8.78E-01
Eu-155	2.9293E-02	28.58	57.15	0.00E+00	8.37E-01	1.67E+00
Fe-55	7.7158E-01	28.58	57.15	0.00E+00	2.20E+01	4.41E+01
H-3	1.1111E-02	28.58	57.15	0.00E+00	3.18E-01	6.35E-01
I-129	7.3684E-07	28.58	57.15	0.00E+00	2.11E-05	4.21E-05
Kr-85	2.5263E-01	28.58	57.15	0.00E+00	7.22E+00	1.44E+01
Np-237	1.2427E-06	28.58	57.15	0.00E+00	3.55E-05	7.10E-05
Pa-231	3.8511E-09	28.58	57.15	0.00E+00	1.10E-07	2.20E-07
Pb-210	7.3880E-15	28.58	57.15	0.00E+00	2.11E-13	4.22E-13
Pm-147	2.1023E+00	28.58	57.15	0.00E+00	6.01E+01	1.20E+02
Pu-238	1.0383E-03	28.58	57.15	0.00E+00	2.97E-02	5.93E-02
Pu-239	5.5293E-03	28.58	57.15	0.00E+00	1.58E-01	3.16E-01
Pu-240	2.1278E-03	28.58	57.15	0.00E+00	6.08E-02	1.22E-01
Pu-241	1.0195E-01	28.58	57.15	0.00E+00	2.91E+00	5.83E+00
Pu-242	2.3128E-07	28.58	57.15	0.00E+00	6.61E-06	1.32E-05
Ra-226	5.2782E-14	28.58	57.15	0.00E+00	1.51E-12	3.02E-12
Ra-228	1.9338E-10	28.58	57.15	0.00E+00	5.53E-09	1.11E-08
Ru-106	9.1684E-02	28.58	57.15	0.00E+00	2.62E+00	5.24E+00
Se-79	1.3018E-05	28.58	57.15	0.00E+00	3.72E-04	7.44E-04
Sn-126	1.2167E-05	28.58	57.15	0.00E+00	3.48E-04	6.95E-04
Sr-90	2.6045E+00	28.58	57.15	0.00E+00	7.44E+01	1.49E+02
Tc-99	4.4241E-04	28.58	57.15	0.00E+00	1.26E-02	2.53E-02
Th-229	1.3713E-10	28.58	57.15	0.00E+00	3.92E-09	7.84E-09
Th-230	1.8090E-11	28.58	57.15	0.00E+00	5.17E-10	1.03E-09
Th-232	2.5278E-10	28.58	57.15	0.00E+00	7.22E-09	1.44E-08
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.238E+12
0.0250	2.033E+12
0.0375	1.731E+12
0.0575	1.777E+12
0.0850	1.101E+12
0.1250	7.993E+11
0.2250	9.337E+11
0.3750	4.738E+11
0.5750	6.299E+12
0.8500	2.704E+11
1.2500	5.491E+12
1.7500	3.660E+09
2.2500	5.899E+09
2.7500	4.681E+07
3.5000	5.448E+06
5.0000	3.090E+01
7.0000	3.499E+00
11.0000	3.967E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E+00	3.33E+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 %:	18.3974673	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		28.58	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding:		57.15	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF IL
SNF ID #: 449
Fuel Units & Descr: 139 - ELEMENT
Heavy Metal Mass: BOL=27.8kg; EOL=26.41kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	1,326.90	2,653.81	0.00E+00	1.13E-06	2.26E-06
Am-241	1.8331E-03	1,326.90	2,653.81	0.00E+00	2.43E+00	4.86E+00
Am-242m	1.4129E-06	1,326.90	2,653.81	0.00E+00	1.87E-03	3.75E-03
Am-243	1.4774E-07	1,326.90	2,653.81	0.00E+00	1.96E-04	3.92E-04
C-14	1.2871E-04	1,326.90	2,653.81	0.00E+00	1.71E-01	3.42E-01
Cl-36	2.8120E-06	1,326.90	2,653.81	0.00E+00	3.73E-03	7.46E-03
Cm-243	1.7940E-07	1,326.90	2,653.81	0.00E+00	2.38E-04	4.76E-04
Cm-244	1.6962E-06	1,326.90	2,653.81	0.00E+00	2.25E-03	4.50E-03
Co-60	1.2839E+00	1,326.90	2,653.81	0.00E+00	1.70E+03	3.41E+03
Cs-134	9.0541E-02	1,326.90	2,653.81	0.00E+00	1.20E+02	2.40E+02
Cs-135	3.2195E-05	1,326.90	2,653.81	0.00E+00	4.27E-02	8.54E-02
Cs-137	2.7564E+00	1,326.90	2,653.81	0.00E+00	3.66E+03	7.31E+03
Eu-154	1.5368E-02	1,326.90	2,653.81	0.00E+00	2.04E+01	4.08E+01
Eu-155	2.9293E-02	1,326.90	2,653.81	0.00E+00	3.89E+01	7.77E+01
Fe-55	7.7158E-01	1,326.90	2,653.81	0.00E+00	1.02E+03	2.05E+03
H-3	1.1111E-02	1,326.90	2,653.81	0.00E+00	1.47E+01	2.95E+01
I-129	7.3684E-07	1,326.90	2,653.81	0.00E+00	9.78E-04	1.96E-03
Kr-85	2.5263E-01	1,326.90	2,653.81	0.00E+00	3.35E+02	6.70E+02
Np-237	1.2427E-06	1,326.90	2,653.81	0.00E+00	1.65E-03	3.30E-03
Pa-231	3.8511E-09	1,326.90	2,653.81	0.00E+00	5.11E-06	1.02E-05
Pb-210	7.3880E-15	1,326.90	2,653.81	0.00E+00	9.80E-12	1.96E-11
Pm-147	2.1023E+00	1,326.90	2,653.81	0.00E+00	2.79E+03	5.58E+03
Pu-238	1.0383E-03	1,326.90	2,653.81	0.00E+00	1.38E+00	2.76E+00
Pu-239	5.5293E-03	1,326.90	2,653.81	0.00E+00	7.34E+00	1.47E+01
Pu-240	2.1278E-03	1,326.90	2,653.81	0.00E+00	2.82E+00	5.65E+00
Pu-241	1.0195E-01	1,326.90	2,653.81	0.00E+00	1.35E+02	2.71E+02
Pu-242	2.3128E-07	1,326.90	2,653.81	0.00E+00	3.07E-04	6.14E-04
Ra-226	5.2782E-14	1,326.90	2,653.81	0.00E+00	7.00E-11	1.40E-10
Ra-228	1.9338E-10	1,326.90	2,653.81	0.00E+00	2.57E-07	5.13E-07
Ru-106	9.1684E-02	1,326.90	2,653.81	0.00E+00	1.22E+02	2.43E+02
Se-79	1.3018E-05	1,326.90	2,653.81	0.00E+00	1.73E-02	3.45E-02
Sn-126	1.2167E-05	1,326.90	2,653.81	0.00E+00	1.61E-02	3.23E-02
Sr-90	2.6045E+00	1,326.90	2,653.81	0.00E+00	3.46E+03	6.91E+03
Tc-99	4.4241E-04	1,326.90	2,653.81	0.00E+00	5.87E-01	1.17E+00
Th-229	1.3713E-10	1,326.90	2,653.81	0.00E+00	1.82E-07	3.64E-07
Th-230	1.8090E-11	1,326.90	2,653.81	0.00E+00	2.40E-08	4.80E-08
Th-232	2.5278E-10	1,326.90	2,653.81	0.00E+00	3.35E-07	6.71E-07
Tl-208	1.6947E-06	1,326.90	2,653.81	0.00E+00	2.25E-05	4.50E-05
U-232	4.8737E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.289E+14
0.0250	9.438E+13
0.0375	8.037E+13
0.0575	8.250E+13
0.0850	5.111E+13
0.1250	3.711E+13
0.2250	4.336E+13
0.3750	2.200E+13
0.5750	2.925E+14
0.8500	1.255E+13
1.2500	2.549E+14
1.7500	1.699E+11
2.2500	2.739E+11
2.7500	2.174E+09
3.5000	2.530E+08
5.0000	1.408E+03
7.0000	1.594E+02
11.0000	1.816E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (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 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	Basis for burnup used in estimate:
Nominal:		1,326.90	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,653.81	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF TX AUSTIN
SNF ID #: 265
Fuel Units & Descr: 156 - ELEMENT
Heavy Metal Mass: BOL=30.124kg; EOL=29.765kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	342.51	685.03	0.00E+00	2.92E-07	5.83E-07
Am-241	1.8331E-03	342.51	685.03	0.00E+00	6.28E-01	1.26E+00
Am-242m	1.4129E-06	342.51	685.03	0.00E+00	4.84E-04	9.68E-04
Am-243	1.4774E-07	342.51	685.03	0.00E+00	5.06E-05	1.01E-04
C-14	1.2871E-04	342.51	685.03	0.00E+00	4.41E-02	8.82E-02
Cl-36	2.8120E-06	342.51	685.03	0.00E+00	9.63E-04	1.93E-03
Cm-243	1.7940E-07	342.51	685.03	0.00E+00	6.14E-05	1.23E-04
Cm-244	1.6962E-06	342.51	685.03	0.00E+00	5.81E-04	1.16E-03
Co-60	1.2839E+00	342.51	685.03	0.00E+00	4.40E+02	8.80E+02
Cs-134	9.0541E-02	342.51	685.03	0.00E+00	3.10E+01	6.20E+01
Cs-135	3.2195E-05	342.51	685.03	0.00E+00	1.10E-02	2.21E-02
Cs-137	2.7564E+00	342.51	685.03	0.00E+00	9.44E+02	1.89E+03
Eu-154	1.5368E-02	342.51	685.03	0.00E+00	5.26E+00	1.05E+01
Eu-155	2.9293E-02	342.51	685.03	0.00E+00	1.00E+01	2.01E+01
Fe-55	7.7158E-01	342.51	685.03	0.00E+00	2.64E+02	5.29E+02
H-3	1.1111E-02	342.51	685.03	0.00E+00	3.81E+00	7.61E+00
I-129	7.3684E-07	342.51	685.03	0.00E+00	2.52E-04	5.05E-04
Kr-85	2.5263E-01	342.51	685.03	0.00E+00	8.65E+01	1.73E+02
Np-237	1.2427E-06	342.51	685.03	0.00E+00	4.26E-04	8.51E-04
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
Tl-208	1.6947E-08	342.51	685.03	0.00E+00	5.80E-06	1.16E-05
U-232	4.8737E-08	342.51	685.03	0.00E+00	1.67E-05	3.34E-05
U-233	1.2203E-07	342.51	685.03	0.00E+00	4.18E-05	8.36E-05
U-234	1.5925E-07	342.51	685.03	0.00E+00	5.45E-05	1.09E-04
U-235	-2.6194E-06	342.51	0.00	1.29E-02	1.20E-02	1.29E-02
U-236	1.2693E-05	342.51	685.03	0.00E+00	4.35E-03	8.70E-03
U-238	-3.6331E-08	342.51	0.00	8.12E-03	8.11E-03	8.12E-03
Y-90	2.6060E+00	342.51	685.03	0.00E+00	8.93E+02	1.79E+03
Other Radionuclides					1.23E+03	2.47E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.107E+14
0.0250	2.436E+13
0.0375	2.075E+13
0.0575	2.129E+13
0.0850	1.319E+13
0.1250	9.580E+12
0.2250	1.119E+13
0.3750	5.679E+12
0.5750	7.550E+13
0.8500	3.240E+12
1.2500	6.581E+13
1.7500	4.387E+10
2.2500	7.071E+10
2.7500	5.611E+08
3.5000	6.530E+07
5.0000	3.778E+02
7.0000	4.279E+01
11.0000	4.876E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.99E+01	3.99E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.78958118	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[1]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		342.51	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		685.03	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.33	
Bounding:	0.67	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF UTAH
SNF ID #: 261
Fuel Units & Descr: 85 - ELEMENT
Heavy Metal Mass: BOL=14.773kg; EOL=14.518kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	243.42	486.85	0.00E+00	2.07E-07	4.15E-07
Am-241	1.8331E-03	243.42	486.85	0.00E+00	4.46E-01	8.92E-01
Am-242m	1.4129E-06	243.42	486.85	0.00E+00	3.44E-04	6.88E-04
Am-243	1.4774E-07	243.42	486.85	0.00E+00	3.60E-05	7.19E-05
C-14	1.2871E-04	243.42	486.85	0.00E+00	3.13E-02	6.27E-02
Cl-36	2.8120E-06	243.42	486.85	0.00E+00	6.85E-04	1.37E-03
Cm-243	1.7940E-07	243.42	486.85	0.00E+00	4.37E-05	8.73E-05
Cm-244	1.6962E-06	243.42	486.85	0.00E+00	4.13E-04	8.26E-04
Co-60	1.2839E+00	243.42	486.85	0.00E+00	3.13E+02	6.25E+02
Cs-134	9.0541E-02	243.42	486.85	0.00E+00	2.20E+01	4.41E+01
Cs-135	3.2195E-05	243.42	486.85	0.00E+00	7.84E-03	1.57E-02
Cs-137	2.7564E+00	243.42	486.85	0.00E+00	6.71E+02	1.34E+03
Eu-154	1.5368E-02	243.42	486.85	0.00E+00	3.74E+00	7.48E+00
Eu-155	2.9293E-02	243.42	486.85	0.00E+00	7.13E+00	1.43E+01
Fe-55	7.7158E-01	243.42	486.85	0.00E+00	1.88E+02	3.76E+02
H-3	1.1111E-02	243.42	486.85	0.00E+00	2.70E+00	5.41E+00
I-129	7.3684E-07	243.42	486.85	0.00E+00	1.79E-04	3.59E-04
Kr-85	2.5263E-01	243.42	486.85	0.00E+00	6.15E+01	1.23E+02
Np-237	1.2427E-06	243.42	486.85	0.00E+00	3.03E-04	6.05E-04
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
Tl-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	3.88E-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					8.78E+02	1.76E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.869E+13
0.0250	1.731E+13
0.0375	1.474E+13
0.0575	1.513E+13
0.0850	9.378E+12
0.1250	6.809E+12
0.2250	7.954E+12
0.3750	4.036E+12
0.5750	5.366E+13
0.8500	2.303E+12
1.2500	4.677E+13
1.7500	3.118E+10
2.2500	5.025E+10
2.7500	3.988E+08
3.5000	4.641E+07
5.0000	2.643E+02
7.0000	2.993E+01
11.0000	3.411E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.42E+01	2.83E+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 %:	19.8999888	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		243.42	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		486.85	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UC @ Berkeley
SNF ID #: 874
Fuel Units & Descr: 111 - ELEMENT
Heavy Metal Mass: BOL=21.645kg; EOL=19.17kg
ROD Storage Site: INEEL

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

Estimated Canister usage:

18"x10'
1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.7038E-09	2,362.94	4,725.88	0.00E+00	1.58E-05	3.17E-05
Am-241	3.9068E-03	2,362.94	4,725.88	0.00E+00	9.23E+00	1.85E+01
Am-242m	1.2325E-06	2,362.94	4,725.88	0.00E+00	2.91E-03	5.82E-03
Am-243	1.4732E-07	2,362.94	4,725.88	0.00E+00	3.48E-04	6.96E-04
C-14	1.2824E-04	2,362.94	4,725.88	0.00E+00	3.03E-01	6.06E-01
Cl-36	2.8120E-06	2,362.94	4,725.88	0.00E+00	6.64E-03	1.33E-02
Cm-243	8.6556E-08	2,362.94	4,725.88	0.00E+00	2.05E-04	4.09E-04
Cm-244	5.3835E-07	2,362.94	4,725.88	0.00E+00	1.27E-03	2.54E-03
Co-60	2.4887E-02	2,362.94	4,725.88	0.00E+00	5.88E+01	1.18E+02
Cs-134	3.8030E-06	2,362.94	4,725.88	0.00E+00	8.99E-03	1.80E-02
Cs-135	3.2195E-05	2,362.94	4,725.88	0.00E+00	7.61E-02	1.52E-01
Cs-137	1.3788E+00	2,362.94	4,725.88	0.00E+00	3.26E+03	6.52E+03
Eu-154	1.3711E-03	2,362.94	4,725.88	0.00E+00	3.24E+00	6.48E+00
Eu-155	4.4361E-04	2,362.94	4,725.88	0.00E+00	1.05E+00	2.10E+00
Fe-55	2.6075E-04	2,362.94	4,725.88	0.00E+00	6.16E-01	1.23E+00
H-3	2.0647E-03	2,362.94	4,725.88	0.00E+00	4.88E+00	9.76E+00
I-129	7.3684E-07	2,362.94	4,725.88	0.00E+00	1.74E-03	3.48E-03
Kr-85	3.6346E-02	2,362.94	4,725.88	0.00E+00	8.59E+01	1.72E+02
Np-237	1.2844E-06	2,362.94	4,725.88	0.00E+00	3.03E-03	6.07E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.299E+14
0.0250	6.854E+13
0.0375	5.955E+13
0.0575	6.416E+13
0.0850	3.861E+13
0.1250	2.512E+13
0.2250	3.325E+13
0.3750	1.450E+13
0.5750	2.425E+14
0.8500	2.482E+12
1.2500	9.632E+12
1.7500	6.442E+10
2.2500	5.279E+07
2.7500	2.427E+06
3.5000	5.829E+03
5.0000	2.454E+03
7.0000	2.768E+02
11.0000	3.147E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.80E+01	7.60E+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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV OF MARYLAND
SNF ID #: 260
Fuel Units & Descr: 93 - ELEMENT
Heavy Metal Mass: BOL=17.205kg; EOL=16.489kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10' 0.84

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	8.5173E-10	683.59	1,367.19	0.00E+00	5.82E-07	1.16E-06
Am-241	1.8331E-03	683.59	1,367.19	0.00E+00	1.25E+00	2.51E+00
Am-242m	1.4129E-06	683.59	1,367.19	0.00E+00	9.66E-04	1.93E-03
Am-243	1.4774E-07	683.59	1,367.19	0.00E+00	1.01E-04	2.02E-04
C-14	1.2871E-04	683.59	1,367.19	0.00E+00	8.80E-02	1.76E-01
Cl-36	2.8120E-06	683.59	1,367.19	0.00E+00	1.92E-03	3.84E-03
Cm-243	1.7940E-07	683.59	1,367.19	0.00E+00	1.23E-04	2.45E-04
Cm-244	1.6962E-06	683.59	1,367.19	0.00E+00	1.16E-03	2.32E-03
Co-60	1.2839E+00	683.59	1,367.19	0.00E+00	8.78E+02	1.76E+03
Cs-134	9.0541E-02	683.59	1,367.19	0.00E+00	6.19E+01	1.24E+02
Cs-135	3.2195E-05	683.59	1,367.19	0.00E+00	2.20E-02	4.40E-02
Cs-137	2.7564E+00	683.59	1,367.19	0.00E+00	1.88E+03	3.77E+03
Eu-154	1.5368E-02	683.59	1,367.19	0.00E+00	1.05E+01	2.10E+01
Eu-155	2.9293E-02	683.59	1,367.19	0.00E+00	2.00E+01	4.00E+01
Fe-55	7.7158E-01	683.59	1,367.19	0.00E+00	5.27E+02	1.05E+03
H-3	1.1111E-02	683.59	1,367.19	0.00E+00	7.60E+00	1.52E+01
I-129	7.3684E-07	683.59	1,367.19	0.00E+00	5.04E-04	1.01E-03
Kr-85	2.5263E-01	683.59	1,367.19	0.00E+00	1.73E+02	3.45E+02
Np-237	1.2427E-06	683.59	1,367.19	0.00E+00	8.50E-04	1.70E-03
Pa-231	3.8511E-09	683.59	1,367.19	0.00E+00	2.63E-06	5.27E-06
Pb-210	7.3880E-15	683.59	1,367.19	0.00E+00	5.05E-12	1.01E-11
Pm-147	2.1023E+00	683.59	1,367.19	0.00E+00	1.44E+03	2.87E+03
Pu-238	1.0383E-03	683.59	1,367.19	0.00E+00	7.10E-01	1.42E+00
Pu-239	5.5293E-03	683.59	1,367.19	0.00E+00	3.78E+00	7.56E+00
Pu-240	2.1278E-03	683.59	1,367.19	0.00E+00	1.45E+00	2.91E+00
Pu-241	1.0195E-01	683.59	1,367.19	0.00E+00	6.97E+01	1.39E+02
Pu-242	2.3128E-07	683.59	1,367.19	0.00E+00	1.58E-04	3.16E-04
Ra-226	5.2782E-14	683.59	1,367.19	0.00E+00	3.61E-11	7.22E-11
Ra-228	1.9338E-10	683.59	1,367.19	0.00E+00	1.32E-07	2.64E-07
Ru-106	9.1684E-02	683.59	1,367.19	0.00E+00	6.27E+01	1.25E+02
Se-79	1.3018E-05	683.59	1,367.19	0.00E+00	8.90E-03	1.78E-02
Sn-126	1.2167E-05	683.59	1,367.19	0.00E+00	8.32E-03	1.66E-02
Sr-90	2.6045E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03
Tc-99	4.4241E-04	683.59	1,367.19	0.00E+00	3.02E-01	6.05E-01
Th-229	1.3713E-10	683.59	1,367.19	0.00E+00	9.37E-08	1.87E-07
Th-230	1.8090E-11	683.59	1,367.19	0.00E+00	1.24E-08	2.47E-08
Th-232	2.5278E-10	683.59	1,367.19	0.00E+00	1.73E-07	3.46E-07
Tl-208	1.6947E-08	683.59	1,367.19	0.00E+00	1.16E-05	2.32E-05
U-232	4.8737E-08	683.59	1,367.19	0.00E+00	3.33E-05	6.66E-05
U-233	1.2203E-07	683.59	1,367.19	0.00E+00	8.34E-05	1.67E-04
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	7.44E-03
U-236	1.2693E-05	683.59	1,367.19	0.00E+00	8.68E-03	1.74E-02
U-238	-3.6331E-08	683.59	0.00	4.63E-03	4.60E-03	4.63E-03
Y-90	2.6060E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03
Other Radionuclides					2.46E+03	4.93E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.210E+14
0.0250	4.862E+13
0.0375	4.141E+13
0.0575	4.250E+13
0.0850	2.633E+13
0.1250	1.912E+13
0.2250	2.234E+13
0.3750	1.133E+13
0.5750	1.507E+14
0.8500	6.467E+12
1.2500	1.313E+14
1.7500	8.755E+10
2.2500	1.411E+11
2.7500	1.120E+09
3.5000	1.303E+08
5.0000	7.272E+02
7.0000	8.232E+01
11.0000	9.378E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.98E+01	7.96E+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	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		683.59	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,367.19	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: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV. OF CAL-IRVINE
SNF ID #: 264
Fuel Units & Descr: 104 - ELEMENT
Heavy Metal Mass: BOL=19.926kg; EOL=19.77kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.94

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	148.92	297.84	0.00E+00	1.27E-07	2.54E-07
Am-241	1.8331E-03	148.92	297.84	0.00E+00	2.73E-01	5.46E-01
Am-242m	1.4129E-06	148.92	297.84	0.00E+00	2.10E-04	4.21E-04
Am-243	1.4774E-07	148.92	297.84	0.00E+00	2.20E-05	4.40E-05
C-14	1.2871E-04	148.92	297.84	0.00E+00	1.92E-02	3.83E-02
Cl-36	2.8120E-06	148.92	297.84	0.00E+00	4.19E-04	8.38E-04
Cm-243	1.7940E-07	148.92	297.84	0.00E+00	2.67E-05	5.34E-05
Cm-244	1.6962E-06	148.92	297.84	0.00E+00	2.53E-04	5.05E-04
Co-60	1.2839E+00	148.92	297.84	0.00E+00	1.91E+02	3.82E+02
Cs-134	9.0541E-02	148.92	297.84	0.00E+00	1.35E+01	2.70E+01
Cs-135	3.2195E-05	148.92	297.84	0.00E+00	4.79E-03	9.59E-03
Cs-137	2.7564E+00	148.92	297.84	0.00E+00	4.10E+02	8.21E+02
Eu-154	1.5368E-02	148.92	297.84	0.00E+00	2.29E+00	4.58E+00
Eu-155	2.9293E-02	148.92	297.84	0.00E+00	4.36E+00	8.72E+00
Fe-55	7.7158E-01	148.92	297.84	0.00E+00	1.15E+02	2.30E+02
H-3	1.1111E-02	148.92	297.84	0.00E+00	1.65E+00	3.31E+00
I-129	7.3684E-07	148.92	297.84	0.00E+00	1.10E-04	2.19E-04
Kr-85	2.5263E-01	148.92	297.84	0.00E+00	3.76E+01	7.52E+01
Np-237	1.2427E-06	148.92	297.84	0.00E+00	1.85E-04	3.70E-04
Pa-231	3.8511E-09	148.92	297.84	0.00E+00	5.74E-07	1.15E-06
Pb-210	7.3880E-15	148.92	297.84	0.00E+00	1.10E-12	2.20E-12
Pm-147	2.1023E+00	148.92	297.84	0.00E+00	3.13E+02	6.26E+02
Pu-238	1.0383E-03	148.92	297.84	0.00E+00	1.55E-01	3.09E-01
Pu-239	5.5293E-03	148.92	297.84	0.00E+00	8.23E-01	1.65E+00
Pu-240	2.1278E-03	148.92	297.84	0.00E+00	3.17E-01	6.34E-01
Pu-241	1.0195E-01	148.92	297.84	0.00E+00	1.52E+01	3.04E+01
Pu-242	2.3128E-07	148.92	297.84	0.00E+00	3.44E-05	6.89E-05
Ra-226	5.2782E-14	148.92	297.84	0.00E+00	7.86E-12	1.57E-11
Ra-228	1.9338E-10	148.92	297.84	0.00E+00	2.88E-08	5.76E-08
Ru-106	9.1684E-02	148.92	297.84	0.00E+00	1.37E+01	2.73E+01
Se-79	1.3018E-05	148.92	297.84	0.00E+00	1.94E-03	3.88E-03
Sn-126	1.2167E-05	148.92	297.84	0.00E+00	1.81E-03	3.62E-03
Sr-90	2.6045E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02
Tc-99	4.4241E-04	148.92	297.84	0.00E+00	6.59E-02	1.32E-01
Th-229	1.3713E-10	148.92	297.84	0.00E+00	2.04E-08	4.08E-08
Th-230	1.8090E-11	148.92	297.84	0.00E+00	2.69E-09	5.39E-09
Th-232	2.5278E-10	148.92	297.84	0.00E+00	3.76E-08	7.53E-08
Tl-208	1.6947E-08	148.92	297.84	0.00E+00	2.52E-06	5.05E-06
U-232	4.8737E-08	148.92	297.84	0.00E+00	7.26E-06	1.45E-05
U-233	1.2203E-07	148.92	297.84	0.00E+00	1.82E-05	3.63E-05
U-234	1.5925E-07	148.92	297.84	0.00E+00	2.37E-05	4.74E-05
U-235	-2.6194E-06	148.92	0.00	8.61E-03	8.22E-03	8.61E-03
U-236	1.2693E-05	148.92	297.84	0.00E+00	1.89E-03	3.78E-03
U-238	-3.6331E-08	148.92	0.00	5.36E-03	5.35E-03	5.36E-03
Y-90	2.6060E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02
Other Radionuclides					5.37E+02	1.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.814E+13
0.0250	1.059E+13
0.0375	9.020E+12
0.0575	9.259E+12
0.0850	5.736E+12
0.1250	4.165E+12
0.2250	4.866E+12
0.3750	2.469E+12
0.5750	3.283E+13
0.8500	1.409E+12
1.2500	2.861E+13
1.7500	1.907E+10
2.2500	3.074E+10
2.7500	2.440E+08
3.5000	2.839E+07
5.0000	1.685E+02
7.0000	1.909E+01
11.0000	2.176E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.67E+00	1.73E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		148.92	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		297.84	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.44	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV. OF WISCONSIN
SNF ID #: 262
Fuel Units & Descr: 128 - ELEMENT
Heavy Metal Mass: BOL=24.96kg; EOL=22.182kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	2,651.52	5,303.03	0.00E+00	2.26E-06	4.52E-06
Am-241	1.8331E-03	2,651.52	5,303.03	0.00E+00	4.86E+00	9.72E+00
Am-242m	1.4129E-06	2,651.52	5,303.03	0.00E+00	3.75E-03	7.49E-03
Am-243	1.4774E-07	2,651.52	5,303.03	0.00E+00	3.92E-04	7.83E-04
C-14	1.2871E-04	2,651.52	5,303.03	0.00E+00	3.41E-01	6.83E-01
Cl-36	2.8120E-06	2,651.52	5,303.03	0.00E+00	7.46E-03	1.49E-02
Cm-243	1.7940E-07	2,651.52	5,303.03	0.00E+00	4.76E-04	9.51E-04
Cm-244	1.6962E-06	2,651.52	5,303.03	0.00E+00	4.50E-03	9.00E-03
Co-60	1.2839E+00	2,651.52	5,303.03	0.00E+00	3.40E+03	6.81E+03
Cs-134	9.0541E-02	2,651.52	5,303.03	0.00E+00	2.40E+02	4.80E+02
Cs-135	3.2195E-05	2,651.52	5,303.03	0.00E+00	8.54E-02	1.71E-01
Cs-137	2.7564E+00	2,651.52	5,303.03	0.00E+00	7.31E+03	1.46E+04
Eu-154	1.5368E-02	2,651.52	5,303.03	0.00E+00	4.07E+01	8.15E+01
Eu-155	2.9293E-02	2,651.52	5,303.03	0.00E+00	7.77E+01	1.55E+02
Fe-55	7.7158E-01	2,651.52	5,303.03	0.00E+00	2.05E+03	4.09E+03
H-3	1.1111E-02	2,651.52	5,303.03	0.00E+00	2.95E+01	5.89E+01
I-129	7.3684E-07	2,651.52	5,303.03	0.00E+00	1.95E-03	3.91E-03
Kr-85	2.5263E-01	2,651.52	5,303.03	0.00E+00	6.70E+02	1.34E+03
Np-237	1.2427E-06	2,651.52	5,303.03	0.00E+00	3.30E-03	6.59E-03
Pa-231	3.8511E-09	2,651.52	5,303.03	0.00E+00	1.02E-05	2.04E-05
Pb-210	7.3880E-15	2,651.52	5,303.03	0.00E+00	1.96E-11	3.92E-11
Pm-147	2.1023E+00	2,651.52	5,303.03	0.00E+00	5.57E+03	1.11E+04
Pu-238	1.0383E-03	2,651.52	5,303.03	0.00E+00	2.75E+00	5.51E+00
Pu-239	5.5293E-03	2,651.52	5,303.03	0.00E+00	1.47E+01	2.93E+01
Pu-240	2.1278E-03	2,651.52	5,303.03	0.00E+00	5.64E+00	1.13E+01
Pu-241	1.0195E-01	2,651.52	5,303.03	0.00E+00	2.70E+02	5.41E+02
Pu-242	2.3128E-07	2,651.52	5,303.03	0.00E+00	6.13E-04	1.23E-03
Ra-226	5.2782E-14	2,651.52	5,303.03	0.00E+00	1.40E-10	2.80E-10
Ra-228	1.9338E-10	2,651.52	5,303.03	0.00E+00	5.13E-07	1.03E-06
Ru-106	9.1684E-02	2,651.52	5,303.03	0.00E+00	2.43E+02	4.86E+02
Se-79	1.3018E-05	2,651.52	5,303.03	0.00E+00	3.45E-02	6.90E-02
Sn-126	1.2167E-05	2,651.52	5,303.03	0.00E+00	3.23E-02	6.45E-02
Sr-90	2.6045E+00	2,651.52	5,303.03	0.00E+00	6.91E+03	1.38E+04
Tc-99	4.4241E-04	2,651.52	5,303.03	0.00E+00	1.17E+00	2.35E+00
Th-229	1.3713E-10	2,651.52	5,303.03	0.00E+00	3.64E-07	7.27E-07
Th-230	1.8090E-11	2,651.52	5,303.03	0.00E+00	4.80E-08	9.59E-08
Th-232	2.5278E-10	2,651.52	5,303.03	0.00E+00	6.70E-07	1.34E-06
Tl-208	1.6947E-08	2,651.52	5,303.03	0.00E+00	4.49E-05	8.99E-05
U-232	4.8737E-08	2,651.52	5,303.03	0.00E+00	1.29E-04	2.58E-04
U-233	1.2203E-07	2,651.52	5,303.03	0.00E+00	3.24E-04	6.47E-04
U-234	1.5925E-07	2,651.52	5,303.03	0.00E+00	4.22E-04	8.44E-04
U-235	-2.6194E-06	2,651.52	0.00	1.08E-02	3.84E-03	1.08E-02
U-236	1.2693E-05	2,651.52	5,303.03	0.00E+00	3.37E-02	6.73E-02
U-238	-3.6331E-08	2,651.52	0.00	6.71E-03	6.61E-03	6.71E-03
Y-90	2.6060E+00	2,651.52	5,303.03	0.00E+00	6.91E+03	1.38E+04
Other Radionuclides					9.56E+03	1.91E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.571E+14
0.0250	1.886E+14
0.0375	1.606E+14
0.0575	1.649E+14
0.0850	1.021E+14
0.1250	7.416E+13
0.2250	8.664E+13
0.3750	4.397E+13
0.5750	5.845E+14
0.8500	2.509E+13
1.2500	5.094E+14
1.7500	3.396E+11
2.2500	5.474E+11
2.7500	4.344E+09
3.5000	5.055E+08
5.0000	2.795E+03
7.0000	3.163E+02
11.0000	3.603E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E+02	3.09E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		2,651.52	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		5,303.03	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 USGS
SNF ID #: 964
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.184kg; EOL=0.183kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.76	1.53	0.00E+00	6.50E-10	1.30E-09
Am-241	1.8331E-03	0.76	1.53	0.00E+00	1.40E-03	2.80E-03
Am-242m	1.4129E-06	0.76	1.53	0.00E+00	1.08E-06	2.16E-06
Am-243	1.4774E-07	0.76	1.53	0.00E+00	1.13E-07	2.26E-07
C-14	1.2871E-04	0.76	1.53	0.00E+00	9.83E-05	1.97E-04
Cl-36	2.8120E-06	0.76	1.53	0.00E+00	2.15E-06	4.30E-06
Cm-243	1.7940E-07	0.76	1.53	0.00E+00	1.37E-07	2.74E-07
Cm-244	1.6962E-06	0.76	1.53	0.00E+00	1.30E-06	2.59E-06
Co-60	1.2839E+00	0.76	1.53	0.00E+00	9.81E-01	1.96E+00
Cs-134	9.0541E-02	0.76	1.53	0.00E+00	6.91E-02	1.38E-01
Cs-135	3.2195E-05	0.76	1.53	0.00E+00	2.46E-05	4.92E-05
Cs-137	2.7564E+00	0.76	1.53	0.00E+00	2.11E+00	4.21E+00
Eu-154	1.5368E-02	0.76	1.53	0.00E+00	1.17E-02	2.35E-02
Eu-155	2.9293E-02	0.76	1.53	0.00E+00	2.24E-02	4.47E-02
Fe-55	7.7158E-01	0.76	1.53	0.00E+00	5.89E-01	1.18E+00
H-3	1.1111E-02	0.76	1.53	0.00E+00	8.49E-03	1.70E-02
I-129	7.3684E-07	0.76	1.53	0.00E+00	5.63E-07	1.13E-06
Kr-85	2.5263E-01	0.76	1.53	0.00E+00	1.93E-01	3.86E-01
Np-237	1.2427E-06	0.76	1.53	0.00E+00	9.49E-07	1.90E-06
Pa-231	3.8511E-09	0.76	1.53	0.00E+00	2.94E-09	5.88E-09
Pb-210	7.3880E-15	0.76	1.53	0.00E+00	5.64E-15	1.13E-14
Pm-147	2.1023E+00	0.76	1.53	0.00E+00	1.61E+00	3.21E+00
Pu-238	1.0383E-03	0.76	1.53	0.00E+00	7.93E-04	1.59E-03
Pu-239	5.5293E-03	0.76	1.53	0.00E+00	4.22E-03	8.45E-03
Pu-240	2.1278E-03	0.76	1.53	0.00E+00	1.62E-03	3.25E-03
Pu-241	1.0195E-01	0.76	1.53	0.00E+00	7.79E-02	1.56E-01
Pu-242	2.3128E-07	0.76	1.53	0.00E+00	1.77E-07	3.53E-07
Ra-226	5.2782E-14	0.76	1.53	0.00E+00	4.03E-14	8.06E-14
Ra-228	1.9338E-10	0.76	1.53	0.00E+00	1.48E-10	2.95E-10
Ru-106	9.1684E-02	0.76	1.53	0.00E+00	7.00E-02	1.40E-01
Se-79	1.3018E-05	0.76	1.53	0.00E+00	9.94E-06	1.99E-05
Sn-126	1.2167E-05	0.76	1.53	0.00E+00	9.29E-06	1.86E-05
Sr-90	2.6045E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00
Tc-99	4.4241E-04	0.76	1.53	0.00E+00	3.38E-04	6.76E-04
Th-229	1.3713E-10	0.76	1.53	0.00E+00	1.05E-10	2.09E-10
Th-230	1.8090E-11	0.76	1.53	0.00E+00	1.38E-11	2.76E-11
Th-232	2.5278E-10	0.76	1.53	0.00E+00	1.93E-10	3.86E-10
Tl-208	1.6947E-08	0.76	1.53	0.00E+00	1.29E-08	2.59E-08
U-232	4.8737E-08	0.76	1.53	0.00E+00	3.72E-08	7.44E-08
U-233	1.2203E-07	0.76	1.53	0.00E+00	9.32E-08	1.86E-07
U-234	1.5925E-07	0.76	1.53	0.00E+00	1.22E-07	2.43E-07
U-235	-2.6194E-06	0.76	0.00	7.79E-05	7.59E-05	7.79E-05
U-236	1.2693E-05	0.76	1.53	0.00E+00	9.69E-06	1.94E-05
U-238	-3.6331E-08	0.76	0.00	4.97E-05	4.97E-05	4.97E-05
Y-90	2.6060E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00
Other Radionuclides					2.75E+00	5.51E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.469E+11
0.0250	5.432E+10
0.0375	4.626E+10
0.0575	4.748E+10
0.0850	2.942E+10
0.1250	2.136E+10
0.2250	2.495E+10
0.3750	1.266E+10
0.5750	1.683E+11
0.8500	7.225E+09
1.2500	1.467E+11
1.7500	9.781E+07
2.2500	1.577E+08
2.7500	1.251E+06
3.5000	1.456E+05
5.0000	9.154E-01
7.0000	1.038E-01
11.0000	1.184E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.44E-02	8.69E-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 %:	19.58243102	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		0.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1.53	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 WSU
SNF ID #: 268
Fuel Units & Descr: 137 - ELEMENT
Heavy Metal Mass: BOL=26.715kg; EOL=23.482kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]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 Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	3,086.44	6,172.87	0.00E+00	2.63E-06	5.26E-06
Am-241	1.8331E-03	3,086.44	6,172.87	0.00E+00	5.66E+00	1.13E+01
Am-242m	1.4129E-06	3,086.44	6,172.87	0.00E+00	4.36E-03	8.72E-03
Am-243	1.4774E-07	3,086.44	6,172.87	0.00E+00	4.56E-04	9.12E-04
C-14	1.2871E-04	3,086.44	6,172.87	0.00E+00	3.97E-01	7.94E-01
Cl-36	2.8120E-06	3,086.44	6,172.87	0.00E+00	8.68E-03	1.74E-02
Cm-243	1.7940E-07	3,086.44	6,172.87	0.00E+00	5.54E-04	1.11E-03
Cm-244	1.6962E-06	3,086.44	6,172.87	0.00E+00	5.24E-03	1.05E-02
Co-60	1.2839E+00	3,086.44	6,172.87	0.00E+00	3.96E+03	7.93E+03
Cs-134	9.0541E-02	3,086.44	6,172.87	0.00E+00	2.79E+02	5.59E+02
Cs-135	3.2195E-05	3,086.44	6,172.87	0.00E+00	9.94E-02	1.99E-01
Cs-137	2.7564E+00	3,086.44	6,172.87	0.00E+00	8.51E+03	1.70E+04
Eu-154	1.5368E-02	3,086.44	6,172.87	0.00E+00	4.74E+01	9.49E+01
Eu-155	2.9293E-02	3,086.44	6,172.87	0.00E+00	9.04E+01	1.81E+02
Fe-55	7.7158E-01	3,086.44	6,172.87	0.00E+00	2.38E+03	4.76E+03
H-3	1.1111E-02	3,086.44	6,172.87	0.00E+00	3.43E+01	6.86E+01
I-129	7.3684E-07	3,086.44	6,172.87	0.00E+00	2.27E-03	4.55E-03
Kr-85	2.5263E-01	3,086.44	6,172.87	0.00E+00	7.80E+02	1.56E+03
Np-237	1.2427E-06	3,086.44	6,172.87	0.00E+00	3.84E-03	7.67E-03
Pa-231	3.8511E-09	3,086.44	6,172.87	0.00E+00	1.19E-05	2.38E-05
Pb-210	7.3880E-15	3,086.44	6,172.87	0.00E+00	2.28E-11	4.56E-11
Pm-147	2.1023E+00	3,086.44	6,172.87	0.00E+00	6.49E+03	1.30E+04
Pu-238	1.0383E-03	3,086.44	6,172.87	0.00E+00	3.20E+00	6.41E+00
Pu-239	5.5293E-03	3,086.44	6,172.87	0.00E+00	1.71E+01	3.41E+01
Pu-240	2.1278E-03	3,086.44	6,172.87	0.00E+00	6.57E+00	1.31E+01
Pu-241	1.0195E-01	3,086.44	6,172.87	0.00E+00	3.15E+02	6.29E+02
Pu-242	2.3128E-07	3,086.44	6,172.87	0.00E+00	7.14E-04	1.43E-03
Ra-226	5.2782E-14	3,086.44	6,172.87	0.00E+00	1.63E-10	3.26E-10
Ra-228	1.9338E-10	3,086.44	6,172.87	0.00E+00	5.97E-07	1.19E-06
Ru-106	9.1684E-02	3,086.44	6,172.87	0.00E+00	2.83E+02	5.66E+02
Se-79	1.3018E-05	3,086.44	6,172.87	0.00E+00	4.02E-02	8.04E-02
Sn-126	1.2167E-05	3,086.44	6,172.87	0.00E+00	3.76E-02	7.51E-02
Sr-90	2.6045E+00	3,086.44	6,172.87	0.00E+00	8.04E+03	1.61E+04
Tc-99	4.4241E-04	3,086.44	6,172.87	0.00E+00	1.37E+00	2.73E+00
Th-229	1.3713E-10	3,086.44	6,172.87	0.00E+00	4.23E-07	8.46E-07
Th-230	1.8090E-11	3,086.44	6,172.87	0.00E+00	5.58E-08	1.12E-07
Th-232	2.5278E-10	3,086.44	6,172.87	0.00E+00	7.80E-07	1.56E-06
Tl-208	1.6947E-06	3,086.44	6,172.87	0.00E+00	5.23E-05	1.05E-04
U-232	4.8737E-08	3,086.44	6,172.87	0.00E+00	1.50E-04	3.01E-04
U-233	1.2203E-07	3,086.44	6,172.87	0.00E+00	3.77E-04	7.53E-04
U-234	1.5925E-07	3,086.44	6,172.87	0.00E+00	4.92E-04	9.83E-04
U-235	-2.6194E-06	3,086.44	0.00	1.14E-02	3.35E-03	1.14E-02
U-236	1.2693E-05	3,086.44	6,172.87	0.00E+00	3.92E-02	7.84E-02
U-238	-3.6331E-08	3,086.44	0.00	7.20E-03	7.09E-03	7.20E-03
Y-90	2.6060E+00	3,086.44	6,172.87	0.00E+00	8.04E+03	1.61E+04
Other Radionuclides					1.11E+04	2.23E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.977E+14
0.0250	2.195E+14
0.0375	1.869E+14
0.0575	1.919E+14
0.0850	1.189E+14
0.1250	8.633E+13
0.2250	1.008E+14
0.3750	5.118E+13
0.5750	6.804E+14
0.8500	2.920E+13
1.2500	5.930E+14
1.7500	3.953E+11
2.2500	6.371E+11
2.7500	5.056E+09
3.5000	5.884E+08
5.0000	3.252E+03
7.0000	3.680E+02
11.0000	4.192E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.80E+02	3.59E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		3,086.44	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		6,172.87	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.39	
Bounding:	6.78	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ZAIRE
SNF ID #: 486
Fuel Units & Descr: 80 - ELEMENT
Heavy Metal Mass: BOL=15.448kg; EOL=15.288kg
ROD Storage Site: INEEL

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

Estimated Canister usage: 18"x10'
0.72

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	152.74	305.47	0.00E+00	4.04E-07	8.08E-07
Am-241	3.1429E-03	152.74	305.47	0.00E+00	4.80E-01	9.60E-01
Am-242m	1.3195E-06	152.74	305.47	0.00E+00	2.02E-04	4.03E-04
Am-243	1.4753E-07	152.74	305.47	0.00E+00	2.25E-05	4.51E-05
C-14	1.2847E-04	152.74	305.47	0.00E+00	1.96E-02	3.92E-02
Cl-36	2.8120E-06	152.74	305.47	0.00E+00	4.30E-04	8.59E-04
Cm-243	1.2465E-07	152.74	305.47	0.00E+00	1.90E-05	3.81E-05
Cm-244	9.5564E-07	152.74	305.47	0.00E+00	1.46E-04	2.92E-04
Co-60	1.7880E-01	152.74	305.47	0.00E+00	2.73E+01	5.46E+01
Cs-134	5.8692E-04	152.74	305.47	0.00E+00	8.96E-02	1.79E-01
Cs-135	3.2195E-05	152.74	305.47	0.00E+00	4.92E-03	9.83E-03
Cs-137	1.9489E+00	152.74	305.47	0.00E+00	2.98E+02	5.95E+02
Eu-154	4.5895E-03	152.74	305.47	0.00E+00	7.01E-01	1.40E+00
Eu-155	3.6045E-03	152.74	305.47	0.00E+00	5.51E-01	1.10E+00
Fe-55	1.4185E-02	152.74	305.47	0.00E+00	2.17E+00	4.33E+00
H-3	4.7895E-03	152.74	305.47	0.00E+00	7.32E-01	1.46E+00
I-129	7.3684E-07	152.74	305.47	0.00E+00	1.13E-04	2.25E-04
Kr-85	9.5820E-02	152.74	305.47	0.00E+00	1.46E+01	2.93E+01
Np-237	1.2552E-06	152.74	305.47	0.00E+00	1.92E-04	3.83E-04
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	9.46E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.061E+13
0.0250	6.372E+12
0.0375	5.520E+12
0.0575	5.939E+12
0.0850	3.585E+12
0.1250	2.343E+12
0.2250	3.079E+12
0.3750	1.349E+12
0.5750	2.219E+13
0.8500	2.501E+11
1.2500	4.145E+12
1.7500	6.426E+09
2.2500	2.213E+07
2.7500	2.439E+05
3.5000	1.371E+03
5.0000	1.683E+02
7.0000	1.903E+01
11.0000	2.166E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.82E+00	7.64E+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	Basis for burnup used in estimate:
Nominal:		152.74	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		305.47	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	
Bounding:	0.58	

Estimated EOL HM/Given EOL HM: 1.00

[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: TRU SCRAP SNF (MOX)
SNF ID #: 368
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=106.338kg
ROD Storage Site: INEEL

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

Estimated Canister usage: HIC 1.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.1822E-12	106,140.24	106,140.24	0.00E+00	6.56E-07	6.56E-07
Am-241	1.1066E-01	106,140.24	106,140.24	4.10E+02	1.22E+04	1.22E+04
Am-242m	1.9247E-03	106,140.24	106,140.24	0.00E+00	2.04E+02	2.04E+02
Am-243	1.0740E-04	106,140.24	106,140.24	0.00E+00	1.14E+01	1.14E+01
C-14	2.6042E-05	106,140.24	106,140.24	0.00E+00	2.76E+00	2.76E+00
Cl-36	3.4243E-10	106,140.24	106,140.24	0.00E+00	3.63E-05	3.63E-05
Cm-243	4.0629E-04	106,140.24	106,140.24	0.00E+00	4.31E+01	4.31E+01
Cm-244	1.6024E-03	106,140.24	106,140.24	0.00E+00	1.70E+02	1.70E+02
Co-60	3.4275E-03	106,140.24	106,140.24	0.00E+00	3.64E+02	3.64E+02
Cs-134	1.5566E-03	106,140.24	106,140.24	0.00E+00	1.65E+02	1.65E+02
Cs-135	4.7693E-05	106,140.24	106,140.24	0.00E+00	5.06E+00	5.06E+00
Cs-137	1.4007E+00	106,140.24	106,140.24	0.00E+00	1.49E+05	1.49E+05
Eu-154	1.6184E-02	106,140.24	106,140.24	0.00E+00	1.72E+03	1.72E+03
Eu-155	1.3774E-02	106,140.24	106,140.24	0.00E+00	1.46E+03	1.46E+03
Fe-55	3.8028E-04	106,140.24	106,140.24	0.00E+00	4.04E+01	4.04E+01
H-3	3.8454E-03	106,140.24	106,140.24	0.00E+00	4.08E+02	4.08E+02
I-129	1.2891E-06	106,140.24	106,140.24	0.00E+00	1.37E-01	1.37E-01
Kr-85	2.7848E-02	106,140.24	106,140.24	0.00E+00	2.96E+03	2.96E+03
Np-237	3.7516E-06	106,140.24	106,140.24	0.00E+00	3.98E-01	3.98E-01
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	0.00	3.37E+03	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	4.56E-01	1.65E+00	1.65E+00
Ra-226	7.8524E-12	106,140.24	106,140.24	0.00E+00	8.33E-07	8.33E-07
Ra-228	2.4086E-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	1.60E+00	1.60E+00
Se-79	1.0127E-05	106,140.24	106,140.24	0.00E+00	1.07E+00	1.07E+00
Sn-126	4.3902E-05	106,140.24	106,140.24	0.00E+00	4.66E+00	4.66E+00
Sr-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	3.36E-11	3.36E-11
Tl-208	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	-1.7914E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.432E+15
0.0250	6.897E+14
0.0375	8.019E+14
0.0575	7.887E+14
0.0850	3.841E+14
0.1250	2.703E+14
0.2250	3.100E+14
0.3750	1.344E+14
0.5750	5.444E+15
0.8500	5.688E+13
1.2500	6.808E+13
1.7500	1.540E+12
2.2500	3.048E+08
2.7500	1.757E+09
3.5000	6.515E+06
5.0000	2.062E+06
7.0000	2.355E+05
11.0000	2.695E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+03	1.80E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	UNKNOWN	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 cladding (SST is conservative) and enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		106,140.24
Bounding:		106,140.24

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:	3.28	
Bounding:	3.28	

Estimated EOL HM/Given EOL HM: 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRU SCRAP SNF (U METAL)
SNF ID #: 904
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=106.338kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: FERMI (Fast, Zirc, 10 to 40%, U)
[2]Template Burnup(MWd): 58.6725048
Template BOL Heavy Metal Mass (MT): 0.018774
Template Decay Time: 35 years

Estimated Canister usage:

HIC
4.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.6110E-08	93,768.99	93,768.99	0.00E+00	9.01E-03	9.01E-03
Am-241	6.5601E-07	93,768.99	93,768.99	0.00E+00	6.15E-02	6.15E-02
Am-242m	0.0000E+00	93,768.99	93,768.99	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	93,768.99	93,768.99	0.00E+00	7.86E-10	7.86E-10
C-14	2.1714E-05	93,768.99	93,768.99	0.00E+00	2.04E+00	2.04E+00
Cl-36	5.5188E-08	93,768.99	93,768.99	0.00E+00	5.17E-03	5.17E-03
Cm-243	1.5496E-14	93,768.99	93,768.99	0.00E+00	1.45E-09	1.45E-09
Cm-244	5.2375E-16	93,768.99	93,768.99	0.00E+00	4.91E-11	4.91E-11
Co-60	2.0947E-03	93,768.99	93,768.99	0.00E+00	1.96E+02	1.96E+02
Cs-134	6.2448E-07	93,768.99	93,768.99	0.00E+00	5.86E-02	5.86E-02
Cs-135	4.4996E-05	93,768.99	93,768.99	0.00E+00	4.22E+00	4.22E+00
Cs-137	1.3775E+00	93,768.99	93,768.99	0.00E+00	1.29E+05	1.29E+05
Eu-154	1.8510E-04	93,768.99	93,768.99	0.00E+00	1.74E+01	1.74E+01
Eu-155	1.4163E-03	93,768.99	93,768.99	0.00E+00	1.33E+02	1.33E+02
Fe-55	1.4179E-05	93,768.99	93,768.99	0.00E+00	1.33E+00	1.33E+00
H-3	3.5383E-03	93,768.99	93,768.99	0.00E+00	3.32E+02	3.32E+02
I-129	1.1426E-06	93,768.99	93,768.99	0.00E+00	1.07E-01	1.07E-01
Kr-85	3.8604E-02	93,768.99	93,768.99	0.00E+00	3.62E+03	3.62E+03
Np-237	3.3099E-06	93,768.99	93,768.99	0.00E+00	3.10E-01	3.10E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.205E+15
0.0250	1.289E+15
0.0375	1.134E+15
0.0575	1.201E+15
0.0850	7.264E+14
0.1250	4.705E+14
0.2250	6.235E+14
0.3750	2.717E+14
0.5750	4.799E+15
0.8500	4.432E+13
1.2500	2.940E+13
1.7500	1.144E+12
2.2500	2.017E+08
2.7500	1.944E+07
3.5000	1.608E+04
5.0000	5.319E+03
7.0000	4.316E+02
11.0000	3.760E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.45E+03	1.45E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		93,768.99
Bounding:		93,768.99

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:	141.08	
Bounding:	141.08	

Estimated EOL HM/Given EOL HM: 1.69

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1977
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	63,036.30	63,666.96	0.00E+00	6.77E-05	6.83E-05
Am-241	1.4751E-01	63,036.30	63,666.96	0.00E+00	9.30E+03	9.39E+03
Am-242m	2.6809E-04	63,036.30	63,666.96	0.00E+00	1.69E+01	1.71E+01
Am-243	6.2484E-04	63,036.30	63,666.96	0.00E+00	3.94E+01	3.98E+01
C-14	4.7820E-05	63,036.30	63,666.96	0.00E+00	3.01E+00	3.04E+00
Cl-36	8.0297E-07	63,036.30	63,666.96	0.00E+00	5.06E-02	5.11E-02
Cm-243	1.7426E-04	63,036.30	63,666.96	0.00E+00	1.10E+01	1.11E+01
Cm-244	2.7616E-02	63,036.30	63,666.96	0.00E+00	1.74E+03	1.76E+03
Co-60	3.5610E-04	63,036.30	63,666.96	0.00E+00	2.24E+01	2.27E+01
Cs-134	2.6260E-07	63,036.30	63,666.96	0.00E+00	1.66E-02	1.67E-02
Cs-135	1.4433E-05	63,036.30	63,666.96	0.00E+00	9.10E-01	9.19E-01
Cs-137	9.8870E-01	63,036.30	63,666.96	0.00E+00	6.23E+04	6.29E+04
Eu-154	6.0320E-03	63,036.30	63,666.96	0.00E+00	3.80E+02	3.84E+02
Eu-155	2.1770E-04	63,036.30	63,666.96	0.00E+00	1.37E+01	1.39E+01
Fe-55	7.9296E-07	63,036.30	63,666.96	0.00E+00	5.00E-02	5.05E-02
H-3	8.9486E-03	63,036.30	63,666.96	0.00E+00	5.64E+02	5.70E+02
I-129	9.8288E-07	63,036.30	63,666.96	0.00E+00	6.20E-02	6.26E-02
Kr-85	1.0707E-02	63,036.30	63,666.96	0.00E+00	6.75E+02	6.82E+02
Np-237	1.1927E-05	63,036.30	63,666.96	0.00E+00	7.52E-01	7.59E-01
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-06	9.96E-06
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
Tl-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
U-233	2.5856E-08	63,036.30	63,666.96	0.00E+00	1.63E-03	1.65E-03
U-234	5.2665E-05	63,036.30	63,666.96	0.00E+00	3.32E+00	3.35E+00
U-235	-1.4487E-06	63,036.30	0.00	1.26E-01	3.51E-02	1.26E-01
U-236	7.5888E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.423E+15
0.0250	4.855E+14
0.0375	4.575E+14
0.0575	5.724E+14
0.0850	2.675E+14
0.1250	1.779E+14
0.2250	2.284E+14
0.3750	9.863E+13
0.5750	2.323E+15
0.8500	2.268E+13
1.2500	1.443E+13
1.7500	6.344E+11
2.2500	1.043E+08
2.7500	3.675E+08
3.5000	2.622E+07
5.0000	1.121E+07
7.0000	1.291E+06
11.0000	1.483E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E+03	1.15E+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 %:	2.559999934	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	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	0.96
Bounding:	0.80	1.89

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: US/UK FUEL PINS
SNF ID #: 356
Fuel Units & Descr: 66 - ROD
Heavy Metal Mass: BOL= ; EOL=8.039kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	7,639.69	7,639.69	0.00E+00	1.76E-02	1.76E-02
Am-241	8.4448E+00	7,639.69	7,639.69	0.00E+00	6.45E+04	6.45E+04
Am-242m	1.6848E-02	7,639.69	7,639.69	0.00E+00	1.29E+02	1.29E+02
Am-243	1.6320E-02	7,639.69	7,639.69	0.00E+00	1.25E+02	1.25E+02
C-14	1.2090E-01	7,639.69	7,639.69	0.00E+00	9.24E+02	9.24E+02
Cl-36	2.2849E-03	7,639.69	7,639.69	0.00E+00	1.75E+01	1.75E+01
Cm-243	8.6624E-04	7,639.69	7,639.69	0.00E+00	6.62E+00	6.62E+00
Cm-244	1.6848E-01	7,639.69	7,639.69	0.00E+00	1.29E+03	1.29E+03
Co-60	2.8086E+01	7,639.69	7,639.69	0.00E+00	2.15E+05	2.15E+05
Cs-134	3.4148E-04	7,639.69	7,639.69	0.00E+00	2.61E+00	2.61E+00
Cs-135	4.3976E-04	7,639.69	7,639.69	0.00E+00	3.36E+00	3.36E+00
Cs-137	2.1049E+01	7,639.69	7,639.69	0.00E+00	1.61E+05	1.61E+05
Eu-154	1.2500E+00	7,639.69	7,639.69	0.00E+00	9.55E+03	9.55E+03
Eu-155	6.8986E-02	7,639.69	7,639.69	0.00E+00	5.27E+02	5.27E+02
Fe-55	2.9308E-01	7,639.69	7,639.69	0.00E+00	2.24E+03	2.24E+03
H-3	2.4311E-01	7,639.69	7,639.69	0.00E+00	1.86E+03	1.86E+03
I-129	1.0618E-05	7,639.69	7,639.69	0.00E+00	8.11E-02	8.11E-02
Kr-85	5.9882E-01	7,639.69	7,639.69	0.00E+00	4.57E+03	4.57E+03
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	1.6900E-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	-4.8440E-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
Tl-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	6.92E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.362E+15
0.0250	1.863E+15
0.0375	1.627E+15
0.0575	2.561E+15
0.0850	9.994E+14
0.1250	7.833E+14
0.2250	8.658E+14
0.3750	3.703E+14
0.5750	6.022E+15
0.8500	2.301E+14
1.2500	1.609E+16
1.7500	7.116E+12
2.2500	8.436E+10
2.7500	2.377E+10
3.5000	1.902E+07
5.0000	8.080E+06
7.0000	9.253E+05
11.0000	1.059E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.53E+03	7.62E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	(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	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
Nominal:	14.21	
Bounding:	14.21	

Estimated EOL HM/Given EOL HM: 591.84

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VBWR (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

[1]Fuel decay start date: 1961
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	135.65	271.30	0.00E+00	6.23E-06	1.25E-05
Am-241	1.1471E-04	135.65	271.30	0.00E+00	1.56E-02	3.11E-02
Am-242m	7.4210E-09	135.65	271.30	0.00E+00	1.01E-06	2.01E-06
Am-243	9.8236E-10	135.65	271.30	0.00E+00	1.33E-07	2.67E-07
C-14	2.2928E-04	135.65	271.30	0.00E+00	3.11E-02	6.22E-02
Cl-36	1.2260E-06	135.65	271.30	0.00E+00	1.66E-04	3.33E-04
Cm-243	1.2000E-10	135.65	271.30	0.00E+00	1.63E-08	3.26E-08
Cm-244	7.3577E-10	135.65	271.30	0.00E+00	9.98E-08	2.00E-07
Co-60	1.3732E-03	135.65	271.30	0.00E+00	1.86E-01	3.73E-01
Cs-134	1.2709E-10	135.65	271.30	0.00E+00	1.72E-08	3.45E-08
Cs-135	3.0316E-05	135.65	271.30	0.00E+00	4.11E-03	8.22E-03
Cs-137	7.2579E-01	135.65	271.30	0.00E+00	9.85E+01	1.97E+02
Eu-154	5.9750E-05	135.65	271.30	0.00E+00	8.11E-03	1.62E-02
Eu-155	1.0577E-05	135.65	271.30	0.00E+00	1.43E-03	2.87E-03
Fe-55	4.1631E-07	135.65	271.30	0.00E+00	5.65E-05	1.13E-04
H-3	4.6722E-04	135.65	271.30	0.00E+00	6.34E-02	1.27E-01
I-129	7.3195E-07	135.65	271.30	0.00E+00	9.93E-05	1.99E-04
Kr-85	5.9418E-03	135.65	271.30	0.00E+00	8.06E-01	1.61E+00
Np-237	1.1499E-06	135.65	271.30	0.00E+00	1.56E-04	3.12E-04
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
Tl-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	-2.7761E-06	135.65	0.00	5.99E-03	5.62E-03	5.99E-03
U-236	1.6190E-05	135.65	271.30	0.00E+00	2.20E-03	4.39E-03
U-238	-2.8547E-09	135.65	0.00	3.28E-03	3.28E-03	3.28E-03
Y-90	6.6889E-01	135.65	271.30	0.00E+00	9.07E+01	1.81E+02
Other Radionuclides					1.23E+02	2.46E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.903E+12
0.0250	2.057E+12
0.0375	1.788E+12
0.0575	1.919E+12
0.0850	1.159E+12
0.1250	7.514E+11
0.2250	9.988E+11
0.3750	4.356E+11
0.5750	7.328E+12
0.8500	7.117E+10
1.2500	5.151E+10
1.7500	1.831E+09
2.2500	3.463E+05
2.7500	1.551E+05
3.5000	3.325E+01
5.0000	1.402E+01
7.0000	1.585E+00
11.0000	1.803E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.10E+00	2.21E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	22.12897667	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		135.65	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		271.30	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.46	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO
SNF ID #: 286
Fuel Units & Descr: 20 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=9148.286kg; EOL=8832.178kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%. U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	300,603.76	601,207.51	0.00E+00	2.64E-04	5.28E-04
Am-241	1.4352E-01	300,603.76	601,207.51	0.00E+00	4.31E+04	8.63E+04
Am-242m	2.8698E-04	300,603.76	601,207.51	0.00E+00	8.63E+01	1.73E+02
Am-243	6.2565E-04	300,603.76	601,207.51	0.00E+00	1.88E+02	3.76E+02
C-14	4.7901E-05	300,603.76	601,207.51	0.00E+00	1.44E+01	2.88E+01
Cl-36	8.0297E-07	300,603.76	601,207.51	0.00E+00	2.41E-01	4.83E-01
Cm-243	2.5081E-04	300,603.76	601,207.51	0.00E+00	7.54E+01	1.51E+02
Cm-244	4.9015E-02	300,603.76	601,207.51	0.00E+00	1.47E+04	2.95E+04
Co-60	2.5581E-03	300,603.76	601,207.51	0.00E+00	7.69E+02	1.54E+03
Cs-134	4.0536E-05	300,603.76	601,207.51	0.00E+00	1.22E+01	2.44E+01
Cs-135	1.4433E-05	300,603.76	601,207.51	0.00E+00	4.34E+00	8.68E+00
Cs-137	1.3979E+00	300,603.76	601,207.51	0.00E+00	4.20E+05	8.40E+05
Eu-154	2.0203E-02	300,603.76	601,207.51	0.00E+00	6.07E+03	1.21E+04
Eu-155	1.7684E-03	300,603.76	601,207.51	0.00E+00	5.32E+02	1.06E+03
Fe-55	4.3136E-05	300,603.76	601,207.51	0.00E+00	1.30E+01	2.59E+01
H-3	2.0769E-02	300,603.76	601,207.51	0.00E+00	6.24E+03	1.25E+04
I-129	9.8288E-07	300,603.76	601,207.51	0.00E+00	2.95E-01	5.91E-01
Kr-85	2.8214E-02	300,603.76	601,207.51	0.00E+00	8.48E+03	1.70E+04
Np-237	1.1218E-05	300,603.76	601,207.51	0.00E+00	3.37E+00	6.74E+00
Pa-231	1.3036E-09	300,603.76	601,207.51	0.00E+00	3.92E-04	7.84E-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	6.85E-05	1.37E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.235E+16
0.0250	6.523E+15
0.0375	6.221E+15
0.0575	7.189E+15
0.0850	3.820E+15
0.1250	2.512E+15
0.2250	3.104E+15
0.3750	1.335E+15
0.5750	3.104E+16
0.8500	4.294E+14
1.2500	4.218E+14
1.7500	1.263E+13
2.2500	2.034E+09
2.7500	4.167E+09
3.5000	4.291E+08
5.0000	1.835E+08
7.0000	2.115E+07
11.0000	2.429E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.91E+03	1.38E+04
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 %:	2.966167273	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	268,593.68	300,603.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	268,637.57	601,207.51	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.94	1.12
Bounding:	1.88	2.08

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1981
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	166,112.80	332,225.60	0.00E+00	1.46E-04	2.92E-04
Am-241	1.4352E-01	166,112.80	332,225.60	0.00E+00	2.38E+04	4.77E+04
Am-242m	2.8698E-04	166,112.80	332,225.60	0.00E+00	4.77E+01	9.53E+01
Am-243	6.2565E-04	166,112.80	332,225.60	0.00E+00	1.04E+02	2.08E+02
C-14	4.7901E-05	166,112.80	332,225.60	0.00E+00	7.96E+00	1.59E+01
Cl-36	8.0297E-07	166,112.80	332,225.60	0.00E+00	1.33E-01	2.67E-01
Cm-243	2.5081E-04	166,112.80	332,225.60	0.00E+00	4.17E+01	8.33E+01
Cm-244	4.9015E-02	166,112.80	332,225.60	0.00E+00	8.14E+03	1.63E+04
Co-60	2.5581E-03	166,112.80	332,225.60	0.00E+00	4.25E+02	8.50E+02
Cs-134	4.0536E-05	166,112.80	332,225.60	0.00E+00	6.73E+00	1.35E+01
Cs-135	1.4433E-05	166,112.80	332,225.60	0.00E+00	2.40E+00	4.80E+00
Cs-137	1.3979E+00	166,112.80	332,225.60	0.00E+00	2.32E+05	4.64E+05
Eu-154	2.0203E-02	166,112.80	332,225.60	0.00E+00	3.36E+03	6.71E+03
Eu-155	1.7684E-03	166,112.80	332,225.60	0.00E+00	2.94E+02	5.88E+02
Fe-55	4.3136E-05	166,112.80	332,225.60	0.00E+00	7.17E+00	1.43E+01
H-3	2.0769E-02	166,112.80	332,225.60	0.00E+00	3.45E+03	6.90E+03
I-129	9.8288E-07	166,112.80	332,225.60	0.00E+00	1.63E-01	3.27E-01
Kr-85	2.8214E-02	166,112.80	332,225.60	0.00E+00	4.69E+03	9.37E+03
Np-237	1.1218E-05	166,112.80	332,225.60	0.00E+00	1.86E+00	3.73E+00
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.788E+16
0.0250	3.605E+15
0.0375	3.438E+15
0.0575	3.972E+15
0.0850	2.000E+15
0.1250	1.388E+15
0.2250	1.715E+15
0.3750	7.375E+14
0.5750	1.715E+16
0.8500	2.373E+14
1.2500	2.331E+14
1.7500	6.981E+12
2.2500	1.124E+09
2.7500	2.303E+09
3.5000	2.371E+08
5.0000	1.014E+08
7.0000	1.169E+07
11.0000	1.342E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.82E+03	7.64E+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 %:	2.833496228	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	161,133.55	166,112.80	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	173,158.20	332,225.60	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.86	1.03
Bounding:	1.73	1.92

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: 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

[1]Fuel decay start date: 1983
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	16,560.18	33,120.35	0.00E+00	1.45E-05	2.91E-05
Am-241	1.4352E-01	16,560.18	33,120.35	0.00E+00	2.38E+03	4.75E+03
Am-242m	2.8698E-04	16,560.18	33,120.35	0.00E+00	4.75E+00	9.50E+00
Am-243	6.2565E-04	16,560.18	33,120.35	0.00E+00	1.04E+01	2.07E+01
C-14	4.7901E-05	16,560.18	33,120.35	0.00E+00	7.93E-01	1.59E+00
Cl-36	8.0297E-07	16,560.18	33,120.35	0.00E+00	1.33E-02	2.66E-02
Cm-243	2.5081E-04	16,560.18	33,120.35	0.00E+00	4.15E+00	8.31E+00
Cm-244	4.9015E-02	16,560.18	33,120.35	0.00E+00	8.12E+02	1.62E+03
Co-60	2.5581E-03	16,560.18	33,120.35	0.00E+00	4.24E+01	8.47E+01
Cs-134	4.0536E-05	16,560.18	33,120.35	0.00E+00	6.71E-01	1.34E+00
Cs-135	1.4433E-05	16,560.18	33,120.35	0.00E+00	2.39E-01	4.78E-01
Cs-137	1.3979E+00	16,560.18	33,120.35	0.00E+00	2.32E+04	4.63E+04
Eu-154	2.0203E-02	16,560.18	33,120.35	0.00E+00	3.35E+02	6.69E+02
Eu-155	1.7684E-03	16,560.18	33,120.35	0.00E+00	2.93E+01	5.86E+01
Fe-55	4.3136E-05	16,560.18	33,120.35	0.00E+00	7.14E-01	1.43E+00
H-3	2.0769E-02	16,560.18	33,120.35	0.00E+00	3.44E+02	6.88E+02
I-129	9.8288E-07	16,560.18	33,120.35	0.00E+00	1.63E-02	3.26E-02
Kr-85	2.8214E-02	16,560.18	33,120.35	0.00E+00	4.67E+02	9.34E+02
Np-237	1.1218E-05	16,560.18	33,120.35	0.00E+00	1.86E-01	3.72E-01
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-05	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
Tl-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-01	16,560.18	33,120.35	0.00E+00	1.52E+04	3.04E+04
Other Radionuclides					2.22E+04	4.45E+04

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.782E+15
0.0250	3.594E+14
0.0375	3.427E+14
0.0575	3.960E+14
0.0850	1.994E+14
0.1250	1.384E+14
0.2250	1.710E+14
0.3750	7.353E+13
0.5750	1.710E+15
0.8500	2.366E+13
1.2500	2.324E+13
1.7500	6.959E+11
2.2500	1.121E+08
2.7500	2.296E+08
3.5000	2.364E+07
5.0000	1.011E+07
7.0000	1.165E+06
11.0000	1.338E+05

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.81E+02	7.62E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.966167273	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	13,429.68	16,560.18	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	14,431.88	33,120.35	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.03	1.23
Bounding:	2.07	2.29

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO (T-11 RODS)
SNF ID #: 1049
Fuel Units & Descr: 9 - ROD
Heavy Metal Mass: BOL=20.18kg; EOL=19.678kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	592.48	636.69	0.00E+00	5.20E-07	5.59E-07
Am-241	1.4352E-01	592.48	636.69	0.00E+00	8.50E+01	9.14E+01
Am-242m	2.8698E-04	592.48	636.69	0.00E+00	1.70E-01	1.83E-01
Am-243	6.2565E-04	592.48	636.69	0.00E+00	3.71E-01	3.98E-01
C-14	4.7901E-05	592.48	636.69	0.00E+00	2.84E-02	3.05E-02
Cl-36	8.0297E-07	592.48	636.69	0.00E+00	4.76E-04	5.11E-04
Cm-243	2.5081E-04	592.48	636.69	0.00E+00	1.49E-01	1.60E-01
Cm-244	4.9015E-02	592.48	636.69	0.00E+00	2.90E+01	3.12E+01
Co-60	2.5581E-03	592.48	636.69	0.00E+00	1.52E+00	1.63E+00
Cs-134	4.0536E-05	592.48	636.69	0.00E+00	2.40E-02	2.58E-02
Cs-135	1.4433E-05	592.48	636.69	0.00E+00	8.55E-03	9.19E-03
Cs-137	1.3979E+00	592.48	636.69	0.00E+00	8.28E+02	8.90E+02
Eu-154	2.0203E-02	592.48	636.69	0.00E+00	1.20E+01	1.29E+01
Eu-155	1.7684E-03	592.48	636.69	0.00E+00	1.05E+00	1.13E+00
Fe-55	4.3136E-05	592.48	636.69	0.00E+00	2.56E-02	2.75E-02
H-3	2.0769E-02	592.48	636.69	0.00E+00	1.23E+01	1.32E+01
I-129	9.8288E-07	592.48	636.69	0.00E+00	5.82E-04	6.26E-04
Kr-85	2.8214E-02	592.48	636.69	0.00E+00	1.67E+01	1.80E+01
Np-237	1.1218E-05	592.48	636.69	0.00E+00	6.65E-03	7.14E-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	6.4260E-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
Tl-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
U-234	5.0000E-05	592.48	636.69	0.00E+00	2.96E-02	3.18E-02
U-235	-1.4489E-06	592.48	0.00	1.30E-03	4.44E-04	1.30E-03
U-236	7.5824E-06	592.48	636.69	0.00E+00	4.49E-03	4.83E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.426E+13
0.0250	6.908E+12
0.0375	6.589E+12
0.0575	7.613E+12
0.0850	3.833E+12
0.1250	2.660E+12
0.2250	3.287E+12
0.3750	1.413E+12
0.5750	3.287E+13
0.8500	4.548E+11
1.2500	4.467E+11
1.7500	1.338E+10
2.2500	2.154E+08
2.7500	4.413E+08
3.5000	4.544E+05
5.0000	1.943E+05
7.0000	2.239E+04
11.0000	2.572E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.35E+01	1.46E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.986165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	592.48	477.57
Bounding:	636.69	955.14

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.81
Bounding:	0.90	1.50

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO T-11
SNF ID #: 994
Fuel Units & Descr: 3 - ROD
Heavy Metal Mass: BOL=6.727kg; EOL=6.559kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	197.49	212.23	0.00E+00	1.73E-07	1.86E-07
Am-241	1.4352E-01	197.49	212.23	0.00E+00	2.83E+01	3.05E+01
Am-242m	2.8698E-04	197.49	212.23	0.00E+00	5.67E-02	6.09E-02
Am-243	6.2565E-04	197.49	212.23	0.00E+00	1.24E-01	1.33E-01
C-14	4.7901E-05	197.49	212.23	0.00E+00	9.46E-03	1.02E-02
Cl-36	8.0297E-07	197.49	212.23	0.00E+00	1.59E-04	1.70E-04
Cm-243	2.5081E-04	197.49	212.23	0.00E+00	4.95E-02	5.32E-02
Cm-244	4.9015E-02	197.49	212.23	0.00E+00	9.68E+00	1.04E+01
Co-60	2.5581E-03	197.49	212.23	0.00E+00	5.05E-01	5.43E-01
Cs-134	4.0536E-05	197.49	212.23	0.00E+00	8.01E-03	8.60E-03
Cs-135	1.4433E-05	197.49	212.23	0.00E+00	2.85E-03	3.06E-03
Cs-137	1.3979E+00	197.49	212.23	0.00E+00	2.76E+02	2.97E+02
Eu-154	2.0203E-02	197.49	212.23	0.00E+00	3.99E+00	4.29E+00
Eu-155	1.7684E-03	197.49	212.23	0.00E+00	3.49E-01	3.75E-01
Fe-55	4.3136E-05	197.49	212.23	0.00E+00	8.52E-03	9.15E-03
H-3	2.0769E-02	197.49	212.23	0.00E+00	4.10E+00	4.41E+00
I-129	9.8288E-07	197.49	212.23	0.00E+00	1.94E-04	2.09E-04
Kr-85	2.8214E-02	197.49	212.23	0.00E+00	5.57E+00	5.99E+00
Np-237	1.1218E-05	197.49	212.23	0.00E+00	2.22E-03	2.38E-03
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	9.1667E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.142E+13
0.0250	2.303E+12
0.0375	2.196E+12
0.0575	2.538E+12
0.0850	1.278E+12
0.1250	8.867E+11
0.2250	1.096E+12
0.3750	4.712E+11
0.5750	1.096E+13
0.8500	1.516E+11
1.2500	1.489E+11
1.7500	4.459E+09
2.2500	7.181E+05
2.7500	1.471E+06
3.5000	1.515E+05
5.0000	6.477E+04
7.0000	7.465E+03
11.0000	8.574E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.64E+00	4.88E+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:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.986165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	197.49	159.19	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	212.23	318.38	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.81
Bounding:	0.90	1.50

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ANL/
SNF ID #: 5
Fuel Units & Descr: 19 - ELEMENT
Heavy Metal Mass: BOL=2.793kg; EOL=2.789kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 357.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 0.79

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.9739E-09	3.60	7.20	0.00E+00	1.07E-08	2.14E-08
Am-241	2.5986E-03	3.60	7.20	0.00E+00	9.35E-03	1.87E-02
Am-242m	3.7010E-07	3.60	7.20	0.00E+00	1.33E-06	2.66E-06
Am-243	1.4858E-06	3.60	7.20	0.00E+00	5.35E-06	1.07E-05
C-14	5.6944E-09	3.60	7.20	0.00E+00	2.05E-08	4.10E-08
Cl-36	1.3124E-32	3.60	7.20	0.00E+00	4.72E-32	9.45E-32
Cm-243	7.9303E-08	3.60	7.20	0.00E+00	2.85E-07	5.71E-07
Cm-244	9.3083E-06	3.60	7.20	0.00E+00	3.35E-05	6.70E-05
Co-60	1.0310E-07	3.60	7.20	0.00E+00	3.71E-07	7.42E-07
Cs-134	1.3254E-07	3.60	7.20	0.00E+00	4.77E-07	9.54E-07
Cs-135	3.4477E-06	3.60	7.20	0.00E+00	1.24E-05	2.48E-05
Cs-137	1.0161E+00	3.60	7.20	0.00E+00	3.66E+00	7.31E+00
Eu-154	2.1879E-03	3.60	7.20	0.00E+00	7.87E-03	1.57E-02
Eu-155	7.2930E-05	3.60	7.20	0.00E+00	2.62E-04	5.25E-04
Fe-55	4.1912E-08	3.60	7.20	0.00E+00	1.51E-07	3.02E-07
H-3	8.4913E-04	3.60	7.20	0.00E+00	3.06E-03	6.11E-03
I-129	7.5300E-07	3.60	7.20	0.00E+00	2.71E-06	5.42E-06
Kr-85	1.5615E-02	3.60	7.20	0.00E+00	5.62E-02	1.12E-01
Np-237	9.5861E-06	3.60	7.20	0.00E+00	3.45E-05	6.90E-05
Pa-231	5.0790E-09	3.60	7.20	0.00E+00	1.83E-08	3.66E-08
Pb-210	6.6176E-10	3.60	7.20	0.00E+00	2.38E-09	4.76E-09
Pm-147	1.7606E-05	3.60	7.20	0.00E+00	6.34E-05	1.27E-04
Pu-238	1.4406E-02	3.60	7.20	0.00E+00	5.18E-02	1.04E-01
Pu-239	4.2783E-04	3.60	7.20	0.00E+00	1.54E-03	3.08E-03
Pu-240	2.4297E-04	3.60	7.20	0.00E+00	8.74E-04	1.75E-03
Pu-241	7.8949E-03	3.60	7.20	0.00E+00	2.84E-02	5.68E-02
Pu-242	3.6329E-07	3.60	7.20	0.00E+00	1.31E-06	2.61E-06
Ra-226	1.5169E-09	3.60	7.20	0.00E+00	5.46E-09	1.09E-08
Ra-228	4.2429E-14	3.60	7.20	0.00E+00	1.53E-13	3.05E-13
Ru-106	7.0833E-15	3.60	7.20	0.00E+00	2.55E-14	5.10E-14
Se-79	1.2928E-05	3.60	7.20	0.00E+00	4.65E-05	9.30E-05
Sn-126	1.1571E-05	3.60	7.20	0.00E+00	4.16E-05	8.33E-05
Sr-90	9.4308E-01	3.60	7.20	0.00E+00	3.39E+00	6.79E+00
Tc-99	4.2239E-04	3.60	7.20	0.00E+00	1.52E-03	3.04E-03
Th-229	1.7968E-11	3.60	7.20	0.00E+00	6.47E-11	1.29E-10
Th-230	1.0855E-07	3.60	7.20	0.00E+00	3.91E-07	7.81E-07
Th-232	4.9809E-14	3.60	7.20	0.00E+00	1.79E-13	3.58E-13
Tl-208	3.4995E-08	3.60	7.20	0.00E+00	1.26E-07	2.52E-07
U-232	9.4798E-08	3.60	7.20	0.00E+00	3.41E-07	6.82E-07
U-233	4.2538E-09	3.60	7.20	0.00E+00	1.53E-08	3.06E-08
U-234	1.8617E-04	3.60	7.20	0.00E+00	6.70E-04	1.34E-03
U-235	-2.7235E-06	3.60	0.00	5.63E-03	5.62E-03	5.63E-03
U-236	1.5493E-05	3.60	7.20	0.00E+00	5.58E-05	1.12E-04
U-238	-4.2851E-09	3.60	0.00	6.39E-05	6.38E-05	6.39E-05
Y-90	9.4308E-01	3.60	7.20	0.00E+00	3.39E+00	6.79E+00
Other Radionuclides					3.49E+00	6.98E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.709E+11
0.0250	7.697E+10
0.0375	6.689E+10
0.0575	7.206E+10
0.0850	4.338E+10
0.1250	2.837E+10
0.2250	3.752E+10
0.3750	1.630E+10
0.5750	2.723E+11
0.8500	2.917E+09
1.2500	1.180E+09
1.7500	7.727E+07
2.2500	7.495E+03
2.7500	8.850E+03
3.5000	5.381E+00
5.0000	2.196E+00
7.0000	2.396E-01
11.0000	2.668E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.28E-02	8.55E-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 %:	93.197	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.60
Bounding:		7.20

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-(AUSTRIA)(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

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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 Ci/MWd From Template	x_a Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_a Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	530.99	1,061.99	0.00E+00	1.07E-06	2.13E-06
Am-241	2.5251E-03	530.99	1,061.99	0.00E+00	1.34E+00	2.68E+00
Am-242m	3.9624E-07	530.99	1,061.99	0.00E+00	2.10E-04	4.21E-04
Am-243	1.4880E-06	530.99	1,061.99	0.00E+00	7.90E-04	1.58E-03
C-14	5.7053E-09	530.99	1,061.99	0.00E+00	3.03E-06	6.06E-06
Cl-36	1.3124E-32	530.99	1,061.99	0.00E+00	6.97E-30	1.39E-29
Cm-243	1.1419E-07	530.99	1,061.99	0.00E+00	6.06E-05	1.21E-04
Cm-244	1.6522E-05	530.99	1,061.99	0.00E+00	8.77E-03	1.75E-02
Co-60	7.4047E-07	530.99	1,061.99	0.00E+00	3.93E-04	7.86E-04
Cs-134	2.0455E-05	530.99	1,061.99	0.00E+00	1.09E-02	2.17E-02
Cs-135	3.4477E-06	530.99	1,061.99	0.00E+00	1.83E-03	3.66E-03
Cs-137	1.4365E+00	530.99	1,061.99	0.00E+00	7.63E+02	1.53E+03
Eu-154	7.3230E-03	530.99	1,061.99	0.00E+00	3.89E+00	7.78E+00
Eu-155	5.9259E-04	530.99	1,061.99	0.00E+00	3.15E-01	6.29E-01
Fe-55	2.2791E-06	530.99	1,061.99	0.00E+00	1.21E-03	2.42E-03
H-3	1.9698E-03	530.99	1,061.99	0.00E+00	1.05E+00	2.09E+00
I-129	7.5300E-07	530.99	1,061.99	0.00E+00	4.00E-04	8.00E-04
Kr-85	4.1176E-02	530.99	1,061.99	0.00E+00	2.19E+01	4.37E+01
Np-237	9.5752E-06	530.99	1,061.99	0.00E+00	5.08E-03	1.02E-02
Pa-231	3.9379E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.822E+13
0.0250	1.624E+13
0.0375	1.412E+13
0.0575	1.520E+13
0.0850	9.156E+12
0.1250	6.047E+12
0.2250	7.904E+12
0.3750	3.439E+12
0.5750	5.683E+13
0.8500	6.942E+11
1.2500	3.358E+11
1.7500	1.890E+10
2.2500	1.580E+06
2.7500	1.508E+06
3.5000	8.812E+02
5.0000	3.602E+02
7.0000	3.944E+01
11.0000	4.398E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+00	1.78E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.50065847	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:		530.99
Bounding:		1,061.99

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:	0.31	
Bounding:	0.63	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-(AUSTRIA)(LEU U3Si2)
SNF ID #: 712
Fuel Units & Descr: 39 - 19 FLAT PLATES
Heavy Metal Mass: BOL=72.236kg; EOL=66.183kg
ROD Storage Site: SRS

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

Estimated Canister usage: 18"x10' 1.08

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	5,732.12	11,464.24	0.00E+00	1.15E-05	2.30E-05
Am-241	2.5251E-03	5,732.12	11,464.24	0.00E+00	1.45E+01	2.89E+01
Am-242m	3.9624E-07	5,732.12	11,464.24	0.00E+00	2.27E-03	4.54E-03
Am-243	1.4880E-06	5,732.12	11,464.24	0.00E+00	8.53E-03	1.71E-02
C-14	5.7053E-09	5,732.12	11,464.24	0.00E+00	3.27E-05	6.54E-05
Cl-36	1.3124E-32	5,732.12	11,464.24	0.00E+00	7.52E-29	1.50E-28
Cm-243	1.1419E-07	5,732.12	11,464.24	0.00E+00	6.55E-04	1.31E-03
Cm-244	1.6522E-05	5,732.12	11,464.24	0.00E+00	9.47E-02	1.89E-01
Co-60	7.4047E-07	5,732.12	11,464.24	0.00E+00	4.24E-03	8.49E-03
Cs-134	2.0455E-05	5,732.12	11,464.24	0.00E+00	1.17E-01	2.34E-01
Cs-135	3.4477E-06	5,732.12	11,464.24	0.00E+00	1.98E-02	3.95E-02
Cs-137	1.4365E+00	5,732.12	11,464.24	0.00E+00	8.23E+03	1.65E+04
Eu-154	7.3230E-03	5,732.12	11,464.24	0.00E+00	4.20E+01	8.40E+01
Eu-155	5.9259E-04	5,732.12	11,464.24	0.00E+00	3.40E+00	6.79E+00
Fe-55	2.2791E-06	5,732.12	11,464.24	0.00E+00	1.31E-02	2.61E-02
H-3	1.9698E-03	5,732.12	11,464.24	0.00E+00	1.13E+01	2.26E+01
I-129	7.5300E-07	5,732.12	11,464.24	0.00E+00	4.32E-03	8.63E-03
Kr-85	4.1176E-02	5,732.12	11,464.24	0.00E+00	2.36E+02	4.72E+02
Np-237	9.5752E-06	5,732.12	11,464.24	0.00E+00	5.49E-02	1.10E-01
Pa-231	3.9379E-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
Pm-147	9.2402E-04	5,732.12	11,464.24	0.00E+00	5.30E+00	1.06E+01
Pu-238	1.6217E-02	5,732.12	11,464.24	0.00E+00	9.30E+01	1.86E+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	3.6329E-07	5,732.12	11,464.24	0.00E+00	2.08E-03	4.16E-03
Ra-226	9.0114E-10	5,732.12	11,464.24	0.00E+00	5.17E-06	1.03E-05
Ra-228	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-06	2.43E-06
Se-79	1.2930E-05	5,732.12	11,464.24	0.00E+00	7.41E-02	1.48E-01
Sn-126	1.1571E-05	5,732.12	11,464.24	0.00E+00	6.63E-02	1.33E-01
Sr-90	1.3472E+00	5,732.12	11,464.24	0.00E+00	7.72E+03	1.54E+04
Tc-99	4.2239E-04	5,732.12	11,464.24	0.00E+00	2.42E+00	4.84E+00
Th-229	1.2407E-11	5,732.12	11,464.24	0.00E+00	7.11E-08	1.42E-07
Th-230	8.3497E-06	5,732.12	11,464.24	0.00E+00	4.79E-04	9.57E-04
Th-232	3.8371E-14	5,732.12	11,464.24	0.00E+00	2.20E-10	4.40E-10
Tl-208	4.0414E-06	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	1.8562E-04	5,732.12	11,464.24	0.00E+00	1.06E+00	2.13E+00
U-235	-2.7235E-06	5,732.12	0.00	3.10E-02	1.54E-02	3.10E-02
U-236	1.5493E-05	5,732.12	11,464.24	0.00E+00	8.88E-02	1.78E-01
U-238	-4.2851E-09	5,732.12	0.00	1.95E-02	1.94E-02	1.95E-02
Y-90	1.3475E+00	5,732.12	11,464.24	0.00E+00	7.72E+03	1.54E+04
Other Radionuclides					7.84E+03	1.57E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.444E+14
0.0250	1.753E+14
0.0375	1.524E+14
0.0575	1.640E+14
0.0850	9.884E+13
0.1250	6.528E+13
0.2250	8.532E+13
0.3750	3.712E+13
0.5750	6.135E+14
0.8500	7.494E+12
1.2500	3.624E+12
1.7500	2.040E+11
2.2500	1.706E+07
2.7500	1.628E+07
3.5000	9.532E+03
5.0000	3.897E+03
7.0000	4.267E+02
11.0000	4.760E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.59E+01	1.92E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.83800556	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:		5,732.12
Bounding:		11,464.24

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:	0.25	
Bounding:	0.50	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIA (UALX-HEU)
SNF ID #: 646
Fuel Units & Descr: 33 - MTR TYPE
Heavy Metal Mass: BOL=9.026kg; EOL=4.359kg
ROD Storage Site: SRS

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

Estimated Canister usage: 18"x10' 0.92

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	4,418.98	8,547.32	0.00E+00	8.87E-06	1.72E-05
Am-241	2.5251E-03	4,418.98	8,547.32	0.00E+00	1.12E+01	2.16E+01
Am-242m	3.9624E-07	4,418.98	8,547.32	0.00E+00	1.75E-03	3.39E-03
Am-243	1.4880E-06	4,418.98	8,547.32	0.00E+00	6.58E-03	1.27E-02
C-14	5.7053E-09	4,418.98	8,547.32	0.00E+00	2.52E-05	4.88E-05
Cl-36	1.3124E-32	4,418.98	8,547.32	0.00E+00	5.80E-29	1.12E-28
Cm-243	1.1419E-07	4,418.98	8,547.32	0.00E+00	5.05E-04	9.76E-04
Cm-244	1.6522E-05	4,418.98	8,547.32	0.00E+00	7.30E-02	1.41E-01
Co-60	7.4047E-07	4,418.98	8,547.32	0.00E+00	3.27E-03	6.33E-03
Cs-134	2.0455E-05	4,418.98	8,547.32	0.00E+00	9.04E-02	1.75E-01
Cs-135	3.4477E-06	4,418.98	8,547.32	0.00E+00	1.52E-02	2.95E-02
Cs-137	1.4365E+00	4,418.98	8,547.32	0.00E+00	6.35E+03	1.23E+04
Eu-154	7.3230E-03	4,418.98	8,547.32	0.00E+00	3.24E+01	6.26E+01
Eu-155	5.9259E-04	4,418.98	8,547.32	0.00E+00	2.62E+00	5.07E+00
Fe-55	2.2791E-06	4,418.98	8,547.32	0.00E+00	1.01E-02	1.95E-02
H-3	1.9698E-03	4,418.98	8,547.32	0.00E+00	8.70E+00	1.68E+01
I-129	7.5300E-07	4,418.98	8,547.32	0.00E+00	3.33E-03	6.44E-03
Kr-85	4.1176E-02	4,418.98	8,547.32	0.00E+00	1.82E+02	3.52E+02
Np-237	9.5752E-06	4,418.98	8,547.32	0.00E+00	4.23E-02	8.18E-02
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	3.1019E-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	4,418.98	8,547.32	0.00E+00	3.69E-04	7.14E-04
Th-232	3.8371E-14	4,418.98	8,547.32	0.00E+00	1.70E-10	3.28E-10
Tl-208	4.0414E-08	4,418.98	8,547.32	0.00E+00	1.79E-04	3.45E-04
U-232	1.0948E-07	4,418.98	8,547.32	0.00E+00	4.84E-04	9.36E-04
U-233	3.6275E-09	4,418.98	8,547.32	0.00E+00	1.60E-05	3.10E-05
U-234	1.8562E-04	4,418.98	8,547.32	0.00E+00	8.20E-01	1.59E+00
U-235	-2.7235E-06	4,418.98	0.00	1.82E-02	6.12E-03	1.82E-02
U-236	1.5493E-05	4,418.98	8,547.32	0.00E+00	6.85E-02	1.32E-01
U-238	-4.2851E-09	4,418.98	0.00	2.10E-04	1.91E-04	2.10E-04
Y-90	1.3475E+00	4,418.98	8,547.32	0.00E+00	5.95E+03	1.15E+04
Other Radionuclides					6.05E+03	1.17E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.295E+14
0.0250	1.307E+14
0.0375	1.136E+14
0.0575	1.223E+14
0.0850	7.369E+13
0.1250	4.867E+13
0.2250	6.361E+13
0.3750	2.768E+13
0.5750	4.574E+14
0.8500	5.587E+12
1.2500	2.702E+12
1.7500	1.521E+11
2.2500	1.272E+07
2.7500	1.214E+07
3.5000	7.031E+03
5.0000	2.873E+03
7.0000	3.144E+02
11.0000	3.505E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.40E+01	1.43E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.07350223	60 to 100

Basis for Parameter Differences: -

Burnup Summary (MWd)[2]

	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 burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.56	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIA (UALX-MEU)
SNF ID #: 566
Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=3.62kg; EOL=2.766kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_a: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	807.81	1,615.62	0.00E+00	1.62E-06	3.24E-06
Am-241	2.5251E-03	807.81	1,615.62	0.00E+00	2.04E+00	4.08E+00
Am-242m	3.9624E-07	807.81	1,615.62	0.00E+00	3.20E-04	6.40E-04
Am-243	1.4880E-06	807.81	1,615.62	0.00E+00	1.20E-03	2.40E-03
C-14	5.7053E-09	807.81	1,615.62	0.00E+00	4.61E-06	9.22E-06
Cl-36	1.3124E-32	807.81	1,615.62	0.00E+00	1.06E-29	2.12E-29
Cm-243	1.1419E-07	807.81	1,615.62	0.00E+00	9.22E-05	1.84E-04
Cm-244	1.6522E-05	807.81	1,615.62	0.00E+00	1.33E-02	2.67E-02
Co-60	7.4047E-07	807.81	1,615.62	0.00E+00	5.98E-04	1.20E-03
Cs-134	2.0455E-05	807.81	1,615.62	0.00E+00	1.65E-02	3.30E-02
Cs-135	3.4477E-06	807.81	1,615.62	0.00E+00	2.79E-03	5.57E-03
Cs-137	1.4365E+00	807.81	1,615.62	0.00E+00	1.16E+03	2.32E+03
Eu-154	7.3230E-03	807.81	1,615.62	0.00E+00	5.92E+00	1.18E+01
Eu-155	5.9259E-04	807.81	1,615.62	0.00E+00	4.79E-01	9.57E-01
Fe-55	2.2791E-06	807.81	1,615.62	0.00E+00	1.84E-03	3.68E-03
H-3	1.9698E-03	807.81	1,615.62	0.00E+00	1.59E+00	3.18E+00
I-129	7.5300E-07	807.81	1,615.62	0.00E+00	6.08E-04	1.22E-03
Kr-85	4.1176E-02	807.81	1,615.62	0.00E+00	3.33E+01	6.65E+01
Np-237	9.5752E-06	807.81	1,615.62	0.00E+00	7.73E-03	1.55E-02
Pa-231	3.9379E-09	807.81	1,615.62	0.00E+00	3.18E-06	6.36E-06
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	7.46E-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-06	2.00E-06
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.190E+14
0.0250	2.471E+13
0.0375	2.148E+13
0.0575	2.312E+13
0.0850	1.393E+13
0.1250	9.200E+12
0.2250	1.202E+13
0.3750	5.231E+12
0.5750	8.646E+13
0.8500	1.056E+12
1.2500	5.108E+11
1.7500	2.875E+10
2.2500	2.404E+06
2.7500	2.294E+06
3.5000	1.332E+03
5.0000	5.445E+02
7.0000	5.959E+01
11.0000	6.645E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.35E+01	2.70E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.43904151	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		807.81
Bounding:		1,615.62

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	
Bounding:	1.42	

Estimated EOL HM/Given EOL HM: 1.02

[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: ATSR
SNF ID #: 17
Fuel Units & Descr: 20 - 19 FLAT PLATES
Heavy Metal Mass: BOL= ; EOL=3.21kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1988
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	3,039.93	3,039.93	0.00E+00	6.10E-06	6.10E-06
Am-241	2.5251E-03	3,039.93	3,039.93	0.00E+00	7.68E+00	7.68E+00
Am-242m	3.9624E-07	3,039.93	3,039.93	0.00E+00	1.20E-03	1.20E-03
Am-243	1.4880E-06	3,039.93	3,039.93	0.00E+00	4.52E-03	4.52E-03
C-14	5.7053E-09	3,039.93	3,039.93	0.00E+00	1.73E-05	1.73E-05
Cl-36	1.3124E-32	3,039.93	3,039.93	0.00E+00	3.99E-29	3.99E-29
Cm-243	1.1419E-07	3,039.93	3,039.93	0.00E+00	3.47E-04	3.47E-04
Cm-244	1.6522E-05	3,039.93	3,039.93	0.00E+00	5.02E-02	5.02E-02
Co-60	7.4047E-07	3,039.93	3,039.93	0.00E+00	2.25E-03	2.25E-03
Cs-134	2.0455E-05	3,039.93	3,039.93	0.00E+00	6.22E-02	6.22E-02
Cs-135	3.4477E-06	3,039.93	3,039.93	0.00E+00	1.05E-02	1.05E-02
Cs-137	1.4365E+00	3,039.93	3,039.93	0.00E+00	4.37E+03	4.37E+03
Eu-154	7.3230E-03	3,039.93	3,039.93	0.00E+00	2.23E+01	2.23E+01
Eu-155	5.9259E-04	3,039.93	3,039.93	0.00E+00	1.80E+00	1.80E+00
Fe-55	2.2791E-06	3,039.93	3,039.93	0.00E+00	6.93E-03	6.93E-03
H-3	1.9698E-03	3,039.93	3,039.93	0.00E+00	5.99E+00	5.99E+00
I-129	7.5300E-07	3,039.93	3,039.93	0.00E+00	2.29E-03	2.29E-03
Kr-85	4.1176E-02	3,039.93	3,039.93	0.00E+00	1.25E+02	1.25E+02
Np-237	9.5752E-06	3,039.93	3,039.93	0.00E+00	2.91E-02	2.91E-02
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	1.6217E-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
Tl-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
U-234	1.8562E-04	3,039.93	3,039.93	0.00E+00	5.64E-01	5.64E-01
U-235	-2.7235E-06	3,039.93	0.00	1.28E-02	4.50E-03	1.28E-02
U-236	1.5493E-05	3,039.93	3,039.93	0.00E+00	4.71E-02	4.71E-02
U-238	-4.2851E-09	3,039.93	0.00	1.29E-04	1.16E-04	1.29E-04
Y-90	1.3475E+00	3,039.93	3,039.93	0.00E+00	4.10E+03	4.10E+03
Other Radionuclides					4.16E+03	4.16E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.239E+14
0.0250	4.649E+13
0.0375	4.041E+13
0.0575	4.350E+13
0.0850	2.621E+13
0.1250	1.731E+13
0.2250	2.263E+13
0.3750	9.843E+12
0.5750	1.627E+14
0.8500	1.987E+12
1.2500	9.611E+11
1.7500	5.409E+10
2.2500	4.523E+06
2.7500	4.317E+06
3.5000	2.501E+03
5.0000	1.022E+03
7.0000	1.118E+02
11.0000	1.247E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.09E+01	8.09E+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 %:		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)[2]

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BABCOCK & WILCOX SCRAP
SNF ID #: 18
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.07kg
ROD Storage Site: INEEL

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

Estimated Canister usage: HIC 1.00

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.5200E-06	66.52	66.52	0.00E+00	1.68E-04	1.68E-04
Am-241	8.6432E+00	66.52	66.52	0.00E+00	5.75E+02	5.75E+02
Am-242m	1.5728E-02	66.52	66.52	0.00E+00	1.05E+00	1.05E+00
Am-243	1.6288E-02	66.52	66.52	0.00E+00	1.08E+00	1.08E+00
C-14	1.2068E-01	66.52	66.52	0.00E+00	8.03E+00	8.03E+00
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01
Cm-243	6.0144E-04	66.52	66.52	0.00E+00	4.00E-02	4.00E-02
Cm-244	9.4880E-02	66.52	66.52	0.00E+00	6.31E+00	6.31E+00
Co-60	3.9052E+00	66.52	66.52	0.00E+00	2.60E+02	2.60E+02
Cs-134	2.2139E-06	66.52	66.52	0.00E+00	1.47E-04	1.47E-04
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02
Cs-137	1.4887E+01	66.52	66.52	0.00E+00	9.90E+02	9.90E+02
Eu-154	3.7342E-01	66.52	66.52	0.00E+00	2.48E+01	2.48E+01
Eu-155	8.4893E-03	66.52	66.52	0.00E+00	5.65E-01	5.65E-01
Fe-55	5.3750E-03	66.52	66.52	0.00E+00	3.58E-01	3.58E-01
H-3	1.0472E-01	66.52	66.52	0.00E+00	6.97E+00	6.97E+00
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04
Kr-85	2.2717E-01	66.52	66.52	0.00E+00	1.51E+01	1.51E+01
Np-237	1.6400E-04	66.52	66.52	0.00E+00	1.09E-02	1.09E-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
Tl-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-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.639E+13
0.0250	1.114E+13
0.0375	9.415E+12
0.0575	1.778E+13
0.0850	5.961E+12
0.1250	4.218E+12
0.2250	5.159E+12
0.3750	2.233E+12
0.5750	3.695E+13
0.8500	8.094E+11
1.2500	1.984E+13
1.7500	2.384E+10
2.2500	1.031E+08
2.7500	1.775E+08
3.5000	9.662E+04
5.0000	4.083E+04
7.0000	4.651E+03
11.0000	5.305E+02

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

	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:		66.52
Bounding:		66.52

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II [HMI] (END BOXES) GERMANY
SNF ID #: 892
Fuel Units & Descr: 6 - MTR TYPE
Heavy Metal Mass: BOL=0kg; EOL=0kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	2.3056E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	4.1476E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4894E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	5.7108E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	1.3124E-32	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.4562E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	2.4221E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	2.7560E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	5.8851E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.4477E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	1.8099E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.6386E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.3957E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	3.2707E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	3.4504E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.5300E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	7.8540E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	9.5615E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	0.000E+00
0.0250	0.000E+00
0.0375	0.000E+00
0.0575	0.000E+00
0.0850	0.000E+00
0.1250	0.000E+00
0.2250	0.000E+00
0.3750	0.000E+00
0.5750	0.000E+00
0.8500	0.000E+00
1.2500	0.000E+00
1.7500	0.000E+00
2.2500	0.000E+00
2.7500	0.000E+00
3.5000	0.000E+00
5.0000	0.000E+00
7.0000	0.000E+00
11.0000	0.000E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II [HMI] (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

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
4.67

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.1465E-09	8,124.67	16,249.34	0.00E+00	9.32E-06	1.86E-05
Am-241	2.3056E-03	8,124.67	16,249.34	0.00E+00	1.87E+01	3.75E+01
Am-242m	4.1476E-07	8,124.67	16,249.34	0.00E+00	3.37E-03	6.74E-03
Am-243	1.4894E-06	8,124.67	16,249.34	0.00E+00	1.21E-02	2.42E-02
C-14	5.7108E-09	8,124.67	16,249.34	0.00E+00	4.64E-05	9.28E-05
Cl-36	1.3124E-32	8,124.67	16,249.34	0.00E+00	1.07E-28	2.13E-28
Cm-243	1.4562E-07	8,124.67	16,249.34	0.00E+00	1.18E-03	2.37E-03
Cm-244	2.4221E-05	8,124.67	16,249.34	0.00E+00	1.97E-01	3.94E-01
Co-60	2.7560E-06	8,124.67	16,249.34	0.00E+00	2.24E-02	4.48E-02
Cs-134	5.8851E-04	8,124.67	16,249.34	0.00E+00	4.78E+00	9.56E+00
Cs-135	3.4477E-06	8,124.67	16,249.34	0.00E+00	2.80E-02	5.60E-02
Cs-137	1.8099E+00	8,124.67	16,249.34	0.00E+00	1.47E+04	2.94E+04
Eu-154	1.6386E-02	8,124.67	16,249.34	0.00E+00	1.33E+02	2.66E+02
Eu-155	2.3957E-03	8,124.67	16,249.34	0.00E+00	1.95E+01	3.89E+01
Fe-55	3.2707E-05	8,124.67	16,249.34	0.00E+00	2.66E-01	5.31E-01
H-3	3.4504E-03	8,124.67	16,249.34	0.00E+00	2.80E+01	5.61E+01
I-129	7.5300E-07	8,124.67	16,249.34	0.00E+00	6.12E-03	1.22E-02
Kr-85	7.8540E-02	8,124.67	16,249.34	0.00E+00	6.38E+02	1.28E+03
Np-237	9.5615E-06	8,124.67	16,249.34	0.00E+00	7.77E-02	1.55E-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	7.7260E-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
Tl-208	4.4336E-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.520E+15
0.0250	3.159E+14
0.0375	2.751E+14
0.0575	2.954E+14
0.0850	1.782E+14
0.1250	1.194E+14
0.2250	1.539E+14
0.3750	6.690E+13
0.5750	1.097E+15
0.8500	1.580E+13
1.2500	8.789E+12
1.7500	4.342E+11
2.2500	3.095E+07
2.7500	2.534E+07
3.5000	1.912E+04
5.0000	6.431E+03
7.0000	7.077E+02
11.0000	7.916E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.72E+02	3.44E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.03245367	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,124.67
Bounding:		16,249.34

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:	1.25	
Bounding:	2.50	

Estimated EOL HM/Given EOL HM: 1.04

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BNL MEDICAL RX (BMRR)
SNF ID #: 21
Fuel Units & Descr: 40 - CYLINDRICAL SECTIONS
Heavy Metal Mass: BOL=6.188kg; EOL=5.124kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 1.11

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1,007.63	2,015.26	0.00E+00	2.02E-06	4.04E-06
Am-241	2.5251E-03	1,007.63	2,015.26	0.00E+00	2.54E+00	5.09E+00
Am-242m	3.9624E-07	1,007.63	2,015.26	0.00E+00	3.99E-04	7.99E-04
Am-243	1.4880E-06	1,007.63	2,015.26	0.00E+00	1.50E-03	3.00E-03
C-14	5.7053E-09	1,007.63	2,015.26	0.00E+00	5.75E-06	1.15E-05
Cl-36	1.3124E-32	1,007.63	2,015.26	0.00E+00	1.32E-29	2.64E-29
Cm-243	1.1419E-07	1,007.63	2,015.26	0.00E+00	1.15E-04	2.30E-04
Cm-244	1.6522E-05	1,007.63	2,015.26	0.00E+00	1.66E-02	3.33E-02
Co-60	7.4047E-07	1,007.63	2,015.26	0.00E+00	7.46E-04	1.49E-03
Cs-134	2.0455E-05	1,007.63	2,015.26	0.00E+00	2.06E-02	4.12E-02
Cs-135	3.4477E-06	1,007.63	2,015.26	0.00E+00	3.47E-03	6.95E-03
Cs-137	1.4365E+00	1,007.63	2,015.26	0.00E+00	1.45E+03	2.90E+03
Eu-154	7.3230E-03	1,007.63	2,015.26	0.00E+00	7.38E+00	1.48E+01
Eu-155	5.9259E-04	1,007.63	2,015.26	0.00E+00	5.97E-01	1.19E+00
Fe-55	2.2791E-06	1,007.63	2,015.26	0.00E+00	2.30E-03	4.59E-03
H-3	1.9698E-03	1,007.63	2,015.26	0.00E+00	1.98E+00	3.97E+00
I-129	7.5300E-07	1,007.63	2,015.26	0.00E+00	7.59E-04	1.52E-03
Kr-85	4.1176E-02	1,007.63	2,015.26	0.00E+00	4.15E+01	8.30E+01
Np-237	9.5752E-06	1,007.63	2,015.26	0.00E+00	9.65E-03	1.93E-02
Pa-231	3.9379E-09	1,007.63	2,015.26	0.00E+00	3.97E-06	7.94E-06
Pb-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-238	1.6217E-02	1,007.63	2,015.26	0.00E+00	1.63E+01	3.27E+01
Pu-239	4.2810E-04	1,007.63	2,015.26	0.00E+00	4.31E-01	8.63E-01
Pu-240	2.4333E-04	1,007.63	2,015.26	0.00E+00	2.45E-01	4.90E-01
Pu-241	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
Ra-226	9.0114E-10	1,007.63	2,015.26	0.00E+00	9.08E-07	1.82E-06
Ra-228	3.1019E-14	1,007.63	2,015.26	0.00E+00	3.13E-11	6.25E-11
Ru-106	2.1225E-10	1,007.63	2,015.26	0.00E+00	2.14E-07	4.28E-07
Se-79	1.2930E-05	1,007.63	2,015.26	0.00E+00	1.30E-02	2.61E-02
Sn-126	1.1571E-05	1,007.63	2,015.26	0.00E+00	1.17E-02	2.33E-02
Sr-90	1.3472E+00	1,007.63	2,015.26	0.00E+00	1.36E+03	2.71E+03
Tc-99	4.2239E-04	1,007.63	2,015.26	0.00E+00	4.26E-01	8.51E-01
Th-229	1.2407E-11	1,007.63	2,015.26	0.00E+00	1.25E-08	2.50E-08
Th-230	8.3497E-08	1,007.63	2,015.26	0.00E+00	8.41E-05	1.68E-04
Th-232	3.8371E-14	1,007.63	2,015.26	0.00E+00	3.87E-11	7.73E-11
Tl-208	4.0414E-06	1,007.63	2,015.26	0.00E+00	4.07E-05	8.14E-05
U-232	1.0948E-07	1,007.63	2,015.26	0.00E+00	1.10E-04	2.21E-04
U-233	3.6275E-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	0.00	1.24E-02	9.65E-03	1.24E-02
U-236	1.5493E-05	1,007.63	2,015.26	0.00E+00	1.56E-02	3.12E-02
U-238	-4.2851E-09	1,007.63	0.00	1.53E-04	1.49E-04	1.53E-04
Y-90	1.3475E+00	1,007.63	2,015.26	0.00E+00	1.36E+03	2.72E+03
Other Radionuclides					1.38E+03	2.76E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.484E+14
0.0250	3.082E+13
0.0375	2.679E+13
0.0575	2.884E+13
0.0850	1.737E+13
0.1250	1.148E+13
0.2250	1.500E+13
0.3750	6.525E+12
0.5750	1.078E+14
0.8500	1.317E+12
1.2500	6.371E+11
1.7500	3.586E+10
2.2500	2.998E+06
2.7500	2.862E+06
3.5000	1.659E+03
5.0000	6.777E+02
7.0000	7.416E+01
11.0000	8.269E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+01	3.37E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.65152255	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.03	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BSR
SNF ID #: 31
Fuel Units & Descr: 41 - 19 PLATE MTR ASS'Y
Heavy Metal Mass: BOL=7.856kg; EOL=6.941kg
ROD Storage Site: SRS

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

Estimated Canister usage: 18"x10' 1.71

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	865.86	1,731.72	0.00E+00	1.74E-06	3.48E-06
Am-241	2.5251E-03	865.86	1,731.72	0.00E+00	2.19E+00	4.37E+00
Am-242m	3.9624E-07	865.86	1,731.72	0.00E+00	3.43E-04	6.86E-04
Am-243	1.4880E-06	865.86	1,731.72	0.00E+00	1.29E-03	2.58E-03
C-14	5.7053E-09	865.86	1,731.72	0.00E+00	4.94E-06	9.88E-06
Cl-36	1.3124E-32	865.86	1,731.72	0.00E+00	1.14E-29	2.27E-29
Cm-243	1.1419E-07	865.86	1,731.72	0.00E+00	9.89E-05	1.98E-04
Cm-244	1.6522E-05	865.86	1,731.72	0.00E+00	1.43E-02	2.86E-02
Co-60	7.4047E-07	865.86	1,731.72	0.00E+00	6.41E-04	1.28E-03
Cs-134	2.0455E-05	865.86	1,731.72	0.00E+00	1.77E-02	3.54E-02
Cs-135	3.4477E-06	865.86	1,731.72	0.00E+00	2.99E-03	5.97E-03
Cs-137	1.4365E+00	865.86	1,731.72	0.00E+00	1.24E+03	2.49E+03
Eu-154	7.3230E-03	865.86	1,731.72	0.00E+00	6.34E+00	1.27E+01
Eu-155	5.9259E-04	865.86	1,731.72	0.00E+00	5.13E-01	1.03E+00
Fe-55	2.2791E-06	865.86	1,731.72	0.00E+00	1.97E-03	3.95E-03
H-3	1.9698E-03	865.86	1,731.72	0.00E+00	1.71E+00	3.41E+00
I-129	7.5300E-07	865.86	1,731.72	0.00E+00	6.52E-04	1.30E-03
Kr-85	4.1176E-02	865.86	1,731.72	0.00E+00	3.57E+01	7.13E+01
Np-237	9.5752E-06	865.86	1,731.72	0.00E+00	8.29E-03	1.66E-02
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	3.66E-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
Tl-208	4.0414E-08	865.86	1,731.72	0.00E+00	3.50E-05	7.00E-05
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.275E+14
0.0250	2.648E+13
0.0375	2.302E+13
0.0575	2.478E+13
0.0850	1.493E+13
0.1250	9.861E+12
0.2250	1.289E+13
0.3750	5.607E+12
0.5750	9.267E+13
0.8500	1.132E+12
1.2500	5.475E+11
1.7500	3.081E+10
2.2500	2.576E+06
2.7500	2.459E+06
3.5000	1.426E+03
5.0000	5.825E+02
7.0000	6.375E+01
11.0000	7.108E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.45E+01	2.90E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.23369049	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		865.86	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,731.72	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CANDU
SNF ID #: 979
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass: BOL= ; EOL=49.32kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	47,275.85	47,275.85	0.00E+00	3.69E-04	3.69E-04
Am-241	2.3560E-02	47,275.85	47,275.85	0.00E+00	1.11E+03	1.11E+03
Am-242m	3.0880E-06	47,275.85	47,275.85	0.00E+00	1.46E-01	1.46E-01
Am-243	2.0520E-06	47,275.85	47,275.85	0.00E+00	9.70E-02	9.70E-02
C-14	1.1222E-03	47,275.85	47,275.85	0.00E+00	5.31E+01	5.31E+01
Cl-36	8.3760E-11	47,275.85	47,275.85	0.00E+00	3.96E-06	3.96E-06
Cm-243	2.4260E-07	47,275.85	47,275.85	0.00E+00	1.15E-02	1.15E-02
Cm-244	3.3140E-06	47,275.85	47,275.85	0.00E+00	1.57E-01	1.57E-01
Co-60	1.2454E-03	47,275.85	47,275.85	0.00E+00	5.89E+01	5.89E+01
Cs-134	3.3040E-10	47,275.85	47,275.85	0.00E+00	1.56E-05	1.56E-05
Cs-135	7.9140E-06	47,275.85	47,275.85	0.00E+00	3.74E-01	3.74E-01
Cs-137	7.1580E-01	47,275.85	47,275.85	0.00E+00	3.38E+04	3.38E+04
Eu-154	6.0500E-04	47,275.85	47,275.85	0.00E+00	2.86E+01	2.86E+01
Eu-155	9.4860E-06	47,275.85	47,275.85	0.00E+00	4.48E-01	4.48E-01
Fe-55	1.9322E-08	47,275.85	47,275.85	0.00E+00	9.13E-04	9.13E-04
H-3	4.4180E-03	47,275.85	47,275.85	0.00E+00	2.09E+02	2.09E+02
I-129	7.5020E-07	47,275.85	47,275.85	0.00E+00	3.55E-02	3.55E-02
Kr-85	5.4940E-03	47,275.85	47,275.85	0.00E+00	2.60E+02	2.60E+02
Np-237	5.8040E-06	47,275.85	47,275.85	0.00E+00	2.74E-01	2.74E-01
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	1.1926E-09	47,275.85	47,275.85	0.00E+00	5.64E-05	5.64E-05
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.618E+15
0.0250	3.342E+14
0.0375	2.942E+14
0.0575	3.258E+14
0.0850	1.875E+14
0.1250	1.218E+14
0.2250	1.614E+14
0.3750	7.028E+13
0.5750	1.257E+15
0.8500	1.201E+13
1.2500	8.677E+12
1.7500	3.102E+11
2.2500	5.583E+07
2.7500	5.801E+07
3.5000	2.364E+05
5.0000	9.920E+04
7.0000	1.115E+04
11.0000	1.265E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.49E+02	4.49E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		47,275.85
Bounding:		47,275.85

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CVTR FUEL
SNF ID #: 37
Fuel Units & Descr: 34 - ROD
Heavy Metal Mass: BOL=68.656kg; EOL=67.47kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1967
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.2320E-09	1,137.42	2,274.84	0.00E+00	7.09E-06	1.42E-05
Am-241	2.3540E-02	1,137.42	2,274.84	0.00E+00	2.68E+01	5.35E+01
Am-242m	3.3060E-06	1,137.42	2,274.84	0.00E+00	3.76E-03	7.52E-03
Am-243	2.0560E-06	1,137.42	2,274.84	0.00E+00	2.34E-03	4.68E-03
C-14	1.1244E-03	1,137.42	2,274.84	0.00E+00	1.28E+00	2.56E+00
Cl-36	8.3760E-11	1,137.42	2,274.84	0.00E+00	9.53E-08	1.91E-07
Cm-243	3.4960E-07	1,137.42	2,274.84	0.00E+00	3.98E-04	7.95E-04
Cm-244	5.8860E-06	1,137.42	2,274.84	0.00E+00	6.69E-03	1.34E-02
Co-60	8.9560E-03	1,137.42	2,274.84	0.00E+00	1.02E+01	2.04E+01
Cs-134	5.1180E-08	1,137.42	2,274.84	0.00E+00	5.82E-05	1.16E-04
Cs-135	7.9140E-06	1,137.42	2,274.84	0.00E+00	9.00E-03	1.80E-02
Cs-137	1.0122E+00	1,137.42	2,274.84	0.00E+00	1.15E+03	2.30E+03
Eu-154	2.0260E-03	1,137.42	2,274.84	0.00E+00	2.30E+00	4.61E+00
Eu-155	7.7180E-05	1,137.42	2,274.84	0.00E+00	8.78E-02	1.76E-01
Fe-55	1.0538E-06	1,137.42	2,274.84	0.00E+00	1.20E-03	2.40E-03
H-3	1.0256E-02	1,137.42	2,274.84	0.00E+00	1.17E+01	2.33E+01
I-129	7.5020E-07	1,137.42	2,274.84	0.00E+00	8.53E-04	1.71E-03
Kr-85	1.4492E-02	1,137.42	2,274.84	0.00E+00	1.65E+01	3.30E+01
Np-237	5.6900E-06	1,137.42	2,274.84	0.00E+00	6.47E-03	1.29E-02
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-06	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-106	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
Tl-208	4.0060E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.110E+14
0.0250	2.296E+13
0.0375	2.020E+13
0.0575	2.210E+13
0.0850	1.289E+13
0.1250	8.420E+12
0.2250	1.111E+13
0.3750	4.834E+12
0.5750	8.557E+13
0.8500	8.698E+11
1.2500	1.856E+12
1.7500	2.288E+10
2.2500	1.023E+07
2.7500	3.238E+06
3.5000	1.163E+04
5.0000	4.879E+03
7.0000	5.488E+02
11.0000	6.227E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.45E+01	2.93E+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:	ZIRC OR SST	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.8	0 to 5

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

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,137.42	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,274.84	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.13	
Bounding:	2.27	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (U3O8 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

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4973E-09	224.12	448.24	0.00E+00	3.36E-07	6.71E-07
Am-241	2.6120E-02	224.12	448.24	0.00E+00	5.85E+00	1.17E+01
Am-242m	8.7133E-06	224.12	448.24	0.00E+00	1.95E-03	3.91E-03
Am-243	6.3980E-06	224.12	448.24	0.00E+00	1.43E-03	2.87E-03
C-14	2.9600E-08	224.12	448.24	0.00E+00	6.63E-06	1.33E-05
Cl-36	5.9507E-35	224.12	448.24	0.00E+00	1.33E-32	2.67E-32
Cm-243	1.9560E-06	224.12	448.24	0.00E+00	4.38E-04	8.77E-04
Cm-244	9.0867E-05	224.12	448.24	0.00E+00	2.04E-02	4.07E-02
Co-60	8.4667E-06	224.12	448.24	0.00E+00	1.90E-03	3.80E-03
Cs-134	3.9760E-04	224.12	448.24	0.00E+00	8.91E-02	1.78E-01
Cs-135	4.8607E-06	224.12	448.24	0.00E+00	1.09E-03	2.18E-03
Cs-137	1.8020E+00	224.12	448.24	0.00E+00	4.04E+02	8.08E+02
Eu-154	1.3960E-02	224.12	448.24	0.00E+00	3.13E+00	6.26E+00
Eu-155	2.0313E-03	224.12	448.24	0.00E+00	4.55E-01	9.11E-01
Fe-55	3.7360E-04	224.12	448.24	0.00E+00	8.37E-02	1.67E-01
H-3	3.5233E-03	224.12	448.24	0.00E+00	7.90E-01	1.58E+00
I-129	7.1600E-07	224.12	448.24	0.00E+00	1.60E-04	3.21E-04
Kr-85	7.4133E-02	224.12	448.24	0.00E+00	1.66E+01	3.32E+01
Np-237	3.8020E-06	224.12	448.24	0.00E+00	8.52E-04	1.70E-03
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	4.3533E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.029E+13
0.0250	8.360E+12
0.0375	7.333E+12
0.0575	7.951E+12
0.0850	4.707E+12
0.1250	3.140E+12
0.2250	4.059E+12
0.3750	1.764E+12
0.5750	3.008E+13
0.8500	4.008E+11
1.2500	2.168E+11
1.7500	1.100E+10
2.2500	8.218E+05
2.7500	1.184E+05
3.5000	2.241E+03
5.0000	8.888E+02
7.0000	1.003E+02
11.0000	1.140E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E+00	9.61E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.58291238	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		224.12
Bounding:		448.24

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.86	
Bounding:	3.72	

Estimated EOL HM/Given EOL HM: 1.02

[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: DR-3 (U3Si2 LEU)(DENMARK)
SNF ID #: 750
Fuel Units & Descr: 375 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=341.662kg; EOL=309.112kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
10.42

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4973E-09	30,937.63	61,875.26	0.00E+00	4.63E-05	9.26E-05
Am-241	2.6120E-02	30,937.63	61,875.26	0.00E+00	8.08E+02	1.62E+03
Am-242m	8.7133E-06	30,937.63	61,875.26	0.00E+00	2.70E-01	5.39E-01
Am-243	6.3980E-06	30,937.63	61,875.26	0.00E+00	1.98E-01	3.96E-01
C-14	2.9600E-08	30,937.63	61,875.26	0.00E+00	9.16E-04	1.83E-03
Cl-36	5.9507E-35	30,937.63	61,875.26	0.00E+00	1.84E-30	3.68E-30
Cm-243	1.9560E-06	30,937.63	61,875.26	0.00E+00	6.05E-02	1.21E-01
Cm-244	9.0867E-05	30,937.63	61,875.26	0.00E+00	2.81E+00	5.62E+00
Co-60	8.4667E-06	30,937.63	61,875.26	0.00E+00	2.62E-01	5.24E-01
Cs-134	3.9760E-04	30,937.63	61,875.26	0.00E+00	1.23E+01	2.46E+01
Cs-135	4.8607E-06	30,937.63	61,875.26	0.00E+00	1.50E-01	3.01E-01
Cs-137	1.8020E+00	30,937.63	61,875.26	0.00E+00	5.57E+04	1.11E+05
Eu-154	1.3960E-02	30,937.63	61,875.26	0.00E+00	4.32E+02	8.64E+02
Eu-155	2.0313E-03	30,937.63	61,875.26	0.00E+00	6.28E+01	1.26E+02
Fe-55	3.7360E-04	30,937.63	61,875.26	0.00E+00	1.16E+01	2.31E+01
H-3	3.5233E-03	30,937.63	61,875.26	0.00E+00	1.09E+02	2.18E+02
I-129	7.1600E-07	30,937.63	61,875.26	0.00E+00	2.22E-02	4.43E-02
Kr-85	7.4133E-02	30,937.63	61,875.26	0.00E+00	2.29E+03	4.59E+03
Np-237	3.8020E-06	30,937.63	61,875.26	0.00E+00	1.18E-01	2.35E-01
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	1.64E+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	3.35E+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-06	6.68E-06
Th-232	2.2773E-14	30,937.63	61,875.26	0.00E+00	7.05E-10	1.41E-09
Tl-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-238	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.562E+15
0.0250	1.154E+15
0.0375	1.012E+15
0.0575	1.098E+15
0.0850	6.497E+14
0.1250	4.335E+14
0.2250	5.603E+14
0.3750	2.435E+14
0.5750	4.152E+15
0.8500	5.533E+13
1.2500	2.993E+13
1.7500	1.519E+12
2.2500	1.134E+08
2.7500	1.634E+07
3.5000	3.092E+05
5.0000	1.227E+05
7.0000	1.385E+04
11.0000	1.573E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.63E+02	1.33E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		30,937.63	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		61,875.26	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

[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: DR-3 (UALX HEU)(DENMARK)
SNF ID #: 714
Fuel Units & Descr: 88 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=14.529kg; EOL=8.8kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 2.44

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	5.4520E-10	5,276.81	10,553.63	0.00E+00	2.88E-06	5.75E-06
Am-241	9.2284E-03	5,276.81	10,553.63	0.00E+00	4.87E+01	9.74E+01
Am-242m	1.3390E-06	5,276.81	10,553.63	0.00E+00	7.07E-03	1.41E-02
Am-243	3.7084E-05	5,276.81	10,553.63	0.00E+00	1.96E-01	3.91E-01
C-14	2.6452E-08	5,276.81	10,553.63	0.00E+00	1.40E-04	2.79E-04
Cl-36	4.4441E-31	5,276.81	10,553.63	0.00E+00	2.35E-27	4.69E-27
Cm-243	5.0498E-06	5,276.81	10,553.63	0.00E+00	2.66E-02	5.33E-02
Cm-244	3.8451E-03	5,276.81	10,553.63	0.00E+00	2.03E+01	4.06E+01
Co-60	2.5225E-05	5,276.81	10,553.63	0.00E+00	1.33E-01	2.66E-01
Cs-134	1.9830E-03	5,276.81	10,553.63	0.00E+00	1.05E+01	2.09E+01
Cs-135	4.2564E-06	5,276.81	10,553.63	0.00E+00	2.25E-02	4.49E-02
Cs-137	1.8141E+00	5,276.81	10,553.63	0.00E+00	9.57E+03	1.91E+04
Eu-154	3.4733E-02	5,276.81	10,553.63	0.00E+00	1.83E+02	3.67E+02
Eu-155	7.1081E-03	5,276.81	10,553.63	0.00E+00	3.75E+01	7.50E+01
Fe-55	3.5790E-04	5,276.81	10,553.63	0.00E+00	1.89E+00	3.78E+00
H-3	3.4945E-03	5,276.81	10,553.63	0.00E+00	1.84E+01	3.69E+01
I-129	6.6403E-07	5,276.81	10,553.63	0.00E+00	3.50E-03	7.01E-03
Kr-85	7.8250E-02	5,276.81	10,553.63	0.00E+00	4.13E+02	8.26E+02
Np-237	3.1567E-05	5,276.81	10,553.63	0.00E+00	1.67E-01	3.33E-01
Pa-231	1.3372E-09	5,276.81	10,553.63	0.00E+00	7.06E-06	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	1.4769E-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-06	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	5.85E-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
Se-79	1.2339E-05	5,276.81	10,553.63	0.00E+00	6.51E-02	1.30E-01
Sn-126	1.0194E-05	5,276.81	10,553.63	0.00E+00	5.38E-02	1.08E-01
Sr-90	1.6932E+00	5,276.81	10,553.63	0.00E+00	8.93E+03	1.79E+04
Tc-99	3.8056E-04	5,276.81	10,553.63	0.00E+00	2.01E+00	4.02E+00
Th-229	9.1252E-12	5,276.81	10,553.63	0.00E+00	4.82E-08	9.63E-08
Th-230	1.5407E-08	5,276.81	10,553.63	0.00E+00	8.13E-05	1.63E-04
Th-232	2.8937E-14	5,276.81	10,553.63	0.00E+00	1.53E-10	3.05E-10
Tl-208	4.7272E-08	5,276.81	10,553.63	0.00E+00	2.49E-04	4.99E-04
U-232	1.2855E-07	5,276.81	10,553.63	0.00E+00	6.78E-04	1.36E-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	-9.4194E-09	5,276.81	0.00	5.43E-04	4.94E-04	5.43E-04
Y-90	1.6932E+00	5,276.81	10,553.63	0.00E+00	8.93E+03	1.79E+04
Other Radionuclides					9.16E+03	1.83E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.894E+14
0.0250	2.036E+14
0.0375	1.798E+14
0.0575	1.918E+14
0.0850	1.154E+14
0.1250	8.010E+13
0.2250	9.963E+13
0.3750	4.313E+13
0.5750	7.152E+14
0.8500	1.409E+13
1.2500	9.507E+12
1.7500	3.935E+11
2.2500	2.121E+07
2.7500	1.823E+07
3.5000	6.259E+05
5.0000	2.653E+05
7.0000	3.043E+04
11.0000	3.486E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+02	2.74E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	88.87461392	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	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 HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN I THO2/UO2 (LEU)
SNF ID #: 44
Fuel Units & Descr: 1000 - ROD
Heavy Metal Mass: BOL= : EOL=2382.5kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]Template Burnup(MWd): 10269.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 50 years

Estimated Canister usage: 18"x15' 5.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0595E-04	2,318,560.61	2,318,560.61	0.00E+00	2.46E+02	2.46E+02
Am-241	2.4968E-04	2,318,560.61	2,318,560.61	0.00E+00	5.79E+02	5.79E+02
Am-242m	1.3847E-06	2,318,560.61	2,318,560.61	0.00E+00	3.21E+00	3.21E+00
Am-243	3.1103E-07	2,318,560.61	2,318,560.61	0.00E+00	7.21E-01	7.21E-01
C-14	9.2267E-05	2,318,560.61	2,318,560.61	0.00E+00	2.14E+02	2.14E+02
Cl-36	1.8103E-06	2,318,560.61	2,318,560.61	0.00E+00	4.20E+00	4.20E+00
Cm-243	2.1248E-07	2,318,560.61	2,318,560.61	0.00E+00	4.93E-01	4.93E-01
Cm-244	7.9666E-06	2,318,560.61	2,318,560.61	0.00E+00	1.85E+01	1.85E+01
Co-60	1.2143E-04	2,318,560.61	2,318,560.61	0.00E+00	2.82E+02	2.82E+02
Cs-134	1.6535E-07	2,318,560.61	2,318,560.61	0.00E+00	3.83E-01	3.83E-01
Cs-135	2.8639E-05	2,318,560.61	2,318,560.61	0.00E+00	6.64E+01	6.64E+01
Cs-137	1.0449E+00	2,318,560.61	2,318,560.61	0.00E+00	2.42E+06	2.42E+06
Eu-154	2.5679E-03	2,318,560.61	2,318,560.61	0.00E+00	5.95E+03	5.95E+03
Eu-155	8.1175E-05	2,318,560.61	2,318,560.61	0.00E+00	1.88E+02	1.88E+02
Fe-55	4.2194E-08	2,318,560.61	2,318,560.61	0.00E+00	9.78E-02	9.78E-02
H-3	9.1673E-04	2,318,560.61	2,318,560.61	0.00E+00	2.13E+03	2.13E+03
I-129	1.5853E-06	2,318,560.61	2,318,560.61	0.00E+00	3.68E+00	3.68E+00
Kr-85	2.3741E-02	2,318,560.61	2,318,560.61	0.00E+00	5.50E+04	5.50E+04
Np-237	1.2747E-07	2,318,560.61	2,318,560.61	0.00E+00	2.96E-01	2.96E-01
Pa-231	1.2007E-04	2,318,560.61	2,318,560.61	0.00E+00	2.78E+02	2.78E+02
Pb-210	1.8424E-08	2,318,560.61	2,318,560.61	0.00E+00	4.27E-02	4.27E-02
Pm-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
Ra-226	2.9038E-08	2,318,560.61	2,318,560.61	0.00E+00	6.73E-02	6.73E-02
Ra-228	4.6352E-06	2,318,560.61	2,318,560.61	0.00E+00	1.07E+01	1.07E+01
Ru-106	1.3321E-15	2,318,560.61	2,318,560.61	0.00E+00	3.09E-09	3.09E-09
Se-79	3.5407E-05	2,318,560.61	2,318,560.61	0.00E+00	8.21E+01	8.21E+01
Sn-126	3.9838E-05	2,318,560.61	2,318,560.61	0.00E+00	9.24E+01	9.24E+01
Sr-90	1.0449E+00	2,318,560.61	2,318,560.61	0.00E+00	2.42E+06	2.42E+06
Tc-99	3.2525E-04	2,318,560.61	2,318,560.61	0.00E+00	7.54E+02	7.54E+02
Th-229	8.2305E-05	2,318,560.61	2,318,560.61	0.00E+00	1.91E+02	1.91E+02
Th-230	1.2533E-06	2,318,560.61	2,318,560.61	0.00E+00	2.91E+00	2.91E+00
Th-232	-9.0328E-08	2,318,560.61	0.00	5.03E-01	2.94E-01	5.03E-01
Tl-208	1.2085E-02	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	0.00	1.69E+03	0.00E+00	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	3.46E-04	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	0.00	2.21E-04	0.00E+00	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					2.84E+06	2.84E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.341E+17
0.0250	2.756E+16
0.0375	2.355E+16
0.0575	2.575E+16
0.0850	1.666E+16
0.1250	1.019E+16
0.2250	1.505E+16
0.3750	5.942E+15
0.5750	9.154E+16
0.8500	1.575E+15
1.2500	4.791E+14
1.7500	1.253E+14
2.2500	2.791E+09
2.7500	9.838E+14
3.5000	3.385E+08
5.0000	1.048E+08
7.0000	7.466E+04
11.0000	5.506E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.68E+04	4.69E+04
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	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:		60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,318,560.61
Bounding:		2,318,560.61

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:	21.79	
Bounding:	21.79	

Estimated EOL HM/Given EOL HM: 1.28

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN UO2 (LEU)
SNF ID #: 49
Fuel Units & Descr: 72 - ROD
Heavy Metal Mass: BOL= ; EOL=162.382kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated Canister usage: 18"x15' 0.36

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	153,393.39	153,393.39	0.00E+00	5.26E-03	5.26E-03
Am-241	1.1458E-04	153,393.39	153,393.39	0.00E+00	1.76E+01	1.76E+01
Am-242m	7.9468E-09	153,393.39	153,393.39	0.00E+00	1.22E-03	1.22E-03
Am-243	9.8386E-10	153,393.39	153,393.39	0.00E+00	1.51E-04	1.51E-04
C-14	2.2978E-04	153,393.39	153,393.39	0.00E+00	3.52E+01	3.52E+01
Cl-36	1.2261E-06	153,393.39	153,393.39	0.00E+00	1.88E-01	1.88E-01
Cm-243	1.7271E-10	153,393.39	153,393.39	0.00E+00	2.65E-05	2.65E-05
Cm-244	1.3058E-09	153,393.39	153,393.39	0.00E+00	2.00E-04	2.00E-04
Co-60	9.8636E-03	153,393.39	153,393.39	0.00E+00	1.51E+03	1.51E+03
Cs-134	1.9617E-08	153,393.39	153,393.39	0.00E+00	3.01E-03	3.01E-03
Cs-135	3.0316E-05	153,393.39	153,393.39	0.00E+00	4.65E+00	4.65E+00
Cs-137	1.0263E+00	153,393.39	153,393.39	0.00E+00	1.57E+05	1.57E+05
Eu-154	2.0017E-04	153,393.39	153,393.39	0.00E+00	3.07E+01	3.07E+01
Eu-155	8.5957E-05	153,393.39	153,393.39	0.00E+00	1.32E+01	1.32E+01
Fe-55	2.2646E-05	153,393.39	153,393.39	0.00E+00	3.47E+00	3.47E+00
H-3	1.0835E-03	153,393.39	153,393.39	0.00E+00	1.66E+02	1.66E+02
I-129	7.3195E-07	153,393.39	153,393.39	0.00E+00	1.12E-01	1.12E-01
Kr-85	1.5661E-02	153,393.39	153,393.39	0.00E+00	2.40E+03	2.40E+03
Np-237	1.1494E-06	153,393.39	153,393.39	0.00E+00	1.76E-01	1.76E-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
Tl-208	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	3.9817E-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	1.6190E-05	153,393.39	153,393.39	0.00E+00	2.48E+00	2.48E+00
U-238	-2.8547E-09	153,393.39	0.00	7.09E-03	6.65E-03	7.09E-03
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.998E+15
0.0250	1.662E+15
0.0375	1.441E+15
0.0575	1.550E+15
0.0850	9.363E+14
0.1250	6.074E+14
0.2250	8.069E+14
0.3750	3.520E+14
0.5750	5.860E+15
0.8500	5.786E+13
1.2500	1.318E+14
1.7500	1.490E+12
2.2500	7.550E+08
2.7500	1.028E+08
3.5000	8.989E+03
5.0000	3.711E+03
7.0000	4.099E+02
11.0000	4.601E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.79E+03	1.79E+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:	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)[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

[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: EBWR (6% UO2) LEU
SNF ID #: 65
Fuel Units & Descr: 61 - 6 FLAT PLATES
Heavy Metal Mass: BOL=1636.02kg; EOL=1603.519kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 5.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	30,906.72	61,813.45	0.00E+00	3.32E-05	6.63E-05
Am-241	1.4751E-01	30,906.72	61,813.45	0.00E+00	4.56E+03	9.12E+03
Am-242m	2.6809E-04	30,906.72	61,813.45	0.00E+00	8.29E+00	1.66E+01
Am-243	6.2484E-04	30,906.72	61,813.45	0.00E+00	1.93E+01	3.86E+01
C-14	4.7820E-05	30,906.72	61,813.45	0.00E+00	1.48E+00	2.96E+00
Cl-36	8.0297E-07	30,906.72	61,813.45	0.00E+00	2.48E-02	4.96E-02
Cm-243	1.7426E-04	30,906.72	61,813.45	0.00E+00	5.39E+00	1.08E+01
Cm-244	2.7616E-02	30,906.72	61,813.45	0.00E+00	8.54E+02	1.71E+03
Co-60	3.5610E-04	30,906.72	61,813.45	0.00E+00	1.10E+01	2.20E+01
Cs-134	2.6260E-07	30,906.72	61,813.45	0.00E+00	8.12E-03	1.62E-02
Cs-135	1.4433E-05	30,906.72	61,813.45	0.00E+00	4.46E-01	8.92E-01
Cs-137	9.8870E-01	30,906.72	61,813.45	0.00E+00	3.06E+04	6.11E+04
Eu-154	6.0320E-03	30,906.72	61,813.45	0.00E+00	1.86E+02	3.73E+02
Eu-155	2.1770E-04	30,906.72	61,813.45	0.00E+00	6.73E+00	1.35E+01
Fe-55	7.9296E-07	30,906.72	61,813.45	0.00E+00	2.45E-02	4.90E-02
H-3	8.9486E-03	30,906.72	61,813.45	0.00E+00	2.77E+02	5.53E+02
I-129	9.8288E-07	30,906.72	61,813.45	0.00E+00	3.04E-02	6.08E-02
Kr-85	1.0707E-02	30,906.72	61,813.45	0.00E+00	3.31E+02	6.62E+02
Np-237	1.1927E-05	30,906.72	61,813.45	0.00E+00	3.69E-01	7.37E-01
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
Tl-208	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	5.2665E-05	30,906.72	61,813.45	0.00E+00	1.63E+00	3.26E+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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.352E+15
0.0250	4.714E+14
0.0375	4.442E+14
0.0575	5.558E+14
0.0850	2.597E+14
0.1250	1.728E+14
0.2250	2.217E+14
0.3750	9.575E+13
0.5750	2.255E+15
0.8500	2.202E+13
1.2500	1.401E+13
1.7500	6.160E+11
2.2500	1.012E+08
2.7500	3.568E+08
3.5000	2.546E+07
5.0000	1.088E+07
7.0000	1.253E+06
11.0000	1.439E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.59E+02	1.12E+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 %:	5.973154429	0 to 5

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		30,906.72
Bounding:	2,617.63	61,813.45

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.54	
Bounding:	1.08	23.61

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: 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

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	29.85	59.70	0.00E+00	1.02E-06	2.05E-06
Am-241	1.1458E-04	29.85	59.70	0.00E+00	3.42E-03	6.84E-03
Am-242m	7.9468E-09	29.85	59.70	0.00E+00	2.37E-07	4.74E-07
Am-243	9.8386E-10	29.85	59.70	0.00E+00	2.94E-08	5.87E-08
C-14	2.2978E-04	29.85	59.70	0.00E+00	6.86E-03	1.37E-02
Cl-36	1.2261E-06	29.85	59.70	0.00E+00	3.66E-05	7.32E-05
Cm-243	1.7271E-10	29.85	59.70	0.00E+00	5.16E-09	1.03E-08
Cm-244	1.3058E-09	29.85	59.70	0.00E+00	3.90E-08	7.80E-08
Co-60	9.8636E-03	29.85	59.70	0.00E+00	2.94E-01	5.89E-01
Cs-134	1.9617E-08	29.85	59.70	0.00E+00	5.86E-07	1.17E-06
Cs-135	3.0316E-05	29.85	59.70	0.00E+00	9.05E-04	1.81E-03
Cs-137	1.0263E+00	29.85	59.70	0.00E+00	3.06E+01	6.13E+01
Eu-154	2.0017E-04	29.85	59.70	0.00E+00	5.98E-03	1.20E-02
Eu-155	8.5957E-05	29.85	59.70	0.00E+00	2.57E-03	5.13E-03
Fe-55	2.2646E-05	29.85	59.70	0.00E+00	6.76E-04	1.35E-03
H-3	1.0835E-03	29.85	59.70	0.00E+00	3.23E-02	6.47E-02
I-129	7.3195E-07	29.85	59.70	0.00E+00	2.18E-05	4.37E-05
Kr-85	1.5661E-02	29.85	59.70	0.00E+00	4.67E-01	9.35E-01
Np-237	1.1494E-06	29.85	59.70	0.00E+00	3.43E-05	6.86E-05
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	2.6223E-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	8.3328E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.113E+12
0.0250	6.469E+11
0.0375	5.609E+11
0.0575	6.033E+11
0.0850	3.644E+11
0.1250	2.364E+11
0.2250	3.141E+11
0.3750	1.370E+11
0.5750	2.281E+12
0.8500	2.252E+10
1.2500	5.129E+10
1.7500	5.798E+08
2.2500	2.939E+05
2.7500	4.003E+04
3.5000	3.796E+00
5.0000	1.569E+00
7.0000	1.736E-01
11.0000	1.950E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.48E-01	6.97E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.636	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		29.85
Bounding:		59.70

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: 1.00

[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: EBWR (MOX)
SNF ID #: 63
Fuel Units & Descr: 25 - 6 FLAT PLATES
Heavy Metal Mass: BOL=986kg; EOL=932.562kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 2.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	50,784.46	101,568.92	0.00E+00	1.28E-01	2.56E-01
Am-241	8.6432E+00	50,784.46	101,568.92	0.00E+00	4.39E+05	8.78E+05
Am-242m	1.5728E-02	50,784.46	101,568.92	0.00E+00	7.99E+02	1.60E+03
Am-243	1.6288E-02	50,784.46	101,568.92	0.00E+00	8.27E+02	1.65E+03
C-14	1.2068E-01	50,784.46	101,568.92	0.00E+00	6.13E+03	1.23E+04
Cl-36	2.2849E-03	50,784.46	101,568.92	0.00E+00	1.16E+02	2.32E+02
Cm-243	6.0144E-04	50,784.46	101,568.92	0.00E+00	3.05E+01	6.11E+01
Cm-244	9.4880E-02	50,784.46	101,568.92	0.00E+00	4.82E+03	9.64E+03
Co-60	3.9052E+00	50,784.46	101,568.92	0.00E+00	1.98E+05	3.97E+05
Cs-134	2.2139E-06	50,784.46	101,568.92	0.00E+00	1.12E-01	2.25E-01
Cs-135	4.3976E-04	50,784.46	101,568.92	0.00E+00	2.23E+01	4.47E+01
Cs-137	1.4887E+01	50,784.46	101,568.92	0.00E+00	7.56E+05	1.51E+06
Eu-154	3.7342E-01	50,784.46	101,568.92	0.00E+00	1.90E+04	3.79E+04
Eu-155	8.4893E-03	50,784.46	101,568.92	0.00E+00	4.31E+02	8.62E+02
Fe-55	5.3750E-03	50,784.46	101,568.92	0.00E+00	2.73E+02	5.46E+02
H-3	1.0472E-01	50,784.46	101,568.92	0.00E+00	5.32E+03	1.06E+04
I-129	1.0618E-05	50,784.46	101,568.92	0.00E+00	5.39E-01	1.08E+00
Kr-85	2.2717E-01	50,784.46	101,568.92	0.00E+00	1.15E+04	2.31E+04
Np-237	1.6400E-04	50,784.46	101,568.92	0.00E+00	8.33E+00	1.67E+01
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+06	0.00E+00	5.04E+06
Pu-242	-1.1381E-04	50,784.46	0.00	8.47E+01	7.90E+01	8.47E+01
Ra-226	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
Tl-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-236	2.3485E-04	50,784.46	101,568.92	0.00E+00	1.19E+01	2.39E+01
U-238	1.1581E-04	50,784.46	101,568.92	5.28E-02	5.93E+00	1.18E+01
Y-90	1.3861E+01	50,784.46	101,568.92	0.00E+00	7.04E+05	1.41E+06
Other Radionuclides					2.61E+06	5.22E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.689E+16
0.0250	1.700E+16
0.0375	1.438E+16
0.0575	2.715E+16
0.0850	9.101E+15
0.1250	6.440E+15
0.2250	7.877E+15
0.3750	3.410E+15
0.5750	5.642E+16
0.8500	1.236E+15
1.2500	3.029E+16
1.7500	3.640E+13
2.2500	1.574E+11
2.7500	2.710E+11
3.5000	1.621E+08
5.0000	6.851E+07
7.0000	7.798E+06
11.0000	8.893E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E+04	6.99E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:	0.222222216	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:		50,784.46
Bounding:		101,568.92

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.54	
Bounding:	3.08	

Estimated EOL HM/Given EOL HM: 34.51

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (NORMAL UO2)
SNF ID #: 60
Fuel Units & Descr: 51 - 6 FLAT PLATES
Heavy Metal Mass: BOL=1358.64kg; EOL=1357.824kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 16"x10'
4.25

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	775.98	1,551.95	0.00E+00	8.33E-07	1.67E-06
Am-241	1.4751E-01	775.98	1,551.95	0.00E+00	1.14E+02	2.29E+02
Am-242m	2.6809E-04	775.98	1,551.95	0.00E+00	2.08E-01	4.16E-01
Am-243	6.2484E-04	775.98	1,551.95	0.00E+00	4.85E-01	9.70E-01
C-14	4.7820E-05	775.98	1,551.95	0.00E+00	3.71E-02	7.42E-02
Cl-36	8.0297E-07	775.98	1,551.95	0.00E+00	6.23E-04	1.25E-03
Cm-243	1.7426E-04	775.98	1,551.95	0.00E+00	1.35E-01	2.70E-01
Cm-244	2.7616E-02	775.98	1,551.95	0.00E+00	2.14E+01	4.29E+01
Co-60	3.5610E-04	775.98	1,551.95	0.00E+00	2.76E-01	5.53E-01
Cs-134	2.6260E-07	775.98	1,551.95	0.00E+00	2.04E-04	4.08E-04
Cs-135	1.4433E-05	775.98	1,551.95	0.00E+00	1.12E-02	2.24E-02
Cs-137	9.8870E-01	775.98	1,551.95	0.00E+00	7.67E+02	1.53E+03
Eu-154	6.0320E-03	775.98	1,551.95	0.00E+00	4.68E+00	9.36E+00
Eu-155	2.1770E-04	775.98	1,551.95	0.00E+00	1.69E-01	3.38E-01
Fe-55	7.9296E-07	775.98	1,551.95	0.00E+00	6.15E-04	1.23E-03
H-3	8.9486E-03	775.98	1,551.95	0.00E+00	6.94E+00	1.39E+01
I-129	9.8288E-07	775.98	1,551.95	0.00E+00	7.63E-04	1.53E-03
Kr-85	1.0707E-02	775.98	1,551.95	0.00E+00	8.31E+00	1.66E+01
Np-237	1.1927E-05	775.98	1,551.95	0.00E+00	9.25E-03	1.85E-02
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
Tl-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	5.2665E-05	775.98	1,551.95	0.00E+00	4.09E-02	6.17E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.906E+13
0.0250	1.183E+13
0.0375	1.115E+13
0.0575	1.395E+13
0.0850	6.520E+12
0.1250	4.338E+12
0.2250	5.567E+12
0.3750	2.404E+12
0.5750	5.661E+13
0.8500	5.528E+11
1.2500	3.518E+11
1.7500	1.547E+10
2.2500	2.546E+06
2.7500	8.962E+06
3.5000	6.416E+05
5.0000	2.742E+05
7.0000	3.159E+04
11.0000	3.627E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.40E+01	2.81E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		775.98	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,551.95	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

[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: EBWR (SPIKES)
SNF ID #: 891
Fuel Units & Descr: 31 - 7 X 7 ROD ARRAY
Heavy Metal Mass: BOL=29.205kg; EOL=26.989kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_a: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	2,093.81	4,187.62	0.00E+00	7.18E-05	1.44E-04
Am-241	1.1458E-04	2,093.81	4,187.62	0.00E+00	2.40E-01	4.80E-01
Am-242m	7.9468E-09	2,093.81	4,187.62	0.00E+00	1.66E-05	3.33E-05
Am-243	9.8386E-10	2,093.81	4,187.62	0.00E+00	2.06E-06	4.12E-06
C-14	2.2978E-04	2,093.81	4,187.62	0.00E+00	4.81E-01	9.62E-01
Cl-36	1.2261E-06	2,093.81	4,187.62	0.00E+00	2.57E-03	5.13E-03
Cm-243	1.7271E-10	2,093.81	4,187.62	0.00E+00	3.62E-07	7.23E-07
Cm-244	1.3058E-09	2,093.81	4,187.62	0.00E+00	2.73E-06	5.47E-06
Co-60	9.8636E-03	2,093.81	4,187.62	0.00E+00	2.07E+01	4.13E+01
Cs-134	1.9617E-06	2,093.81	4,187.62	0.00E+00	4.11E-05	8.21E-05
Cs-135	3.0316E-05	2,093.81	4,187.62	0.00E+00	6.35E-02	1.27E-01
Cs-137	1.0263E+00	2,093.81	4,187.62	0.00E+00	2.15E+03	4.30E+03
Eu-154	2.0017E-04	2,093.81	4,187.62	0.00E+00	4.19E-01	8.38E-01
Eu-155	8.5957E-05	2,093.81	4,187.62	0.00E+00	1.80E-01	3.60E-01
Fe-55	2.2646E-05	2,093.81	4,187.62	0.00E+00	4.74E-02	9.48E-02
H-3	1.0835E-03	2,093.81	4,187.62	0.00E+00	2.27E+00	4.54E+00
I-129	7.3195E-07	2,093.81	4,187.62	0.00E+00	1.53E-03	3.07E-03
Kr-85	1.5661E-02	2,093.81	4,187.62	0.00E+00	3.28E+01	6.56E+01
Np-237	1.1494E-06	2,093.81	4,187.62	0.00E+00	2.41E-03	4.81E-03
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	4.6656E-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
Tl-208	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	6.82E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.184E+14
0.0250	4.538E+13
0.0375	3.934E+13
0.0575	4.232E+13
0.0850	2.556E+13
0.1250	1.658E+13
0.2250	2.203E+13
0.3750	9.609E+12
0.5750	1.600E+14
0.8500	1.580E+12
1.2500	3.597E+12
1.7500	4.067E+10
2.2500	2.061E+07
2.7500	2.808E+06
3.5000	2.493E+02
5.0000	1.029E+02
7.0000	1.138E+01
11.0000	1.277E+00

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.18999022	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,233.24	2,093.81	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	1,767.05	4,187.62	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.54	1.70
Bounding:	3.07	2.37

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: EBWR (U METAL) ENRICHED HEAVY
SNF ID #: 64
Fuel Units & Descr: 53 - 6 FLAT PLATES
Heavy Metal Mass: BOL=2969.2kg; EOL=2982.962kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	5,932.14	11,864.28	0.00E+00	6.37E-06	1.27E-05
Am-241	1.4751E-01	5,932.14	11,864.28	0.00E+00	8.75E+02	1.75E+03
Am-242m	2.6809E-04	5,932.14	11,864.28	0.00E+00	1.59E+00	3.18E+00
Am-243	6.2484E-04	5,932.14	11,864.28	0.00E+00	3.71E+00	7.41E+00
C-14	4.7820E-05	5,932.14	11,864.28	0.00E+00	2.84E-01	5.67E-01
Cl-36	8.0297E-07	5,932.14	11,864.28	0.00E+00	4.76E-03	9.53E-03
Cm-243	1.7426E-04	5,932.14	11,864.28	0.00E+00	1.03E+00	2.07E+00
Cm-244	2.7616E-02	5,932.14	11,864.28	0.00E+00	1.64E+02	3.28E+02
Co-60	3.5610E-04	5,932.14	11,864.28	0.00E+00	2.11E+00	4.22E+00
Cs-134	2.6260E-07	5,932.14	11,864.28	0.00E+00	1.56E-03	3.12E-03
Cs-135	1.4433E-05	5,932.14	11,864.28	0.00E+00	8.56E-02	1.71E-01
Cs-137	9.8870E-01	5,932.14	11,864.28	0.00E+00	5.87E+03	1.17E+04
Eu-154	6.0320E-03	5,932.14	11,864.28	0.00E+00	3.58E+01	7.16E+01
Eu-155	2.1770E-04	5,932.14	11,864.28	0.00E+00	1.29E+00	2.58E+00
Fe-55	7.9296E-07	5,932.14	11,864.28	0.00E+00	4.70E-03	9.41E-03
H-3	8.9486E-03	5,932.14	11,864.28	0.00E+00	5.31E+01	1.06E+02
I-129	9.8288E-07	5,932.14	11,864.28	0.00E+00	5.83E-03	1.17E-02
Kr-85	1.0707E-02	5,932.14	11,864.28	0.00E+00	6.35E+01	1.27E+02
Np-237	1.1927E-05	5,932.14	11,864.28	0.00E+00	7.08E-02	1.42E-01
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	6.4163E-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
Tl-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	5.2665E-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					5.65E+03	1.13E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.515E+14
0.0250	9.047E+13
0.0375	8.525E+13
0.0575	1.067E+14
0.0850	4.964E+13
0.1250	3.316E+13
0.2250	4.256E+13
0.3750	1.838E+13
0.5750	4.328E+14
0.8500	4.226E+12
1.2500	2.689E+12
1.7500	1.182E+11
2.2500	1.944E+07
2.7500	6.850E+07
3.5000	4.891E+06
5.0000	2.090E+06
7.0000	2.408E+05
11.0000	2.765E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+02	2.15E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		5,932.14	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	4,782.72	11,864.28	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

[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: EBWR (U METAL) ENRICHED THIN
SNF ID #: 887
Fuel Units & Descr: 54 - 6 FLAT PLATES
Heavy Metal Mass: BOL= ; EOL=2194.101kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	3,516.48	3,516.48	0.00E+00	3.77E-06	3.77E-06
Am-241	1.4751E-01	3,516.48	3,516.48	0.00E+00	5.19E+02	5.19E+02
Am-242m	2.6809E-04	3,516.48	3,516.48	0.00E+00	9.43E-01	9.43E-01
Am-243	6.2484E-04	3,516.48	3,516.48	0.00E+00	2.20E+00	2.20E+00
C-14	4.7820E-05	3,516.48	3,516.48	0.00E+00	1.68E-01	1.68E-01
Cl-36	8.0297E-07	3,516.48	3,516.48	0.00E+00	2.82E-03	2.82E-03
Cm-243	1.7426E-04	3,516.48	3,516.48	0.00E+00	6.13E-01	6.13E-01
Cm-244	2.7616E-02	3,516.48	3,516.48	0.00E+00	9.71E+01	9.71E+01
Co-60	3.5610E-04	3,516.48	3,516.48	0.00E+00	1.25E+00	1.25E+00
Cs-134	2.6260E-07	3,516.48	3,516.48	0.00E+00	9.23E-04	9.23E-04
Cs-135	1.4433E-05	3,516.48	3,516.48	0.00E+00	5.08E-02	5.08E-02
Cs-137	9.8870E-01	3,516.48	3,516.48	0.00E+00	3.48E+03	3.48E+03
Eu-154	6.0320E-03	3,516.48	3,516.48	0.00E+00	2.12E+01	2.12E+01
Eu-155	2.1770E-04	3,516.48	3,516.48	0.00E+00	7.66E-01	7.66E-01
Fe-55	7.9296E-07	3,516.48	3,516.48	0.00E+00	2.79E-03	2.79E-03
H-3	8.9486E-03	3,516.48	3,516.48	0.00E+00	3.15E+01	3.15E+01
I-129	9.8288E-07	3,516.48	3,516.48	0.00E+00	3.46E-03	3.46E-03
Kr-85	1.0707E-02	3,516.48	3,516.48	0.00E+00	3.77E+01	3.77E+01
Np-237	1.1927E-05	3,516.48	3,516.48	0.00E+00	4.19E-02	4.19E-02
Pa-231	1.4703E-09	3,516.48	3,516.48	0.00E+00	5.17E-06	5.17E-06
Pb-210	1.6828E-10	3,516.48	3,516.48	0.00E+00	5.92E-07	5.92E-07
Pm-147	6.9606E-06	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	6.4260E-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-05	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-06	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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.338E+14
0.0250	2.681E+13
0.0375	2.527E+13
0.0575	3.162E+13
0.0850	1.477E+13
0.1250	9.829E+12
0.2250	1.262E+13
0.3750	5.447E+12
0.5750	1.283E+14
0.8500	1.253E+12
1.2500	7.970E+11
1.7500	3.504E+10
2.2500	5.766E+06
2.7500	2.030E+07
3.5000	1.452E+06
5.0000	6.206E+05
7.0000	7.149E+04
11.0000	8.209E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.36E+01	6.36E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		3,516.48
Bounding:		3,516.48

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.05	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
0.08

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	1,745.00	3,490.00	0.00E+00	1.87E-06	3.75E-06
Am-241	1.4751E-01	1,745.00	3,490.00	0.00E+00	2.57E+02	5.15E+02
Am-242m	2.6809E-04	1,745.00	3,490.00	0.00E+00	4.68E-01	9.36E-01
Am-243	6.2484E-04	1,745.00	3,490.00	0.00E+00	1.09E+00	2.18E+00
C-14	4.7820E-05	1,745.00	3,490.00	0.00E+00	8.34E-02	1.67E-01
Cl-36	8.0297E-07	1,745.00	3,490.00	0.00E+00	1.40E-03	2.80E-03
Cm-243	1.7426E-04	1,745.00	3,490.00	0.00E+00	3.04E-01	6.08E-01
Cm-244	2.7616E-02	1,745.00	3,490.00	0.00E+00	4.82E+01	9.64E+01
Co-60	3.5610E-04	1,745.00	3,490.00	0.00E+00	6.21E-01	1.24E+00
Cs-134	2.6260E-07	1,745.00	3,490.00	0.00E+00	4.58E-04	9.16E-04
Cs-135	1.4433E-05	1,745.00	3,490.00	0.00E+00	2.52E-02	5.04E-02
Cs-137	9.8870E-01	1,745.00	3,490.00	0.00E+00	1.73E+03	3.45E+03
Eu-154	6.0320E-03	1,745.00	3,490.00	0.00E+00	1.05E+01	2.11E+01
Eu-155	2.1770E-04	1,745.00	3,490.00	0.00E+00	3.80E-01	7.60E-01
Fe-55	7.9296E-07	1,745.00	3,490.00	0.00E+00	1.38E-03	2.77E-03
H-3	8.9486E-03	1,745.00	3,490.00	0.00E+00	1.56E+01	3.12E+01
I-129	9.8288E-07	1,745.00	3,490.00	0.00E+00	1.72E-03	3.43E-03
Kr-85	1.0707E-02	1,745.00	3,490.00	0.00E+00	1.87E+01	3.74E+01
Np-237	1.1927E-05	1,745.00	3,490.00	0.00E+00	2.08E-02	4.16E-02
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	4.05E+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
Tl-206	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	9.19E-02	1.84E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.328E+14
0.0250	2.661E+13
0.0375	2.508E+13
0.0575	3.136E+13
0.0850	1.466E+13
0.1250	9.755E+12
0.2250	1.252E+13
0.3750	5.406E+12
0.5750	1.273E+14
0.8500	1.243E+12
1.2500	7.910E+11
1.7500	3.478E+10
2.2500	5.716E+06
2.7500	2.015E+07
3.5000	1.437E+06
5.0000	6.143E+05
7.0000	7.077E+04
11.0000	8.126E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.16E+01	6.31E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.447761165	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,745.00	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	64.32	3,490.00	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

[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: EBWR (U METAL) NORMAL HEAVY
SNF ID #: 889
Fuel Units & Descr: 11 - 6 FLAT PLATES
Heavy Metal Mass: BOL=620.4kg; EOL=566.145kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 0.92

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	51,594.22	103,188.45	0.00E+00	5.54E-05	1.11E-04
Am-241	1.4751E-01	51,594.22	103,188.45	0.00E+00	7.61E+03	1.52E+04
Am-242m	2.6809E-04	51,594.22	103,188.45	0.00E+00	1.38E+01	2.77E+01
Am-243	6.2484E-04	51,594.22	103,188.45	0.00E+00	3.22E+01	6.45E+01
C-14	4.7820E-05	51,594.22	103,188.45	0.00E+00	2.47E+00	4.93E+00
Cl-36	8.0297E-07	51,594.22	103,188.45	0.00E+00	4.14E-02	8.29E-02
Cm-243	1.7426E-04	51,594.22	103,188.45	0.00E+00	8.99E+00	1.80E+01
Cm-244	2.7616E-02	51,594.22	103,188.45	0.00E+00	1.42E+03	2.85E+03
Co-60	3.5610E-04	51,594.22	103,188.45	0.00E+00	1.84E+01	3.67E+01
Cs-134	2.6260E-07	51,594.22	103,188.45	0.00E+00	1.35E-02	2.71E-02
Cs-135	1.4433E-05	51,594.22	103,188.45	0.00E+00	7.45E-01	1.49E+00
Cs-137	9.8870E-01	51,594.22	103,188.45	0.00E+00	5.10E+04	1.02E+05
Eu-154	6.0320E-03	51,594.22	103,188.45	0.00E+00	3.11E+02	6.22E+02
Eu-155	2.1770E-04	51,594.22	103,188.45	0.00E+00	1.12E+01	2.25E+01
Fe-55	7.9296E-07	51,594.22	103,188.45	0.00E+00	4.09E-02	8.18E-02
H-3	8.9486E-03	51,594.22	103,188.45	0.00E+00	4.62E+02	9.23E+02
I-129	9.8288E-07	51,594.22	103,188.45	0.00E+00	5.07E-02	1.01E-01
Kr-85	1.0707E-02	51,594.22	103,188.45	0.00E+00	5.52E+02	1.10E+03
Np-237	1.1927E-05	51,594.22	103,188.45	0.00E+00	6.15E-01	1.23E+00
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	6.9606E-06	51,594.22	103,188.45	0.00E+00	3.59E-01	7.18E-01
Pu-238	6.6263E-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	2.26E+04	4.52E+04
Pu-242	6.4260E-05	51,594.22	103,188.45	0.00E+00	3.32E+00	6.63E+00
Ra-226	3.8501E-10	51,594.22	103,188.45	0.00E+00	1.99E-05	3.97E-05
Ra-228	5.2955E-12	51,594.22	103,188.45	0.00E+00	2.73E-07	5.46E-07
Ru-106	2.0413E-14	51,594.22	103,188.45	0.00E+00	1.05E-09	2.11E-09
Se-79	1.2376E-05	51,594.22	103,188.45	0.00E+00	6.39E-01	1.28E+00
Sn-126	2.5210E-05	51,594.22	103,188.45	0.00E+00	1.30E+00	2.60E+00
Sr-90	6.4163E-01	51,594.22	103,188.45	0.00E+00	3.31E+04	6.62E+04
Tc-99	3.9357E-04	51,594.22	103,188.45	0.00E+00	2.03E+01	4.06E+01
Th-229	1.5644E-10	51,594.22	103,188.45	0.00E+00	8.07E-06	1.61E-05
Th-230	2.7972E-06	51,594.22	103,188.45	0.00E+00	1.44E-03	2.89E-03
Th-232	5.3036E-12	51,594.22	103,188.45	0.00E+00	2.74E-07	5.47E-07
Tl-208	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	7.5888E-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					4.92E+04	9.83E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.926E+15
0.0250	7.869E+14
0.0375	7.414E+14
0.0575	9.278E+14
0.0850	4.335E+14
0.1250	2.884E+14
0.2250	3.701E+14
0.3750	1.598E+14
0.5750	3.764E+15
0.8500	3.676E+13
1.2500	2.339E+13
1.7500	1.028E+12
2.2500	1.690E+08
2.7500	5.957E+08
3.5000	4.250E+07
5.0000	1.816E+07
7.0000	2.092E+06
11.0000	2.403E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.33E+02	1.87E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.712765938	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		51,594.22	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	992.64	103,188.45	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.38	
Bounding:	4.75	103.95

Estimated EOL HM/Given EOL HM: 1.05

[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: 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

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	2,210.01	4,420.01	0.00E+00	2.37E-06	4.74E-06
Am-241	1.4751E-01	2,210.01	4,420.01	0.00E+00	3.26E+02	6.52E+02
Am-242m	2.6809E-04	2,210.01	4,420.01	0.00E+00	5.92E-01	1.18E+00
Am-243	6.2484E-04	2,210.01	4,420.01	0.00E+00	1.38E+00	2.76E+00
C-14	4.7820E-05	2,210.01	4,420.01	0.00E+00	1.06E-01	2.11E-01
Cl-36	8.0297E-07	2,210.01	4,420.01	0.00E+00	1.77E-03	3.55E-03
Cm-243	1.7426E-04	2,210.01	4,420.01	0.00E+00	3.85E-01	7.70E-01
Cm-244	2.7616E-02	2,210.01	4,420.01	0.00E+00	6.10E+01	1.22E+02
Co-60	3.5610E-04	2,210.01	4,420.01	0.00E+00	7.87E-01	1.57E+00
Cs-134	2.6260E-07	2,210.01	4,420.01	0.00E+00	5.80E-04	1.16E-03
Cs-135	1.4433E-05	2,210.01	4,420.01	0.00E+00	3.19E-02	6.38E-02
Cs-137	9.8870E-01	2,210.01	4,420.01	0.00E+00	2.19E+03	4.37E+03
Eu-154	6.0320E-03	2,210.01	4,420.01	0.00E+00	1.33E+01	2.67E+01
Eu-155	2.1770E-04	2,210.01	4,420.01	0.00E+00	4.81E-01	9.62E-01
Fe-55	7.9296E-07	2,210.01	4,420.01	0.00E+00	1.75E-03	3.50E-03
H-3	8.9486E-03	2,210.01	4,420.01	0.00E+00	1.98E+01	3.96E+01
I-129	9.8288E-07	2,210.01	4,420.01	0.00E+00	2.17E-03	4.34E-03
Kr-85	1.0707E-02	2,210.01	4,420.01	0.00E+00	2.37E+01	4.73E+01
Np-237	1.1927E-05	2,210.01	4,420.01	0.00E+00	2.64E-02	5.27E-02
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	6.4260E-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	6.4163E-01	2,210.01	4,420.01	0.00E+00	1.42E+03	2.84E+03
Tc-99	3.9357E-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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.682E+14
0.0250	3.370E+13
0.0375	3.176E+13
0.0575	3.974E+13
0.0850	1.857E+13
0.1250	1.235E+13
0.2250	1.585E+13
0.3750	6.847E+12
0.5750	1.612E+14
0.8500	1.574E+12
1.2500	1.002E+12
1.7500	4.405E+10
2.2500	7.240E+06
2.7500	2.552E+07
3.5000	1.821E+06
5.0000	7.782E+05
7.0000	8.965E+04
11.0000	1.029E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.00E+01	7.99E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		2,210.01	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	450.24	4,420.01	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.45	9.82

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: ENEA (LEU UALX) SALUGGIA ITALY
SNF ID #: 760
Fuel Units & Descr: 32 - MTR TYPE
Heavy Metal Mass: BOL=22.4kg; EOL=21.568kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.1465E-09	787.92	1,575.84	0.00E+00	9.03E-07	1.81E-06
Am-241	2.3056E-03	787.92	1,575.84	0.00E+00	1.82E+00	3.63E+00
Am-242m	4.1476E-07	787.92	1,575.84	0.00E+00	3.27E-04	6.54E-04
Am-243	1.4894E-06	787.92	1,575.84	0.00E+00	1.17E-03	2.35E-03
C-14	5.7108E-09	787.92	1,575.84	0.00E+00	4.50E-06	9.00E-06
Cl-36	1.3124E-32	787.92	1,575.84	0.00E+00	1.03E-29	2.07E-29
Cm-243	1.4562E-07	787.92	1,575.84	0.00E+00	1.15E-04	2.29E-04
Cm-244	2.4221E-05	787.92	1,575.84	0.00E+00	1.91E-02	3.82E-02
Co-60	2.7560E-06	787.92	1,575.84	0.00E+00	2.17E-03	4.34E-03
Cs-134	5.8851E-04	787.92	1,575.84	0.00E+00	4.64E-01	9.27E-01
Cs-135	3.4477E-06	787.92	1,575.84	0.00E+00	2.72E-03	5.43E-03
Cs-137	1.8099E+00	787.92	1,575.84	0.00E+00	1.43E+03	2.85E+03
Eu-154	1.6386E-02	787.92	1,575.84	0.00E+00	1.29E+01	2.58E+01
Eu-155	2.3957E-03	787.92	1,575.84	0.00E+00	1.89E+00	3.78E+00
Fe-55	3.2707E-05	787.92	1,575.84	0.00E+00	2.58E-02	5.15E-02
H-3	3.4504E-03	787.92	1,575.84	0.00E+00	2.72E+00	5.44E+00
I-129	7.5300E-07	787.92	1,575.84	0.00E+00	5.93E-04	1.19E-03
Kr-85	7.8540E-02	787.92	1,575.84	0.00E+00	6.19E+01	1.24E+02
Np-237	9.5615E-06	787.92	1,575.84	0.00E+00	7.53E-03	1.51E-02
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	4.61E-05	9.22E-05
Th-232	2.6906E-14	787.92	1,575.84	0.00E+00	2.12E-11	4.24E-11
Tl-208	4.4336E-08	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
U-234	1.8497E-04	787.92	1,575.84	0.00E+00	1.46E-01	2.91E-01
U-235	-2.7235E-06	787.92	0.00	9.68E-03	7.54E-03	9.68E-03
U-236	1.5493E-05	787.92	1,575.84	0.00E+00	1.22E-02	2.44E-02
U-238	-4.2851E-09	787.92	0.00	6.02E-03	6.02E-03	6.02E-03
Y-90	1.7094E+00	787.92	1,575.84	0.00E+00	1.35E+03	2.69E+03
Other Radionuclides					1.36E+03	2.71E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.475E+14
0.0250	3.063E+13
0.0375	2.668E+13
0.0575	2.865E+13
0.0850	1.729E+13
0.1250	1.158E+13
0.2250	1.492E+13
0.3750	6.488E+12
0.5750	1.064E+14
0.8500	1.533E+12
1.2500	8.523E+11
1.7500	4.211E+10
2.2500	3.001E+08
2.7500	2.458E+08
3.5000	1.886E+03
5.0000	6.375E+02
7.0000	7.021E+01
11.0000	7.859E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	3.33E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		787.92
Bounding:		1,575.84

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:	0.11	
Bounding:	0.22	

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: ENEA (UALX HEU) SALUGGIA ITALY
SNF ID #: 574
Fuel Units & Descr: 116 - MTR TYPE
Heavy Metal Mass: BOL=18.56kg; EOL=17.226kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	1,263.32	2,526.65	0.00E+00	1.45E-06	2.90E-06
Am-241	2.3056E-03	1,263.32	2,526.65	0.00E+00	2.91E+00	5.83E+00
Am-242m	4.1476E-07	1,263.32	2,526.65	0.00E+00	5.24E-04	1.05E-03
Am-243	1.4894E-06	1,263.32	2,526.65	0.00E+00	1.88E-03	3.76E-03
C-14	5.7108E-09	1,263.32	2,526.65	0.00E+00	7.21E-06	1.44E-05
Cl-36	1.3124E-32	1,263.32	2,526.65	0.00E+00	1.66E-29	3.32E-29
Cm-243	1.4562E-07	1,263.32	2,526.65	0.00E+00	1.84E-04	3.68E-04
Cm-244	2.4221E-05	1,263.32	2,526.65	0.00E+00	3.06E-02	6.12E-02
Co-60	2.7560E-06	1,263.32	2,526.65	0.00E+00	3.48E-03	6.96E-03
Cs-134	5.8851E-04	1,263.32	2,526.65	0.00E+00	7.43E-01	1.49E+00
Cs-135	3.4477E-06	1,263.32	2,526.65	0.00E+00	4.36E-03	8.71E-03
Cs-137	1.8099E+00	1,263.32	2,526.65	0.00E+00	2.29E+03	4.57E+03
Eu-154	1.6386E-02	1,263.32	2,526.65	0.00E+00	2.07E+01	4.14E+01
Eu-155	2.3957E-03	1,263.32	2,526.65	0.00E+00	3.03E+00	6.05E+00
Fe-55	3.2707E-05	1,263.32	2,526.65	0.00E+00	4.13E-02	8.26E-02
H-3	3.4504E-03	1,263.32	2,526.65	0.00E+00	4.36E+00	8.72E+00
I-129	7.5300E-07	1,263.32	2,526.65	0.00E+00	9.51E-04	1.90E-03
Kr-85	7.8540E-02	1,263.32	2,526.65	0.00E+00	9.92E+01	1.98E+02
Np-237	9.5615E-06	1,263.32	2,526.65	0.00E+00	1.21E-02	2.42E-02
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	2.16E+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	9.76E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.364E+14
0.0250	4.912E+13
0.0375	4.278E+13
0.0575	4.593E+13
0.0850	2.772E+13
0.1250	1.856E+13
0.2250	2.393E+13
0.3750	1.040E+13
0.5750	1.705E+14
0.8500	2.457E+12
1.2500	1.367E+12
1.7500	6.752E+10
2.2500	4.812E+06
2.7500	3.940E+06
3.5000	2.976E+03
5.0000	1.001E+03
7.0000	1.102E+02
11.0000	1.232E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.67E+01	5.34E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		1,263.32	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,526.65	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.43	

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: EPRI
SNF ID #: 67
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.02kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186365
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' — 0.03

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	19.01	19.01	0.00E+00	4.79E-05	4.79E-05
Am-241	8.6432E+00	19.01	19.01	0.00E+00	1.64E+02	1.64E+02
Am-242m	1.5728E-02	19.01	19.01	0.00E+00	2.99E-01	2.99E-01
Am-243	1.6288E-02	19.01	19.01	0.00E+00	3.10E-01	3.10E-01
C-14	1.2068E-01	19.01	19.01	0.00E+00	2.29E+00	2.29E+00
Cl-36	2.2849E-03	19.01	19.01	0.00E+00	4.34E-02	4.34E-02
Cm-243	6.0144E-04	19.01	19.01	0.00E+00	1.14E-02	1.14E-02
Cm-244	9.4880E-02	19.01	19.01	0.00E+00	1.80E+00	1.80E+00
Co-60	3.9052E+00	19.01	19.01	0.00E+00	7.42E+01	7.42E+01
Cs-134	2.2139E-06	19.01	19.01	0.00E+00	4.21E-05	4.21E-05
Cs-135	4.3976E-04	19.01	19.01	0.00E+00	8.36E-03	8.36E-03
Cs-137	1.4887E+01	19.01	19.01	0.00E+00	2.83E+02	2.83E+02
Eu-154	3.7342E-01	19.01	19.01	0.00E+00	7.10E+00	7.10E+00
Eu-155	8.4893E-03	19.01	19.01	0.00E+00	1.61E-01	1.61E-01
Fe-55	5.3750E-03	19.01	19.01	0.00E+00	1.02E-01	1.02E-01
H-3	1.0472E-01	19.01	19.01	0.00E+00	1.99E+00	1.99E+00
I-129	1.0618E-05	19.01	19.01	0.00E+00	2.02E-04	2.02E-04
Kr-85	2.2717E-01	19.01	19.01	0.00E+00	4.32E+00	4.32E+00
Np-237	1.6400E-04	19.01	19.01	0.00E+00	3.12E-03	3.12E-03
Pa-231	2.8688E-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	0.00	5.14E+00	0.00E+00	5.14E+00
Pu-239	-4.8600E-02	19.01	0.00	6.22E-01	0.00E+00	6.22E-01
Pu-240	-3.0127E-01	19.01	0.00	7.94E-01	0.00E+00	7.94E-01
Pu-241	-1.2917E+02	19.01	0.00	2.04E+02	0.00E+00	2.04E+02
Pu-242	-1.1381E-04	19.01	0.00	3.44E-03	1.27E-03	3.44E-03
Ra-226	1.0760E-07	19.01	19.01	0.00E+00	2.05E-06	2.05E-06
Ra-228	6.0160E-07	19.01	19.01	0.00E+00	1.14E-05	1.14E-05
Ru-106	1.3388E-13	19.01	19.01	0.00E+00	2.54E-12	2.54E-12
Se-79	1.9179E-04	19.01	19.01	0.00E+00	3.65E-03	3.65E-03
Sn-126	1.6669E-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	6.7678E-03	19.01	19.01	0.00E+00	1.29E-01	1.29E-01
Th-229	2.2592E-06	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
Tl-208	7.5795E-05	19.01	19.01	0.00E+00	1.44E-03	1.44E-03
U-232	2.0521E-04	19.01	19.01	0.00E+00	3.90E-03	3.90E-03
U-233	3.6128E-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	1.3861E+01	19.01	19.01	0.00E+00	2.63E+02	2.63E+02
Other Radionuclides					9.77E+02	9.77E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.611E+13
0.0250	3.182E+12
0.0375	2.690E+12
0.0575	5.081E+12
0.0850	1.703E+12
0.1250	1.205E+12
0.2250	1.474E+12
0.3750	6.380E+11
0.5750	1.056E+13
0.8500	2.313E+11
1.2500	5.668E+12
1.7500	6.812E+09
2.2500	2.946E+07
2.7500	5.071E+07
3.5000	2.761E+04
5.0000	1.167E+04
7.0000	1.329E+03
11.0000	1.516E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.02E+01	1.04E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	SST	SST/Inconel
BOL HM Constituents:	Pu	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:		19.01
Bounding:		19.01

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: 601.11

[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: ERR (ASSEMBLIES)
SNF ID #: 68
Fuel Units & Descr: 190 - 5 X 5 ROD ARRAY
Heavy Metal Mass: BOL=5056.66kg; EOL=5041.023kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]Template Burnup(MWd): 10269.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 50 years

Estimated Canister usage:
18"x10'
10.56

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0595E-04	27,366.64	65,736.58	0.00E+00	2.90E+00	6.96E+00
Am-241	2.4968E-04	27,366.64	65,736.58	0.00E+00	6.83E+00	1.64E+01
Am-242m	1.3847E-06	27,366.64	65,736.58	0.00E+00	3.79E-02	9.10E-02
Am-243	3.1103E-07	27,366.64	65,736.58	0.00E+00	8.51E-03	2.04E-02
C-14	9.2267E-05	27,366.64	65,736.58	0.00E+00	2.53E+00	6.07E+00
Cl-36	1.8103E-06	27,366.64	65,736.58	0.00E+00	4.95E-02	1.19E-01
Cm-243	2.1248E-07	27,366.64	65,736.58	0.00E+00	5.81E-03	1.40E-02
Cm-244	7.9666E-06	27,366.64	65,736.58	0.00E+00	2.18E-01	5.24E-01
Co-60	1.2143E-04	27,366.64	65,736.58	0.00E+00	3.32E+00	7.98E+00
Cs-134	1.6535E-07	27,366.64	65,736.58	0.00E+00	4.53E-03	1.09E-02
Cs-135	2.8639E-05	27,366.64	65,736.58	0.00E+00	7.84E-01	1.88E+00
Cs-137	1.0449E+00	27,366.64	65,736.58	0.00E+00	2.86E+04	6.87E+04
Eu-154	2.5679E-03	27,366.64	65,736.58	0.00E+00	7.03E+01	1.69E+02
Eu-155	8.1175E-05	27,366.64	65,736.58	0.00E+00	2.22E+00	5.34E+00
Fe-55	4.2194E-08	27,366.64	65,736.58	0.00E+00	1.15E-03	2.77E-03
H-3	9.1673E-04	27,366.64	65,736.58	0.00E+00	2.51E+01	6.03E+01
I-129	1.5853E-06	27,366.64	65,736.58	0.00E+00	4.34E-02	1.04E-01
Kr-85	2.3741E-02	27,366.64	65,736.58	0.00E+00	6.50E+02	1.56E+03
Np-237	1.2747E-07	27,366.64	65,736.58	0.00E+00	3.49E-03	8.38E-03
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-05	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	4.0831E-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	3.9838E-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
Tl-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	1.80E+03
U-234	8.1769E-04	27,366.64	65,736.58	0.00E+00	2.24E+01	5.38E+01
U-235	5.7813E-08	27,366.64	65,736.58	3.67E-04	1.95E-03	4.17E-03
U-236	1.3273E-07	27,366.64	65,736.58	0.00E+00	3.63E-03	8.73E-03
U-238	-3.1121E-10	27,366.64	0.00	2.35E-04	2.26E-04	2.35E-04
Y-90	1.0449E+00	27,366.64	65,736.58	0.00E+00	2.86E+04	6.87E+04
Other Radionuclides					3.35E+04	8.04E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.807E+15
0.0250	7.815E+14
0.0375	6.678E+14
0.0575	7.299E+14
0.0850	4.723E+14
0.1250	2.889E+14
0.2250	4.266E+14
0.3750	1.685E+14
0.5750	2.595E+15
0.8500	4.464E+13
1.2500	1.358E+13
1.7500	3.563E+12
2.2500	7.916E+07
2.7500	2.789E+13
3.5000	1.074E+05
5.0000	3.313E+04
7.0000	2.338E+03
11.0000	1.701E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.62E+02	1.38E+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:	SST	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	92.94902719	60 to 100

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	27,366.64	15,217.35
Bounding:	65,736.58	30,434.70

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:	0.24	0.56
Bounding:	0.58	0.46

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: ERR (RODS)
SNF ID #: 1057
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass: BOL=4.293kg; EOL=4.242kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0595E-04	49.83	99.65	0.00E+00	5.28E-03	1.06E-02
Am-241	2.4968E-04	49.83	99.65	0.00E+00	1.24E-02	2.49E-02
Am-242m	1.3847E-06	49.83	99.65	0.00E+00	6.90E-05	1.38E-04
Am-243	3.1103E-07	49.83	99.65	0.00E+00	1.55E-05	3.10E-05
C-14	9.2267E-05	49.83	99.65	0.00E+00	4.60E-03	9.19E-03
Cl-36	1.8103E-06	49.83	99.65	0.00E+00	9.02E-05	1.80E-04
Cm-243	2.1248E-07	49.83	99.65	0.00E+00	1.06E-05	2.12E-05
Cm-244	7.9666E-06	49.83	99.65	0.00E+00	3.97E-04	7.94E-04
Co-60	1.2143E-04	49.83	99.65	0.00E+00	6.05E-03	1.21E-02
Cs-134	1.6535E-07	49.83	99.65	0.00E+00	8.24E-06	1.65E-05
Cs-135	2.8639E-05	49.83	99.65	0.00E+00	1.43E-03	2.85E-03
Cs-137	1.0449E+00	49.83	99.65	0.00E+00	5.21E+01	1.04E+02
Eu-154	2.5679E-03	49.83	99.65	0.00E+00	1.28E-01	2.56E-01
Eu-155	8.1175E-05	49.83	99.65	0.00E+00	4.04E-03	8.09E-03
Fe-55	4.2194E-08	49.83	99.65	0.00E+00	2.10E-06	4.20E-06
H-3	9.1673E-04	49.83	99.65	0.00E+00	4.57E-02	9.14E-02
I-129	1.5853E-06	49.83	99.65	0.00E+00	7.90E-05	1.58E-04
Kr-85	2.3741E-02	49.83	99.65	0.00E+00	1.18E+00	2.37E+00
Np-237	1.2747E-07	49.83	99.65	0.00E+00	6.35E-06	1.27E-05
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	8.06E-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-08	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
Sn-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
Tl-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-08	49.83	99.65	3.12E-07	3.19E-06	6.07E-06
U-236	1.3273E-07	49.83	99.65	0.00E+00	6.61E-06	1.32E-05
U-238	-3.1121E-10	49.83	0.00	1.99E-07	1.84E-07	1.99E-07
Y-90	1.0449E+00	49.83	99.65	0.00E+00	5.21E+01	1.04E+02
Other Radionuclides					6.09E+01	1.22E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.767E+12
0.0250	1.185E+12
0.0375	1.012E+12
0.0575	1.107E+12
0.0850	7.160E+11
0.1250	4.380E+11
0.2250	6.467E+11
0.3750	2.554E+11
0.5750	3.935E+12
0.8500	6.768E+10
1.2500	2.059E+10
1.7500	5.386E+09
2.2500	1.200E+05
2.7500	4.229E+10
3.5000	1.550E+02
5.0000	4.789E+01
7.0000	3.393E+00
11.0000	2.483E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.05E+00	2.06E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.0868939	60 to 100

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.

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	28.26	49.83	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	45.49	99.65	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	1.76
Bounding:	1.04	2.19

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ESSOR (UALX-HEU) ITALY
SNF ID #: 762
Fuel Units & Descr: 12 - 18 CURVED PLATES
Heavy Metal Mass: BOL=7.8kg; EOL=5.73kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	1,960.33	3,920.66	0.00E+00	1.30E-06	2.60E-06
Am-241	2.0060E-03	1,960.33	3,920.66	0.00E+00	3.93E+00	7.86E+00
Am-242m	4.2429E-07	1,960.33	3,920.66	0.00E+00	8.32E-04	1.66E-03
Am-243	1.4899E-06	1,960.33	3,920.66	0.00E+00	2.92E-03	5.84E-03
C-14	5.7135E-09	1,960.33	3,920.66	0.00E+00	1.12E-05	2.24E-05
Cl-36	1.3124E-32	1,960.33	3,920.66	0.00E+00	2.57E-29	5.15E-29
Cm-243	1.6443E-07	1,960.33	3,920.66	0.00E+00	3.22E-04	6.45E-04
Cm-244	2.9330E-05	1,960.33	3,920.66	0.00E+00	5.75E-02	1.15E-01
Co-60	5.3186E-06	1,960.33	3,920.66	0.00E+00	1.04E-02	2.09E-02
Cs-134	3.1563E-03	1,960.33	3,920.66	0.00E+00	6.19E+00	1.24E+01
Cs-135	3.4477E-06	1,960.33	3,920.66	0.00E+00	6.76E-03	1.35E-02
Cs-137	2.0313E+00	1,960.33	3,920.66	0.00E+00	3.98E+03	7.96E+03
Eu-154	2.4513E-02	1,960.33	3,920.66	0.00E+00	4.81E+01	9.61E+01
Eu-155	4.8175E-03	1,960.33	3,920.66	0.00E+00	9.44E+00	1.89E+01
Fe-55	1.2397E-04	1,960.33	3,920.66	0.00E+00	2.43E-01	4.86E-01
H-3	4.5697E-03	1,960.33	3,920.66	0.00E+00	8.96E+00	1.79E+01
I-129	7.5300E-07	1,960.33	3,920.66	0.00E+00	1.48E-03	2.95E-03
Kr-85	1.0850E-01	1,960.33	3,920.66	0.00E+00	2.13E+02	4.25E+02
Np-237	9.5561E-06	1,960.33	3,920.66	0.00E+00	1.87E-02	3.75E-02
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
Tl-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
U-233	2.5825E-09	1,960.33	3,920.66	0.00E+00	5.06E-06	1.01E-05
U-234	1.8450E-04	1,960.33	3,920.66	0.00E+00	3.62E-01	7.23E-01
U-235	-2.7235E-06	1,960.33	0.00	1.56E-02	1.03E-02	1.56E-02
U-236	1.5493E-05	1,960.33	3,920.66	0.00E+00	3.04E-02	6.07E-02
U-238	-4.2851E-09	1,960.33	0.00	1.96E-04	1.87E-04	1.96E-04
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.139E+14
0.0250	8.606E+13
0.0375	7.506E+13
0.0575	8.040E+13
0.0850	4.858E+13
0.1250	3.288E+13
0.2250	4.192E+13
0.3750	1.825E+13
0.5750	2.977E+14
0.8500	5.032E+12
1.2500	2.874E+12
1.7500	1.319E+11
2.2500	1.157E+07
2.7500	6.541E+06
3.5000	3.005E+04
5.0000	1.699E+03
7.0000	1.875E+02
11.0000	2.102E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.67E+01	9.35E+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 %:	92.52828863	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,960.33	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,920.66	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

[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: FMRB (GERMANY)
SNF ID #: 577
Fuel Units & Descr: 92 - MTR TYPE
Heavy Metal Mass: BOL=13.138kg; EOL=11.666kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1,394.01	2,788.03	0.00E+00	2.80E-06	5.60E-06
Am-241	2.5251E-03	1,394.01	2,788.03	0.00E+00	3.52E+00	7.04E+00
Am-242m	3.9624E-07	1,394.01	2,788.03	0.00E+00	5.52E-04	1.10E-03
Am-243	1.4880E-06	1,394.01	2,788.03	0.00E+00	2.07E-03	4.15E-03
C-14	5.7053E-09	1,394.01	2,788.03	0.00E+00	7.95E-06	1.59E-05
Cl-36	1.3124E-32	1,394.01	2,788.03	0.00E+00	1.83E-29	3.66E-29
Cm-243	1.1419E-07	1,394.01	2,788.03	0.00E+00	1.59E-04	3.18E-04
Cm-244	1.6522E-05	1,394.01	2,788.03	0.00E+00	2.30E-02	4.61E-02
Co-60	7.4047E-07	1,394.01	2,788.03	0.00E+00	1.03E-03	2.06E-03
Cs-134	2.0455E-05	1,394.01	2,788.03	0.00E+00	2.85E-02	5.70E-02
Cs-135	3.4477E-06	1,394.01	2,788.03	0.00E+00	4.81E-03	9.61E-03
Cs-137	1.4365E+00	1,394.01	2,788.03	0.00E+00	2.00E+03	4.01E+03
Eu-154	7.3230E-03	1,394.01	2,788.03	0.00E+00	1.02E+01	2.04E+01
Eu-155	5.9259E-04	1,394.01	2,788.03	0.00E+00	8.26E-01	1.65E+00
Fe-55	2.2791E-06	1,394.01	2,788.03	0.00E+00	3.18E-03	6.35E-03
H-3	1.9698E-03	1,394.01	2,788.03	0.00E+00	2.75E+00	5.49E+00
I-129	7.5300E-07	1,394.01	2,788.03	0.00E+00	1.05E-03	2.10E-03
Kr-85	4.1176E-02	1,394.01	2,788.03	0.00E+00	5.74E+01	1.15E+02
Np-237	9.5752E-06	1,394.01	2,788.03	0.00E+00	1.33E-02	2.67E-02
Pa-231	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
Tl-208	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-09	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.053E+14
0.0250	4.264E+13
0.0375	3.706E+13
0.0575	3.989E+13
0.0850	2.404E+13
0.1250	1.588E+13
0.2250	2.075E+13
0.3750	9.028E+12
0.5750	1.492E+14
0.8500	1.822E+12
1.2500	8.814E+11
1.7500	4.961E+10
2.2500	4.148E+08
2.7500	3.959E+08
3.5000	2.296E+08
5.0000	9.381E+02
7.0000	1.027E+02
11.0000	1.145E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.33E+01	4.67E+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 %:	91.25787542	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,394.01
Bounding:		2,788.03

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:	0.34	
Bounding:	0.67	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.29

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	881.01	1,762.02	0.00E+00	1.77E-06	3.54E-06
Am-241	2.5251E-03	881.01	1,762.02	0.00E+00	2.22E+00	4.45E+00
Am-242m	3.9624E-07	881.01	1,762.02	0.00E+00	3.49E-04	6.98E-04
Am-243	1.4880E-06	881.01	1,762.02	0.00E+00	1.31E-03	2.62E-03
C-14	5.7053E-09	881.01	1,762.02	0.00E+00	5.03E-06	1.01E-05
Cl-36	1.3124E-32	881.01	1,762.02	0.00E+00	1.16E-29	2.31E-29
Cm-243	1.1419E-07	881.01	1,762.02	0.00E+00	1.01E-04	2.01E-04
Cm-244	1.6522E-05	881.01	1,762.02	0.00E+00	1.46E-02	2.91E-02
Co-60	7.4047E-07	881.01	1,762.02	0.00E+00	6.52E-04	1.30E-03
Cs-134	2.0455E-05	881.01	1,762.02	0.00E+00	1.80E-02	3.60E-02
Cs-135	3.4477E-06	881.01	1,762.02	0.00E+00	3.04E-03	6.07E-03
Cs-137	1.4365E+00	881.01	1,762.02	0.00E+00	1.27E+03	2.53E+03
Eu-154	7.3230E-03	881.01	1,762.02	0.00E+00	6.45E+00	1.29E+01
Eu-155	5.9259E-04	881.01	1,762.02	0.00E+00	5.22E-01	1.04E+00
Fe-55	2.2791E-06	881.01	1,762.02	0.00E+00	2.01E-03	4.02E-03
H-3	1.9698E-03	881.01	1,762.02	0.00E+00	1.74E+00	3.47E+00
I-129	7.5300E-07	881.01	1,762.02	0.00E+00	6.63E-04	1.33E-03
Kr-85	4.1176E-02	881.01	1,762.02	0.00E+00	3.63E+01	7.26E+01
Np-237	9.5752E-06	881.01	1,762.02	0.00E+00	8.44E-03	1.69E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.298E+14
0.0250	2.695E+13
0.0375	2.342E+13
0.0575	2.521E+13
0.0850	1.519E+13
0.1250	1.003E+13
0.2250	1.311E+13
0.3750	5.705E+12
0.5750	9.429E+13
0.8500	1.152E+12
1.2500	5.571E+11
1.7500	3.135E+10
2.2500	2.621E+06
2.7500	2.502E+06
3.5000	1.463E+03
5.0000	5.981E+02
7.0000	6.548E+01
11.0000	7.303E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.47E+01	2.95E+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 %:	19.73077542	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:		881.01
Bounding:		1,762.02

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:	0.59	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	10,064.45	20,128.90	0.00E+00	2.02E-05	4.04E-05
Am-241	2.5251E-03	10,064.45	20,128.90	0.00E+00	2.54E+01	5.08E+01
Am-242m	3.9624E-07	10,064.45	20,128.90	0.00E+00	3.99E-03	7.98E-03
Am-243	1.4880E-06	10,064.45	20,128.90	0.00E+00	1.50E-02	3.00E-02
C-14	5.7053E-09	10,064.45	20,128.90	0.00E+00	5.74E-05	1.15E-04
Cl-36	1.3124E-32	10,064.45	20,128.90	0.00E+00	1.32E-28	2.64E-28
Cm-243	1.1419E-07	10,064.45	20,128.90	0.00E+00	1.15E-03	2.30E-03
Cm-244	1.6522E-05	10,064.45	20,128.90	0.00E+00	1.66E-01	3.33E-01
Co-60	7.4047E-07	10,064.45	20,128.90	0.00E+00	7.45E-03	1.49E-02
Cs-134	2.0455E-05	10,064.45	20,128.90	0.00E+00	2.06E-01	4.12E-01
Cs-135	3.4477E-06	10,064.45	20,128.90	0.00E+00	3.47E-02	6.94E-02
Cs-137	1.4365E+00	10,064.45	20,128.90	0.00E+00	1.45E+04	2.89E+04
Eu-154	7.3230E-03	10,064.45	20,128.90	0.00E+00	7.37E+01	1.47E+02
Eu-155	5.9259E-04	10,064.45	20,128.90	0.00E+00	5.96E+00	1.19E+01
Fe-55	2.2791E-06	10,064.45	20,128.90	0.00E+00	2.29E-02	4.59E-02
H-3	1.9698E-03	10,064.45	20,128.90	0.00E+00	1.98E+01	3.96E+01
I-129	7.5300E-07	10,064.45	20,128.90	0.00E+00	7.58E-03	1.52E-02
Kr-85	4.1176E-02	10,064.45	20,128.90	0.00E+00	4.14E+02	8.29E+02
Np-237	9.5752E-06	10,064.45	20,128.90	0.00E+00	9.64E-02	1.93E-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-06	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
Tl-208	4.0414E-06	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	2.75E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.483E+15
0.0250	3.078E+14
0.0375	2.676E+14
0.0575	2.880E+14
0.0850	1.735E+14
0.1250	1.146E+14
0.2250	1.498E+14
0.3750	6.518E+13
0.5750	1.077E+15
0.8500	1.316E+13
1.2500	6.364E+12
1.7500	3.582E+11
2.2500	2.995E+07
2.7500	2.858E+07
3.5000	1.679E+04
5.0000	6.865E+03
7.0000	7.518E+02
11.0000	8.386E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E+02	3.37E+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 %:	19.81106509	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:		10,064.45
Bounding:		20,128.90

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:	0.20	
Bounding:	0.40	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (UALX HEU) GERMANY
SNF ID #: 742
Fuel Units & Descr: 141 - MTR TYPE
Heavy Metal Mass: BOL=23.42kg; EOL=16.539kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
5.88

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	6,516.25	13,032.50	0.00E+00	1.31E-05	2.62E-05
Am-241	2.5251E-03	6,516.25	13,032.50	0.00E+00	1.65E+01	3.29E+01
Am-242m	3.9624E-07	6,516.25	13,032.50	0.00E+00	2.58E-03	5.16E-03
Am-243	1.4880E-06	6,516.25	13,032.50	0.00E+00	9.70E-03	1.94E-02
C-14	5.7053E-09	6,516.25	13,032.50	0.00E+00	3.72E-05	7.44E-05
Cl-36	1.3124E-32	6,516.25	13,032.50	0.00E+00	8.55E-29	1.71E-28
Cm-243	1.1419E-07	6,516.25	13,032.50	0.00E+00	7.44E-04	1.49E-03
Cm-244	1.6522E-05	6,516.25	13,032.50	0.00E+00	1.08E-01	2.15E-01
Co-60	7.4047E-07	6,516.25	13,032.50	0.00E+00	4.83E-03	9.65E-03
Cs-134	2.0455E-05	6,516.25	13,032.50	0.00E+00	1.33E-01	2.67E-01
Cs-135	3.4477E-06	6,516.25	13,032.50	0.00E+00	2.25E-02	4.49E-02
Cs-137	1.4365E+00	6,516.25	13,032.50	0.00E+00	9.36E+03	1.87E+04
Eu-154	7.3230E-03	6,516.25	13,032.50	0.00E+00	4.77E+01	9.54E+01
Eu-155	5.9259E-04	6,516.25	13,032.50	0.00E+00	3.86E+00	7.72E+00
Fe-55	2.2791E-06	6,516.25	13,032.50	0.00E+00	1.49E-02	2.97E-02
H-3	1.9698E-03	6,516.25	13,032.50	0.00E+00	1.28E+01	2.57E+01
I-129	7.5300E-07	6,516.25	13,032.50	0.00E+00	4.91E-03	9.81E-03
Kr-85	4.1176E-02	6,516.25	13,032.50	0.00E+00	2.68E+02	5.37E+02
Np-237	9.5752E-06	6,516.25	13,032.50	0.00E+00	6.24E-02	1.25E-01
Pa-231	3.9379E-09	6,516.25	13,032.50	0.00E+00	2.57E-05	5.13E-05
Pb-210	3.3115E-10	6,516.25	13,032.50	0.00E+00	2.16E-06	4.32E-06
Pm-147	9.2402E-04	6,516.25	13,032.50	0.00E+00	6.02E+00	1.20E+01
Pu-238	1.6217E-02	6,516.25	13,032.50	0.00E+00	1.06E+02	2.11E+02
Pu-239	4.2810E-04	6,516.25	13,032.50	0.00E+00	2.79E+00	5.58E+00
Pu-240	2.4333E-04	6,516.25	13,032.50	0.00E+00	1.59E+00	3.17E+00
Pu-241	1.6242E-02	6,516.25	13,032.50	0.00E+00	1.06E+02	2.12E+02
Pu-242	3.6329E-07	6,516.25	13,032.50	0.00E+00	2.37E-03	4.73E-03
Ra-226	9.0114E-10	6,516.25	13,032.50	0.00E+00	5.87E-06	1.17E-05
Ra-228	3.1019E-14	6,516.25	13,032.50	0.00E+00	2.02E-10	4.04E-10
Ru-106	2.1225E-10	6,516.25	13,032.50	0.00E+00	1.38E-06	2.77E-06
Se-79	1.2930E-05	6,516.25	13,032.50	0.00E+00	8.43E-02	1.69E-01
Sn-126	1.1571E-05	6,516.25	13,032.50	0.00E+00	7.54E-02	1.51E-01
Sr-90	1.3472E+00	6,516.25	13,032.50	0.00E+00	8.78E+03	1.76E+04
Tc-99	4.2239E-04	6,516.25	13,032.50	0.00E+00	2.75E+00	5.50E+00
Th-229	1.2407E-11	6,516.25	13,032.50	0.00E+00	8.08E-08	1.62E-07
Th-230	8.3497E-08	6,516.25	13,032.50	0.00E+00	5.44E-04	1.09E-03
Th-232	3.8371E-14	6,516.25	13,032.50	0.00E+00	2.50E-10	5.00E-10
Tl-208	4.0414E-08	6,516.25	13,032.50	0.00E+00	2.63E-04	5.27E-04
U-232	1.0948E-07	6,516.25	13,032.50	0.00E+00	7.13E-04	1.43E-03
U-233	3.6275E-09	6,516.25	13,032.50	0.00E+00	2.36E-05	4.73E-05
U-234	1.8562E-04	6,516.25	13,032.50	0.00E+00	1.21E+00	2.42E+00
U-235	-2.7235E-06	6,516.25	0.00	4.70E-02	2.92E-02	4.70E-02
U-236	1.5493E-05	6,516.25	13,032.50	0.00E+00	1.01E-01	2.02E-01
U-238	-4.2851E-09	6,516.25	0.00	5.63E-04	5.35E-04	5.63E-04
Y-90	1.3475E+00	6,516.25	13,032.50	0.00E+00	8.78E+03	1.76E+04
Other Radionuclides					8.92E+03	1.78E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.599E+14
0.0250	1.993E+14
0.0375	1.732E+14
0.0575	1.865E+14
0.0850	1.124E+14
0.1250	7.421E+13
0.2250	9.700E+13
0.3750	4.220E+13
0.5750	6.974E+14
0.8500	8.519E+12
1.2500	4.120E+12
1.7500	2.319E+11
2.2500	1.939E+07
2.7500	1.851E+07
3.5000	1.072E+04
5.0000	4.381E+03
7.0000	4.794E+02
11.0000	5.346E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.09E+02	2.18E+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 %:	92.84381755	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		6,516.25	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		13,032.50	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.88	
Bounding:	1.77	

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (UALX-HEU) GERMANY
SNF ID #: 933
Fuel Units & Descr: 195 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=39.312kg; EOL=26.871kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%. U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.5869E-10	11,459.44	22,918.88	0.00E+00	1.10E-05	2.20E-05
Am-241	1.0109E-02	11,459.44	22,918.88	0.00E+00	1.16E+02	2.32E+02
Am-242m	1.2789E-06	11,459.44	22,918.88	0.00E+00	1.47E-02	2.93E-02
Am-243	3.7047E-05	11,459.44	22,918.88	0.00E+00	4.25E-01	8.49E-01
C-14	2.6416E-08	11,459.44	22,918.88	0.00E+00	3.03E-04	6.05E-04
Cl-36	4.4441E-31	11,459.44	22,918.88	0.00E+00	5.09E-27	1.02E-26
Cm-243	3.9605E-06	11,459.44	22,918.88	0.00E+00	4.54E-02	9.08E-02
Cm-244	2.6227E-03	11,459.44	22,918.88	0.00E+00	3.01E+01	6.01E+01
Co-60	6.7740E-06	11,459.44	22,918.88	0.00E+00	7.76E-02	1.55E-01
Cs-134	6.8894E-05	11,459.44	22,918.88	0.00E+00	7.89E-01	1.58E+00
Cs-135	4.2564E-06	11,459.44	22,918.88	0.00E+00	4.88E-02	9.76E-02
Cs-137	1.4399E+00	11,459.44	22,918.88	0.00E+00	1.65E+04	3.30E+04
Eu-154	1.5522E-02	11,459.44	22,918.88	0.00E+00	1.78E+02	3.56E+02
Eu-155	1.7588E-03	11,459.44	22,918.88	0.00E+00	2.02E+01	4.03E+01
Fe-55	2.4933E-05	11,459.44	22,918.88	0.00E+00	2.86E-01	5.71E-01
H-3	1.9945E-03	11,459.44	22,918.88	0.00E+00	2.29E+01	4.57E+01
I-129	6.6403E-07	11,459.44	22,918.88	0.00E+00	7.61E-03	1.52E-02
Kr-85	4.1002E-02	11,459.44	22,918.88	0.00E+00	4.70E+02	9.40E+02
Np-237	3.1610E-05	11,459.44	22,918.88	0.00E+00	3.62E-01	7.24E-01
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	3.3366E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.693E+15
0.0250	3.478E+14
0.0375	3.049E+14
0.0575	3.280E+14
0.0850	1.963E+14
0.1250	1.324E+14
0.2250	1.696E+14
0.3750	7.361E+13
0.5750	1.230E+15
0.8500	1.821E+13
1.2500	1.088E+13
1.7500	5.147E+11
2.2500	3.563E+07
2.7500	3.582E+07
3.5000	9.523E+05
5.0000	4.047E+05
7.0000	4.633E+04
11.0000	5.302E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.42E+02	4.83E+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 HM Constituents:	U	U
BOL Enrichment %:	79.89992512	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		11,459.44	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		22,918.88	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.67	
Bounding:	1.34	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (UALX-MEU) GERMANY
SNF ID #: 1000
Fuel Units & Descr: 10 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=3.781kg; EOL=3.338kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.5869E-10	408.05	816.10	0.00E+00	3.91E-07	7.82E-07
Am-241	1.0109E-02	408.05	816.10	0.00E+00	4.13E+00	8.25E+00
Am-242m	1.2789E-06	408.05	816.10	0.00E+00	5.22E-04	1.04E-03
Am-243	3.7047E-05	408.05	816.10	0.00E+00	1.51E-02	3.02E-02
C-14	2.6416E-08	408.05	816.10	0.00E+00	1.08E-05	2.16E-05
Cl-36	4.4441E-31	408.05	816.10	0.00E+00	1.81E-28	3.63E-28
Cm-243	3.9605E-06	408.05	816.10	0.00E+00	1.62E-03	3.23E-03
Cm-244	2.6227E-03	408.05	816.10	0.00E+00	1.07E+00	2.14E+00
Co-60	6.7740E-06	408.05	816.10	0.00E+00	2.76E-03	5.53E-03
Cs-134	6.8894E-05	408.05	816.10	0.00E+00	2.81E-02	5.62E-02
Cs-135	4.2564E-06	408.05	816.10	0.00E+00	1.74E-03	3.47E-03
Cs-137	1.4399E+00	408.05	816.10	0.00E+00	5.88E+02	1.18E+03
Eu-154	1.5522E-02	408.05	816.10	0.00E+00	6.33E+00	1.27E+01
Eu-155	1.7588E-03	408.05	816.10	0.00E+00	7.18E-01	1.44E+00
Fe-55	2.4933E-05	408.05	816.10	0.00E+00	1.02E-02	2.03E-02
H-3	1.9945E-03	408.05	816.10	0.00E+00	8.14E-01	1.63E+00
I-129	6.6403E-07	408.05	816.10	0.00E+00	2.71E-04	5.42E-04
Kr-85	4.1002E-02	408.05	816.10	0.00E+00	1.67E+01	3.35E+01
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	4.6501E-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	5.57E+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	1.0194E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.028E+13
0.0250	1.239E+13
0.0375	1.086E+13
0.0575	1.168E+13
0.0850	6.989E+12
0.1250	4.713E+12
0.2250	6.039E+12
0.3750	2.621E+12
0.5750	4.378E+13
0.8500	6.484E+11
1.2500	3.874E+11
1.7500	1.833E+10
2.2500	1.269E+06
2.7500	1.275E+06
3.5000	3.391E+04
5.0000	1.441E+04
7.0000	1.650E+03
11.0000	1.888E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.60E+00	1.72E+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 %:	44.88296013	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		408.05	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		816.10	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.25	
Bounding:	0.49	

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: FRJ TUBES (U3O8 LEU) GERMANY
SNF ID #: 999
Fuel Units & Descr: 3 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=3.038kg; EOL=3.008kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4973E-09	28.23	56.46	0.00E+00	4.23E-08	8.45E-08
Am-241	2.6120E-02	28.23	56.46	0.00E+00	7.37E-01	1.47E+00
Am-242m	8.7133E-06	28.23	56.46	0.00E+00	2.46E-04	4.92E-04
Am-243	6.3980E-06	28.23	56.46	0.00E+00	1.81E-04	3.61E-04
C-14	2.9600E-08	28.23	56.46	0.00E+00	8.36E-07	1.67E-06
Cl-36	5.9507E-35	28.23	56.46	0.00E+00	1.68E-33	3.36E-33
Cm-243	1.9560E-06	28.23	56.46	0.00E+00	5.52E-05	1.10E-04
Cm-244	9.0867E-05	28.23	56.46	0.00E+00	2.57E-03	5.13E-03
Co-60	8.4667E-06	28.23	56.46	0.00E+00	2.39E-04	4.78E-04
Cs-134	3.9760E-04	28.23	56.46	0.00E+00	1.12E-02	2.24E-02
Cs-135	4.8607E-06	28.23	56.46	0.00E+00	1.37E-04	2.74E-04
Cs-137	1.8020E+00	28.23	56.46	0.00E+00	5.09E+01	1.02E+02
Eu-154	1.3960E-02	28.23	56.46	0.00E+00	3.94E-01	7.88E-01
Eu-155	2.0313E-03	28.23	56.46	0.00E+00	5.73E-02	1.15E-01
Fe-55	3.7360E-04	28.23	56.46	0.00E+00	1.05E-02	2.11E-02
H-3	3.5233E-03	28.23	56.46	0.00E+00	9.95E-02	1.99E-01
I-129	7.1600E-07	28.23	56.46	0.00E+00	2.02E-05	4.04E-05
Kr-85	7.4133E-02	28.23	56.46	0.00E+00	2.09E+00	4.19E+00
Np-237	3.8020E-06	28.23	56.46	0.00E+00	1.07E-04	2.15E-04
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-06	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
Tl-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-06	28.23	0.00	1.30E-03	1.22E-03	1.30E-03
U-236	1.3000E-05	28.23	56.46	0.00E+00	3.67E-04	7.34E-04
U-238	-1.4207E-08	28.23	0.00	8.20E-04	8.19E-04	8.20E-04
Y-90	1.6340E+00	28.23	56.46	0.00E+00	4.61E+01	9.23E+01
Other Radionuclides					4.83E+01	9.66E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.075E+12
0.0250	1.053E+12
0.0375	9.236E+11
0.0575	1.001E+12
0.0850	5.928E+11
0.1250	3.955E+11
0.2250	5.112E+11
0.3750	2.222E+11
0.5750	3.788E+12
0.8500	5.049E+10
1.2500	2.731E+10
1.7500	1.386E+09
2.2500	1.035E+05
2.7500	1.491E+04
3.5000	2.861E+02
5.0000	1.136E+02
7.0000	1.283E+01
11.0000	1.458E+00

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

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.73	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.25	28.23
Bounding:		56.46

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:	0.21	113.31
Bounding:	0.42	

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: 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

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	4,460.46	8,920.92	0.00E+00	8.95E-06	1.79E-05
Am-241	2.5251E-03	4,460.46	8,920.92	0.00E+00	1.13E+01	2.25E+01
Am-242m	3.9624E-07	4,460.46	8,920.92	0.00E+00	1.77E-03	3.53E-03
Am-243	1.4880E-06	4,460.46	8,920.92	0.00E+00	6.64E-03	1.33E-02
C-14	5.7053E-09	4,460.46	8,920.92	0.00E+00	2.54E-05	5.09E-05
Cl-36	1.3124E-32	4,460.46	8,920.92	0.00E+00	5.85E-29	1.17E-28
Cm-243	1.1419E-07	4,460.46	8,920.92	0.00E+00	5.09E-04	1.02E-03
Cm-244	1.6522E-05	4,460.46	8,920.92	0.00E+00	7.37E-02	1.47E-01
Co-60	7.4047E-07	4,460.46	8,920.92	0.00E+00	3.30E-03	6.61E-03
Cs-134	2.0455E-05	4,460.46	8,920.92	0.00E+00	9.12E-02	1.82E-01
Cs-135	3.4477E-06	4,460.46	8,920.92	0.00E+00	1.54E-02	3.08E-02
Cs-137	1.4365E+00	4,460.46	8,920.92	0.00E+00	6.41E+03	1.28E+04
Eu-154	7.3230E-03	4,460.46	8,920.92	0.00E+00	3.27E+01	6.53E+01
Eu-155	5.9259E-04	4,460.46	8,920.92	0.00E+00	2.64E+00	5.29E+00
Fe-55	2.2791E-06	4,460.46	8,920.92	0.00E+00	1.02E-02	2.03E-02
H-3	1.9698E-03	4,460.46	8,920.92	0.00E+00	8.79E+00	1.76E+01
I-129	7.5300E-07	4,460.46	8,920.92	0.00E+00	3.36E-03	6.72E-03
Kr-85	4.1176E-02	4,460.46	8,920.92	0.00E+00	1.84E+02	3.67E+02
Np-237	9.5752E-06	4,460.46	8,920.92	0.00E+00	4.27E-02	8.54E-02
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	3.6329E-07	4,460.46	8,920.92	0.00E+00	1.62E-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
Tl-208	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	1.62E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.570E+14
0.0250	1.364E+14
0.0375	1.186E+14
0.0575	1.276E+14
0.0850	7.691E+13
0.1250	5.060E+13
0.2250	6.640E+13
0.3750	2.889E+13
0.5750	4.774E+14
0.8500	5.831E+12
1.2500	2.820E+12
1.7500	1.587E+11
2.2500	1.327E+07
2.7500	1.267E+07
3.5000	7.365E+03
5.0000	3.010E+03
7.0000	3.294E+02
11.0000	3.674E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.46E+01	1.49E+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 %:	44.97952648	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:	686.61	4,460.46
Bounding:		8,920.92

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.50	6.50
Bounding:	1.01	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRM (UALX HEU) GERMANY
SNF ID #: 806
Fuel Units & Descr: 31 - MTR TYPE
Heavy Metal Mass: BOL=6.395kg; EOL=3.171kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	3,053.19	6,056.47	0.00E+00	6.13E-06	1.22E-05
Am-241	2.5251E-03	3,053.19	6,056.47	0.00E+00	7.71E+00	1.53E+01
Am-242m	3.9624E-07	3,053.19	6,056.47	0.00E+00	1.21E-03	2.40E-03
Am-243	1.4880E-06	3,053.19	6,056.47	0.00E+00	4.54E-03	9.01E-03
C-14	5.7053E-09	3,053.19	6,056.47	0.00E+00	1.74E-05	3.46E-05
Cl-36	1.3124E-32	3,053.19	6,056.47	0.00E+00	4.01E-29	7.95E-29
Cm-243	1.1419E-07	3,053.19	6,056.47	0.00E+00	3.49E-04	6.92E-04
Cm-244	1.6522E-05	3,053.19	6,056.47	0.00E+00	5.04E-02	1.00E-01
Co-60	7.4047E-07	3,053.19	6,056.47	0.00E+00	2.26E-03	4.48E-03
Cs-134	2.0455E-05	3,053.19	6,056.47	0.00E+00	6.25E-02	1.24E-01
Cs-135	3.4477E-06	3,053.19	6,056.47	0.00E+00	1.05E-02	2.09E-02
Cs-137	1.4365E+00	3,053.19	6,056.47	0.00E+00	4.39E+03	8.70E+03
Eu-154	7.3230E-03	3,053.19	6,056.47	0.00E+00	2.24E+01	4.44E+01
Eu-155	5.9259E-04	3,053.19	6,056.47	0.00E+00	1.81E+00	3.59E+00
Fe-55	2.2791E-06	3,053.19	6,056.47	0.00E+00	6.96E-03	1.38E-02
H-3	1.9698E-03	3,053.19	6,056.47	0.00E+00	6.01E+00	1.19E+01
I-129	7.5300E-07	3,053.19	6,056.47	0.00E+00	2.30E-03	4.56E-03
Kr-85	4.1176E-02	3,053.19	6,056.47	0.00E+00	1.26E+02	2.49E+02
Np-237	9.5752E-06	3,053.19	6,056.47	0.00E+00	2.92E-02	5.80E-02
Pa-231	3.9379E-09	3,053.19	6,056.47	0.00E+00	1.20E-05	2.38E-05
Pb-210	3.3115E-10	3,053.19	6,056.47	0.00E+00	1.01E-06	2.01E-06
Pm-147	9.2402E-04	3,053.19	6,056.47	0.00E+00	2.82E+00	5.60E+00
Pu-238	1.6217E-02	3,053.19	6,056.47	0.00E+00	4.95E+01	9.82E+01
Pu-239	4.2810E-04	3,053.19	6,056.47	0.00E+00	1.31E+00	2.59E+00
Pu-240	2.4333E-04	3,053.19	6,056.47	0.00E+00	7.43E-01	1.47E+00
Pu-241	1.6242E-02	3,053.19	6,056.47	0.00E+00	4.96E+01	9.84E+01
Pu-242	3.6329E-07	3,053.19	6,056.47	0.00E+00	1.11E-03	2.20E-03
Ra-226	9.0114E-10	3,053.19	6,056.47	0.00E+00	2.75E-06	5.46E-06
Ra-228	3.1019E-14	3,053.19	6,056.47	0.00E+00	9.47E-11	1.88E-10
Ru-106	2.1225E-10	3,053.19	6,056.47	0.00E+00	6.48E-07	1.29E-06
Se-79	1.2930E-05	3,053.19	6,056.47	0.00E+00	3.95E-02	7.83E-02
Sn-126	1.1571E-05	3,053.19	6,056.47	0.00E+00	3.53E-02	7.01E-02
Sr-90	1.3472E+00	3,053.19	6,056.47	0.00E+00	4.11E+03	8.16E+03
Tc-99	4.2239E-04	3,053.19	6,056.47	0.00E+00	1.29E+00	2.56E+00
Th-229	1.2407E-11	3,053.19	6,056.47	0.00E+00	3.79E-08	7.51E-08
Th-230	8.3497E-08	3,053.19	6,056.47	0.00E+00	2.55E-04	5.06E-04
Th-232	3.8371E-14	3,053.19	6,056.47	0.00E+00	1.17E-10	2.32E-10
Tl-208	4.0414E-08	3,053.19	6,056.47	0.00E+00	1.23E-04	2.45E-04
U-232	1.0948E-07	3,053.19	6,056.47	0.00E+00	3.34E-04	6.63E-04
U-233	3.6275E-09	3,053.19	6,056.47	0.00E+00	1.11E-05	2.20E-05
U-234	1.8562E-04	3,053.19	6,056.47	0.00E+00	5.67E-01	1.12E+00
U-235	-2.7235E-06	3,053.19	0.00	1.26E-02	4.28E-03	1.26E-02
U-236	1.5493E-05	3,053.19	6,056.47	0.00E+00	4.73E-02	9.38E-02
U-238	-4.2851E-09	3,053.19	0.00	1.91E-04	1.78E-04	1.91E-04
Y-90	1.3475E+00	3,053.19	6,056.47	0.00E+00	4.11E+03	8.16E+03
Other Radionuclides					4.18E+03	8.29E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.461E+14
0.0250	9.263E+13
0.0375	8.051E+13
0.0575	8.666E+13
0.0850	5.221E+13
0.1250	3.449E+13
0.2250	4.508E+13
0.3750	1.961E+13
0.5750	3.241E+14
0.8500	3.959E+12
1.2500	1.915E+12
1.7500	1.078E+11
2.2500	9.010E+06
2.7500	8.600E+06
3.5000	4.982E+03
5.0000	2.036E+03
7.0000	2.228E+02
11.0000	2.484E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.11E+01	1.01E+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 %:	91.10863593	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		3,053.19	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		6,056.47	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U308-LEU) AUSTRIA
SNF ID #: 556
Fuel Units & Descr: 4 - MTR TYPE
Heavy Metal Mass: BOL= ; EOL=6.96kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	6,591.26	6,591.26	0.00E+00	4.37E-06	4.37E-06
Am-241	2.0060E-03	6,591.26	6,591.26	0.00E+00	1.32E+01	1.32E+01
Am-242m	4.2429E-07	6,591.26	6,591.26	0.00E+00	2.80E-03	2.80E-03
Am-243	1.4899E-06	6,591.26	6,591.26	0.00E+00	9.82E-03	9.82E-03
C-14	5.7135E-09	6,591.26	6,591.26	0.00E+00	3.77E-05	3.77E-05
Cl-36	1.3124E-32	6,591.26	6,591.26	0.00E+00	8.65E-29	8.65E-29
Cm-243	1.6443E-07	6,591.26	6,591.26	0.00E+00	1.08E-03	1.08E-03
Cm-244	2.9330E-05	6,591.26	6,591.26	0.00E+00	1.93E-01	1.93E-01
Co-60	5.3186E-06	6,591.26	6,591.26	0.00E+00	3.51E-02	3.51E-02
Cs-134	3.1563E-03	6,591.26	6,591.26	0.00E+00	2.08E+01	2.08E+01
Cs-135	3.4477E-06	6,591.26	6,591.26	0.00E+00	2.27E-02	2.27E-02
Cs-137	2.0313E+00	6,591.26	6,591.26	0.00E+00	1.34E+04	1.34E+04
Eu-154	2.4513E-02	6,591.26	6,591.26	0.00E+00	1.62E+02	1.62E+02
Eu-155	4.8175E-03	6,591.26	6,591.26	0.00E+00	3.18E+01	3.18E+01
Fe-55	1.2397E-04	6,591.26	6,591.26	0.00E+00	8.17E-01	8.17E-01
H-3	4.5697E-03	6,591.26	6,591.26	0.00E+00	3.01E+01	3.01E+01
I-129	7.5300E-07	6,591.26	6,591.26	0.00E+00	4.96E-03	4.96E-03
Kr-85	1.0850E-01	6,591.26	6,591.26	0.00E+00	7.15E+02	7.15E+02
Np-237	9.5561E-06	6,591.26	6,591.26	0.00E+00	6.30E-02	6.30E-02
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
Tl-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	9.76E-03	2.77E-02
U-236	1.5493E-05	6,591.26	6,591.26	0.00E+00	1.02E-01	1.02E-01
U-238	-4.2851E-09	6,591.26	0.00	2.80E-04	2.52E-04	2.80E-04
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.958E+14
0.0250	1.447E+14
0.0375	1.262E+14
0.0575	1.352E+14
0.0850	8.168E+13
0.1250	5.527E+13
0.2250	7.048E+13
0.3750	3.068E+13
0.5750	5.004E+14
0.8500	8.460E+12
1.2500	4.831E+12
1.7500	2.217E+11
2.2500	1.945E+07
2.7500	1.100E+07
3.5000	5.051E+04
5.0000	2.856E+03
7.0000	3.153E+02
11.0000	3.534E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.57E+02	1.57E+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 %:		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)[2]

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_a: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	3,596.31	7,192.61	0.00E+00	2.38E-06	4.77E-06
Am-241	2.0060E-03	3,596.31	7,192.61	0.00E+00	7.21E+00	1.44E+01
Am-242m	4.2429E-07	3,596.31	7,192.61	0.00E+00	1.53E-03	3.05E-03
Am-243	1.4899E-06	3,596.31	7,192.61	0.00E+00	5.36E-03	1.07E-02
C-14	5.7135E-09	3,596.31	7,192.61	0.00E+00	2.05E-05	4.11E-05
Cl-36	1.3124E-32	3,596.31	7,192.61	0.00E+00	4.72E-29	9.44E-29
Cm-243	1.6443E-07	3,596.31	7,192.61	0.00E+00	5.91E-04	1.18E-03
Cm-244	2.9330E-05	3,596.31	7,192.61	0.00E+00	1.05E-01	2.11E-01
Co-60	5.3186E-06	3,596.31	7,192.61	0.00E+00	1.91E-02	3.83E-02
Cs-134	3.1563E-03	3,596.31	7,192.61	0.00E+00	1.14E+01	2.27E+01
Cs-135	3.4477E-06	3,596.31	7,192.61	0.00E+00	1.24E-02	2.48E-02
Cs-137	2.0313E+00	3,596.31	7,192.61	0.00E+00	7.31E+03	1.46E+04
Eu-154	2.4513E-02	3,596.31	7,192.61	0.00E+00	8.82E+01	1.76E+02
Eu-155	4.8175E-03	3,596.31	7,192.61	0.00E+00	1.73E+01	3.47E+01
Fe-55	1.2397E-04	3,596.31	7,192.61	0.00E+00	4.46E-01	8.92E-01
H-3	4.5697E-03	3,596.31	7,192.61	0.00E+00	1.64E+01	3.29E+01
I-129	7.5300E-07	3,596.31	7,192.61	0.00E+00	2.71E-03	5.42E-03
Kr-85	1.0850E-01	3,596.31	7,192.61	0.00E+00	3.90E+02	7.80E+02
Np-237	9.5561E-06	3,596.31	7,192.61	0.00E+00	3.44E-02	6.87E-02
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-06	3.66E-06
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
Tl-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	6.64E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.592E+14
0.0250	1.579E+14
0.0375	1.377E+14
0.0575	1.475E+14
0.0850	8.913E+13
0.1250	6.031E+13
0.2250	7.690E+13
0.3750	3.348E+13
0.5750	5.461E+14
0.8500	9.232E+12
1.2500	5.272E+12
1.7500	2.420E+11
2.2500	2.122E+07
2.7500	1.200E+07
3.5000	5.525E+04
5.0000	3.171E+03
7.0000	3.503E+02
11.0000	3.928E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.57E+01	1.71E+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 %:	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)[2]

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (UALX-HEU) AUSTRIA
SNF ID #: 654
Fuel Units & Descr: 2 - MTR TYPE
Heavy Metal Mass: BOL=0.14kg; EOL=0.12kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	18.94	37.88	0.00E+00	1.26E-08	2.51E-08
Am-241	2.0060E-03	18.94	37.88	0.00E+00	3.80E-02	7.60E-02
Am-242m	4.2429E-07	18.94	37.88	0.00E+00	8.04E-06	1.61E-05
Am-243	1.4899E-06	18.94	37.88	0.00E+00	2.82E-05	5.64E-05
C-14	5.7135E-09	18.94	37.88	0.00E+00	1.08E-07	2.16E-07
Cl-36	1.3124E-32	18.94	37.88	0.00E+00	2.49E-31	4.97E-31
Cm-243	1.6443E-07	18.94	37.88	0.00E+00	3.11E-06	6.23E-06
Cm-244	2.9330E-05	18.94	37.88	0.00E+00	5.56E-04	1.11E-03
Co-60	5.3186E-06	18.94	37.88	0.00E+00	1.01E-04	2.01E-04
Cs-134	3.1563E-03	18.94	37.88	0.00E+00	5.98E-02	1.20E-01
Cs-135	3.4477E-06	18.94	37.88	0.00E+00	6.53E-05	1.31E-04
Cs-137	2.0313E+00	18.94	37.88	0.00E+00	3.85E+01	7.69E+01
Eu-154	2.4513E-02	18.94	37.88	0.00E+00	4.64E-01	9.29E-01
Eu-155	4.8175E-03	18.94	37.88	0.00E+00	9.12E-02	1.82E-01
Fe-55	1.2397E-04	18.94	37.88	0.00E+00	2.35E-03	4.70E-03
H-3	4.5697E-03	18.94	37.88	0.00E+00	8.66E-02	1.73E-01
I-129	7.5300E-07	18.94	37.88	0.00E+00	1.43E-05	2.85E-05
Kr-85	1.0850E-01	18.94	37.88	0.00E+00	2.05E+00	4.11E+00
Np-237	9.5561E-06	18.94	37.88	0.00E+00	1.81E-04	3.62E-04
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	9.19E-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	9.65E-11	1.93E-10
Th-230	4.1885E-08	18.94	37.88	0.00E+00	7.93E-07	1.59E-06
Th-232	1.9270E-14	18.94	37.88	0.00E+00	3.65E-13	7.30E-13
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.999E+12
0.0250	8.315E+11
0.0375	7.253E+11
0.0575	7.768E+11
0.0850	4.694E+11
0.1250	3.176E+11
0.2250	4.050E+11
0.3750	1.763E+11
0.5750	2.876E+12
0.8500	4.862E+10
1.2500	2.776E+10
1.7500	1.274E+09
2.2500	1.118E+05
2.7500	6.320E+04
3.5000	2.903E+02
5.0000	1.642E+01
7.0000	1.813E+00
11.0000	2.032E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.82E-01	9.03E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		18.94	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		37.88	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (UALX-HEU) AUSTRIA
SNF ID #: 738
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=5.6kg; EOL=4.858kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	702.69	1,405.38	0.00E+00	4.66E-07	9.32E-07
Am-241	2.0060E-03	702.69	1,405.38	0.00E+00	1.41E+00	2.82E+00
Am-242m	4.2429E-07	702.69	1,405.38	0.00E+00	2.98E-04	5.96E-04
Am-243	1.4899E-06	702.69	1,405.38	0.00E+00	1.05E-03	2.09E-03
C-14	5.7135E-09	702.69	1,405.38	0.00E+00	4.01E-06	8.03E-06
Cl-36	1.3124E-32	702.69	1,405.38	0.00E+00	9.22E-30	1.84E-29
Cm-243	1.6443E-07	702.69	1,405.38	0.00E+00	1.16E-04	2.31E-04
Cm-244	2.9330E-05	702.69	1,405.38	0.00E+00	2.06E-02	4.12E-02
Co-60	5.3186E-06	702.69	1,405.38	0.00E+00	3.74E-03	7.47E-03
Cs-134	3.1563E-03	702.69	1,405.38	0.00E+00	2.22E+00	4.44E+00
Cs-135	3.4477E-06	702.69	1,405.38	0.00E+00	2.42E-03	4.85E-03
Cs-137	2.0313E+00	702.69	1,405.38	0.00E+00	1.43E+03	2.85E+03
Eu-154	2.4513E-02	702.69	1,405.38	0.00E+00	1.72E+01	3.44E+01
Eu-155	4.8175E-03	702.69	1,405.38	0.00E+00	3.39E+00	6.77E+00
Fe-55	1.2397E-04	702.69	1,405.38	0.00E+00	8.71E-02	1.74E-01
H-3	4.5697E-03	702.69	1,405.38	0.00E+00	3.21E+00	6.42E+00
I-129	7.5300E-07	702.69	1,405.38	0.00E+00	5.29E-04	1.06E-03
Kr-85	1.0850E-01	702.69	1,405.38	0.00E+00	7.62E+01	1.52E+02
Np-237	9.5561E-06	702.69	1,405.38	0.00E+00	6.71E-03	1.34E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.484E+14
0.0250	3.085E+13
0.0375	2.691E+13
0.0575	2.882E+13
0.0850	1.741E+13
0.1250	1.178E+13
0.2250	1.503E+13
0.3750	6.541E+12
0.5750	1.067E+14
0.8500	1.804E+12
1.2500	1.030E+12
1.7500	4.728E+10
2.2500	4.147E+06
2.7500	2.345E+06
3.5000	1.077E+04
5.0000	6.092E+02
7.0000	6.725E+01
11.0000	7.537E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E+01	3.35E+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 %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		702.69	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,405.38	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR FMRB (GERMANY)
SNF ID #: 1066
Fuel Units & Descr: 18 - MTR TYPE
Heavy Metal Mass: BOL=2.57kg; EOL=2.282kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	272.74	545.48	0.00E+00	5.47E-07	1.09E-06
Am-241	2.5251E-03	272.74	545.48	0.00E+00	6.89E-01	1.38E+00
Am-242m	3.9624E-07	272.74	545.48	0.00E+00	1.08E-04	2.16E-04
Am-243	1.4880E-06	272.74	545.48	0.00E+00	4.06E-04	8.12E-04
C-14	5.7053E-09	272.74	545.48	0.00E+00	1.56E-06	3.11E-06
Cl-36	1.3124E-32	272.74	545.48	0.00E+00	3.58E-30	7.16E-30
Cm-243	1.1419E-07	272.74	545.48	0.00E+00	3.11E-05	6.23E-05
Cm-244	1.6522E-05	272.74	545.48	0.00E+00	4.51E-03	9.01E-03
Co-60	7.4047E-07	272.74	545.48	0.00E+00	2.02E-04	4.04E-04
Cs-134	2.0455E-05	272.74	545.48	0.00E+00	5.58E-03	1.12E-02
Cs-135	3.4477E-06	272.74	545.48	0.00E+00	9.40E-04	1.88E-03
Cs-137	1.4365E+00	272.74	545.48	0.00E+00	3.92E+02	7.84E+02
Eu-154	7.3230E-03	272.74	545.48	0.00E+00	2.00E+00	3.99E+00
Eu-155	5.9259E-04	272.74	545.48	0.00E+00	1.62E-01	3.23E-01
Fe-55	2.2791E-06	272.74	545.48	0.00E+00	6.22E-04	1.24E-03
H-3	1.9698E-03	272.74	545.48	0.00E+00	5.37E-01	1.07E+00
I-129	7.5300E-07	272.74	545.48	0.00E+00	2.05E-04	4.11E-04
Kr-85	4.1176E-02	272.74	545.48	0.00E+00	1.12E+01	2.25E+01
Np-237	9.5752E-06	272.74	545.48	0.00E+00	2.61E-03	5.22E-03
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	9.0114E-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	7.05E-03
Sn-126	1.1571E-05	272.74	545.48	0.00E+00	3.16E-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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.018E+13
0.0250	8.342E+12
0.0375	7.251E+12
0.0575	7.805E+12
0.0850	4.703E+12
0.1250	3.106E+12
0.2250	4.060E+12
0.3750	1.766E+12
0.5750	2.919E+13
0.8500	3.566E+11
1.2500	1.725E+11
1.7500	9.706E+09
2.2500	8.115E+05
2.7500	7.746E+05
3.5000	4.492E+02
5.0000	1.835E+02
7.0000	2.009E+01
11.0000	2.239E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.86E+00	9.13E+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 %:	91.25787542	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		272.74	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		545.48	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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 CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	3.41	6.82	0.00E+00	2.26E-09	4.52E-09
Am-241	2.0060E-03	3.41	6.82	0.00E+00	6.84E-03	1.37E-02
Am-242m	4.2429E-07	3.41	6.82	0.00E+00	1.45E-06	2.89E-06
Am-243	1.4899E-06	3.41	6.82	0.00E+00	5.08E-06	1.02E-05
C-14	5.7135E-09	3.41	6.82	0.00E+00	1.95E-08	3.90E-08
Cl-36	1.3124E-32	3.41	6.82	0.00E+00	4.47E-32	8.95E-32
Cm-243	1.6443E-07	3.41	6.82	0.00E+00	5.61E-07	1.12E-06
Cm-244	2.9330E-05	3.41	6.82	0.00E+00	1.00E-04	2.00E-04
Co-60	5.3186E-06	3.41	6.82	0.00E+00	1.81E-05	3.63E-05
Cs-134	3.1563E-03	3.41	6.82	0.00E+00	1.08E-02	2.15E-02
Cs-135	3.4477E-06	3.41	6.82	0.00E+00	1.18E-05	2.35E-05
Cs-137	2.0313E+00	3.41	6.82	0.00E+00	6.93E+00	1.39E+01
Eu-154	2.4513E-02	3.41	6.82	0.00E+00	8.36E-02	1.67E-01
Eu-155	4.8175E-03	3.41	6.82	0.00E+00	1.64E-02	3.28E-02
Fe-55	1.2397E-04	3.41	6.82	0.00E+00	4.23E-04	8.45E-04
H-3	4.5697E-03	3.41	6.82	0.00E+00	1.56E-02	3.12E-02
I-129	7.5300E-07	3.41	6.82	0.00E+00	2.57E-06	5.13E-06
Kr-85	1.0850E-01	3.41	6.82	0.00E+00	3.70E-01	7.40E-01
Np-237	9.5561E-06	3.41	6.82	0.00E+00	3.26E-05	6.52E-05
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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.199E+11
0.0250	1.497E+11
0.0375	1.305E+11
0.0575	1.398E+11
0.0850	8.451E+10
0.1250	5.721E+10
0.2250	7.304E+10
0.3750	3.174E+10
0.5750	5.177E+11
0.8500	8.752E+09
1.2500	4.997E+09
1.7500	2.294E+08
2.2500	2.012E+04
2.7500	1.138E+04
3.5000	5.307E+01
5.0000	3.297E+00
7.0000	3.650E-01
11.0000	4.098E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.14E-02	1.63E-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 %:	89.99998815	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 16"x10'
0.33

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	67.30	134.60	0.00E+00	4.46E-08	8.93E-08
Am-241	2.0060E-03	67.30	134.60	0.00E+00	1.35E-01	2.70E-01
Am-242m	4.2429E-07	67.30	134.60	0.00E+00	2.86E-05	5.71E-05
Am-243	1.4899E-06	67.30	134.60	0.00E+00	1.00E-04	2.01E-04
C-14	5.7135E-09	67.30	134.60	0.00E+00	3.85E-07	7.69E-07
Cl-36	1.3124E-32	67.30	134.60	0.00E+00	8.83E-31	1.77E-30
Cm-243	1.6443E-07	67.30	134.60	0.00E+00	1.11E-05	2.21E-05
Cm-244	2.9330E-05	67.30	134.60	0.00E+00	1.97E-03	3.95E-03
Co-60	5.3186E-06	67.30	134.60	0.00E+00	3.58E-04	7.16E-04
Cs-134	3.1563E-03	67.30	134.60	0.00E+00	2.12E-01	4.25E-01
Cs-135	3.4477E-06	67.30	134.60	0.00E+00	2.32E-04	4.64E-04
Cs-137	2.0313E+00	67.30	134.60	0.00E+00	1.37E+02	2.73E+02
Eu-154	2.4513E-02	67.30	134.60	0.00E+00	1.65E+00	3.30E+00
Eu-155	4.8175E-03	67.30	134.60	0.00E+00	3.24E-01	6.48E-01
Fe-55	1.2397E-04	67.30	134.60	0.00E+00	8.34E-03	1.67E-02
H-3	4.5697E-03	67.30	134.60	0.00E+00	3.08E-01	6.15E-01
I-129	7.5300E-07	67.30	134.60	0.00E+00	5.07E-05	1.01E-04
Kr-85	1.0850E-01	67.30	134.60	0.00E+00	7.30E+00	1.46E+01
Np-237	9.5561E-06	67.30	134.60	0.00E+00	6.43E-04	1.29E-03
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
Tl-208	4.6024E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.421E+13
0.0250	2.954E+12
0.0375	2.577E+12
0.0575	2.760E+12
0.0850	1.868E+12
0.1250	1.129E+12
0.2250	1.439E+12
0.3750	6.265E+11
0.5750	1.022E+13
0.8500	1.728E+11
1.2500	9.865E+10
1.7500	4.528E+09
2.2500	3.972E+05
2.7500	2.245E+05
3.5000	1.032E+03
5.0000	5.867E+01
7.0000	6.478E+00
11.0000	7.261E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.60E+00	3.21E+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 %:	89.81998522	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		67.30
Bounding:		134.60

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) JAPAN
SNF ID #: 605
Fuel Units & Descr: 81 - MTR TYPE
Heavy Metal Mass: BOL=24.818kg; EOL=24.786kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 3.38

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	30.68	61.37	0.00E+00	2.03E-08	4.07E-08
Am-241	2.0060E-03	30.68	61.37	0.00E+00	6.16E-02	1.23E-01
Am-242m	4.2429E-07	30.68	61.37	0.00E+00	1.30E-05	2.60E-05
Am-243	1.4899E-06	30.68	61.37	0.00E+00	4.57E-05	9.14E-05
C-14	5.7135E-09	30.68	61.37	0.00E+00	1.75E-07	3.51E-07
Cl-36	1.3124E-32	30.68	61.37	0.00E+00	4.03E-31	8.05E-31
Cm-243	1.6443E-07	30.68	61.37	0.00E+00	5.05E-06	1.01E-05
Cm-244	2.9330E-05	30.68	61.37	0.00E+00	9.00E-04	1.80E-03
Co-60	5.3186E-06	30.68	61.37	0.00E+00	1.63E-04	3.26E-04
Cs-134	3.1563E-03	30.68	61.37	0.00E+00	9.68E-02	1.94E-01
Cs-135	3.4477E-06	30.68	61.37	0.00E+00	1.06E-04	2.12E-04
Cs-137	2.0313E+00	30.68	61.37	0.00E+00	6.23E+01	1.25E+02
Eu-154	2.4513E-02	30.68	61.37	0.00E+00	7.52E-01	1.50E+00
Eu-155	4.8175E-03	30.68	61.37	0.00E+00	1.48E-01	2.96E-01
Fe-55	1.2397E-04	30.68	61.37	0.00E+00	3.80E-03	7.61E-03
H-3	4.5697E-03	30.68	61.37	0.00E+00	1.40E-01	2.80E-01
I-129	7.5300E-07	30.68	61.37	0.00E+00	2.31E-05	4.62E-05
Kr-85	1.0850E-01	30.68	61.37	0.00E+00	3.33E+00	6.66E+00
Np-237	9.5561E-06	30.68	61.37	0.00E+00	2.93E-04	5.86E-04
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	5.60E-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	4.2239E-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
Tl-208	4.6024E-06	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
U-234	1.8450E-04	30.68	61.37	0.00E+00	5.66E-03	1.13E-02
U-235	-2.7235E-06	30.68	0.00	4.99E-02	4.98E-02	4.99E-02
U-236	1.5493E-05	30.68	61.37	0.00E+00	4.75E-04	9.51E-04
U-238	-4.2851E-09	30.68	0.00	5.84E-04	5.84E-04	5.84E-04
Y-90	1.9254E+00	30.68	61.37	0.00E+00	5.91E+01	1.18E+02
Other Radionuclides					5.93E+01	1.19E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.479E+12
0.0250	1.347E+12
0.0375	1.175E+12
0.0575	1.258E+12
0.0850	7.606E+11
0.1250	5.149E+11
0.2250	6.572E+11
0.3750	2.856E+11
0.5750	4.659E+12
0.8500	7.877E+10
1.2500	4.498E+10
1.7500	2.064E+09
2.2500	1.811E+05
2.7500	1.024E+05
3.5000	4.751E+02
5.0000	2.860E+01
7.0000	3.162E+00
11.0000	3.547E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.33E-01	1.46E+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 %:	93.00000613	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) NETHERLANDS
SNF ID #: 609
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=3.192kg; EOL=3.188kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	3.98	7.96	0.00E+00	2.64E-09	5.28E-09
Am-241	2.0060E-03	3.98	7.96	0.00E+00	7.98E-03	1.60E-02
Am-242m	4.2429E-07	3.98	7.96	0.00E+00	1.69E-06	3.38E-06
Am-243	1.4899E-06	3.98	7.96	0.00E+00	5.93E-06	1.19E-05
C-14	5.7135E-09	3.98	7.96	0.00E+00	2.27E-08	4.55E-08
Cl-36	1.3124E-32	3.98	7.96	0.00E+00	5.22E-32	1.04E-31
Cm-243	1.6443E-07	3.98	7.96	0.00E+00	6.54E-07	1.31E-06
Cm-244	2.9330E-05	3.98	7.96	0.00E+00	1.17E-04	2.33E-04
Co-60	5.3186E-06	3.98	7.96	0.00E+00	2.12E-05	4.23E-05
Cs-134	3.1563E-03	3.98	7.96	0.00E+00	1.26E-02	2.51E-02
Cs-135	3.4477E-06	3.98	7.96	0.00E+00	1.37E-05	2.74E-05
Cs-137	2.0313E+00	3.98	7.96	0.00E+00	8.08E+00	1.62E+01
Eu-154	2.4513E-02	3.98	7.96	0.00E+00	9.75E-02	1.95E-01
Eu-155	4.8175E-03	3.98	7.96	0.00E+00	1.92E-02	3.83E-02
Fe-55	1.2397E-04	3.98	7.96	0.00E+00	4.93E-04	9.86E-04
H-3	4.5697E-03	3.98	7.96	0.00E+00	1.82E-02	3.64E-02
I-129	7.5300E-07	3.98	7.96	0.00E+00	3.00E-06	5.99E-06
Kr-85	1.0850E-01	3.98	7.96	0.00E+00	4.32E-01	8.63E-01
Np-237	9.5561E-06	3.98	7.96	0.00E+00	3.80E-05	7.60E-05
Pa-231	2.0359E-09	3.98	7.96	0.00E+00	8.10E-09	1.62E-08
Pb-210	4.9728E-11	3.98	7.96	0.00E+00	1.98E-10	3.96E-10
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	1.9248E+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
Tl-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-09	3.98	7.96	0.00E+00	1.03E-08	2.05E-08
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	6.42E-03	6.40E-03	6.42E-03
U-236	1.5493E-05	3.98	7.96	0.00E+00	6.16E-05	1.23E-04
U-238	-4.2851E-09	3.98	0.00	7.51E-05	7.51E-05	7.51E-05
Y-90	1.9254E+00	3.98	7.96	0.00E+00	7.66E+00	1.53E+01
Other Radionuclides					7.69E+00	1.54E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.399E+11
0.0250	1.746E+11
0.0375	1.523E+11
0.0575	1.631E+11
0.0850	9.859E+10
0.1250	6.674E+10
0.2250	8.519E+10
0.3750	3.703E+10
0.5750	6.040E+11
0.8500	1.021E+10
1.2500	5.830E+09
1.7500	2.676E+08
2.2500	2.348E+04
2.7500	1.327E+04
3.5000	6.158E+01
5.0000	3.705E+00
7.0000	4.096E-01
11.0000	4.595E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.50E-02	1.90E-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 %:	92.9999964	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	3.31	6.63	0.00E+00	2.20E-09	4.40E-09
Am-241	2.0060E-03	3.31	6.63	0.00E+00	6.65E-03	1.33E-02
Am-242m	4.2429E-07	3.31	6.63	0.00E+00	1.41E-06	2.81E-06
Am-243	1.4899E-06	3.31	6.63	0.00E+00	4.94E-06	9.88E-06
C-14	5.7135E-09	3.31	6.63	0.00E+00	1.89E-08	3.79E-08
Cl-36	1.3124E-32	3.31	6.63	0.00E+00	4.35E-32	8.70E-32
Cm-243	1.6443E-07	3.31	6.63	0.00E+00	5.45E-07	1.09E-06
Cm-244	2.9330E-05	3.31	6.63	0.00E+00	9.72E-05	1.94E-04
Co-60	5.3186E-06	3.31	6.63	0.00E+00	1.76E-05	3.53E-05
Cs-134	3.1563E-03	3.31	6.63	0.00E+00	1.05E-02	2.09E-02
Cs-135	3.4477E-06	3.31	6.63	0.00E+00	1.14E-05	2.29E-05
Cs-137	2.0313E+00	3.31	6.63	0.00E+00	6.73E+00	1.35E+01
Eu-154	2.4513E-02	3.31	6.63	0.00E+00	8.12E-02	1.62E-01
Eu-155	4.8175E-03	3.31	6.63	0.00E+00	1.60E-02	3.19E-02
Fe-55	1.2397E-04	3.31	6.63	0.00E+00	4.11E-04	8.22E-04
H-3	4.5697E-03	3.31	6.63	0.00E+00	1.51E-02	3.03E-02
I-129	7.5300E-07	3.31	6.63	0.00E+00	2.50E-06	4.99E-06
Kr-85	1.0850E-01	3.31	6.63	0.00E+00	3.60E-01	7.19E-01
Np-237	9.5561E-06	3.31	6.63	0.00E+00	3.17E-05	6.33E-05
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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.000E+11
0.0250	1.455E+11
0.0375	1.269E+11
0.0575	1.359E+11
0.0850	8.217E+10
0.1250	5.564E+10
0.2250	7.107E+10
0.3750	3.086E+10
0.5750	5.033E+11
0.8500	8.509E+09
1.2500	4.859E+09
1.7500	2.230E+08
2.2500	1.956E+04
2.7500	1.106E+04
3.5000	5.171E+01
5.0000	3.252E+00
7.0000	3.598E-01
11.0000	4.039E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.93E-02	1.58E-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 %:	93.19000561	60 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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	34.09	68.19	0.00E+00	2.26E-08	4.52E-08
Am-241	2.0060E-03	34.09	68.19	0.00E+00	6.84E-02	1.37E-01
Am-242m	4.2429E-07	34.09	68.19	0.00E+00	1.45E-05	2.89E-05
Am-243	1.4899E-06	34.09	68.19	0.00E+00	5.08E-05	1.02E-04
C-14	5.7135E-09	34.09	68.19	0.00E+00	1.95E-07	3.90E-07
Cl-36	1.3124E-32	34.09	68.19	0.00E+00	4.47E-31	8.95E-31
Cm-243	1.6443E-07	34.09	68.19	0.00E+00	5.61E-06	1.12E-05
Cm-244	2.9330E-05	34.09	68.19	0.00E+00	1.00E-03	2.00E-03
Co-60	5.3186E-06	34.09	68.19	0.00E+00	1.81E-04	3.63E-04
Cs-134	3.1563E-03	34.09	68.19	0.00E+00	1.08E-01	2.15E-01
Cs-135	3.4477E-06	34.09	68.19	0.00E+00	1.18E-04	2.35E-04
Cs-137	2.0313E+00	34.09	68.19	0.00E+00	6.93E+01	1.39E+02
Eu-154	2.4513E-02	34.09	68.19	0.00E+00	8.36E-01	1.67E+00
Eu-155	4.8175E-03	34.09	68.19	0.00E+00	1.64E-01	3.28E-01
Fe-55	1.2397E-04	34.09	68.19	0.00E+00	4.23E-03	8.45E-03
H-3	4.5697E-03	34.09	68.19	0.00E+00	1.56E-01	3.12E-01
I-129	7.5300E-07	34.09	68.19	0.00E+00	2.57E-05	5.13E-05
Kr-85	1.0850E-01	34.09	68.19	0.00E+00	3.70E+00	7.40E+00
Np-237	9.5561E-06	34.09	68.19	0.00E+00	3.26E-04	6.52E-04
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	1.9270E-14	34.09	68.19	0.00E+00	6.57E-13	1.31E-12
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.198E+12
0.0250	1.497E+12
0.0375	1.305E+12
0.0575	1.398E+12
0.0850	8.450E+11
0.1250	5.718E+11
0.2250	7.292E+11
0.3750	3.174E+11
0.5750	5.177E+12
0.8500	8.752E+10
1.2500	4.997E+10
1.7500	2.294E+09
2.2500	2.013E+05
2.7500	1.138E+05
3.5000	5.497E+02
5.0000	4.119E+01
7.0000	4.602E+00
11.0000	5.197E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.13E-01	1.63E+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 %:	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:		34.09
Bounding:		68.19

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:	0.01	
Bounding:	0.01	

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: FRR MTR (UALX-LEU) JAPAN
SNF ID #: 551
Fuel Units & Descr: 27 - ASSEMBLY
Heavy Metal Mass: BOL=17.482kg; EOL=17.469kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	12.78	25.57	0.00E+00	8.48E-09	1.70E-08
Am-241	2.0060E-03	12.78	25.57	0.00E+00	2.56E-02	5.13E-02
Am-242m	4.2429E-07	12.78	25.57	0.00E+00	5.42E-06	1.08E-05
Am-243	1.4899E-06	12.78	25.57	0.00E+00	1.90E-05	3.81E-05
C-14	5.7135E-09	12.78	25.57	0.00E+00	7.30E-08	1.46E-07
Cl-36	1.3124E-32	12.78	25.57	0.00E+00	1.68E-31	3.36E-31
Cm-243	1.6443E-07	12.78	25.57	0.00E+00	2.10E-06	4.20E-06
Cm-244	2.9330E-05	12.78	25.57	0.00E+00	3.75E-04	7.50E-04
Co-60	5.3186E-06	12.78	25.57	0.00E+00	6.80E-05	1.36E-04
Cs-134	3.1563E-03	12.78	25.57	0.00E+00	4.04E-02	8.07E-02
Cs-135	3.4477E-06	12.78	25.57	0.00E+00	4.41E-05	8.82E-05
Cs-137	2.0313E+00	12.78	25.57	0.00E+00	2.60E+01	5.19E+01
Eu-154	2.4513E-02	12.78	25.57	0.00E+00	3.13E-01	6.27E-01
Eu-155	4.8175E-03	12.78	25.57	0.00E+00	6.16E-02	1.23E-01
Fe-55	1.2397E-04	12.78	25.57	0.00E+00	1.58E-03	3.17E-03
H-3	4.5697E-03	12.78	25.57	0.00E+00	5.84E-02	1.17E-01
I-129	7.5300E-07	12.78	25.57	0.00E+00	9.63E-06	1.93E-05
Kr-85	1.0850E-01	12.78	25.57	0.00E+00	1.39E+00	2.77E+00
Np-237	9.5561E-06	12.78	25.57	0.00E+00	1.22E-04	2.44E-04
Pa-231	2.0359E-09	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-06	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
Tl-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-236	1.5493E-05	12.78	25.57	0.00E+00	1.98E-04	3.96E-04
U-238	-4.2851E-09	12.78	0.00	4.70E-03	4.70E-03	4.70E-03
Y-90	1.9254E+00	12.78	25.57	0.00E+00	2.46E+01	4.92E+01
Other Radionuclides					2.47E+01	4.95E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.699E+12
0.0250	5.613E+11
0.0375	4.896E+11
0.0575	5.243E+11
0.0850	3.169E+11
0.1250	2.145E+11
0.2250	2.735E+11
0.3750	1.190E+11
0.5750	1.941E+12
0.8500	3.282E+10
1.2500	1.874E+10
1.7500	8.602E+08
2.2500	7.550E+04
2.7500	4.269E+04
3.5000	2.212E+02
5.0000	2.194E+01
7.0000	2.474E+00
11.0000	2.809E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.05E-01	6.10E-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 %:	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) TAIWAN
SNF ID #: 555
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass: BOL=34.797kg; EOL=34.797kg
ROO Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[b]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 16"x10'
0.96

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	659.06	1,318.13	0.00E+00	4.37E-07	8.74E-07
Am-241	2.0060E-03	659.06	1,318.13	0.00E+00	1.32E+00	2.64E+00
Am-242m	4.2429E-07	659.06	1,318.13	0.00E+00	2.80E-04	5.59E-04
Am-243	1.4899E-06	659.06	1,318.13	0.00E+00	9.82E-04	1.96E-03
C-14	5.7135E-09	659.06	1,318.13	0.00E+00	3.77E-06	7.53E-06
Cl-36	1.3124E-32	659.06	1,318.13	0.00E+00	8.65E-30	1.73E-29
Cm-243	1.6443E-07	659.06	1,318.13	0.00E+00	1.08E-04	2.17E-04
Cm-244	2.9330E-05	659.06	1,318.13	0.00E+00	1.93E-02	3.87E-02
Co-60	5.3186E-06	659.06	1,318.13	0.00E+00	3.51E-03	7.01E-03
Cs-134	3.1563E-03	659.06	1,318.13	0.00E+00	2.08E+00	4.16E+00
Cs-135	3.4477E-06	659.06	1,318.13	0.00E+00	2.27E-03	4.54E-03
Cs-137	2.0313E+00	659.06	1,318.13	0.00E+00	1.34E+03	2.68E+03
Eu-154	2.4513E-02	659.06	1,318.13	0.00E+00	1.62E+01	3.23E+01
Eu-155	4.8175E-03	659.06	1,318.13	0.00E+00	3.18E+00	6.35E+00
Fe-55	1.2397E-04	659.06	1,318.13	0.00E+00	8.17E-02	1.63E-01
H-3	4.5697E-03	659.06	1,318.13	0.00E+00	3.01E+00	6.02E+00
I-129	7.5300E-07	659.06	1,318.13	0.00E+00	4.96E-04	9.93E-04
Kr-85	1.0850E-01	659.06	1,318.13	0.00E+00	7.15E+01	1.43E+02
Np-237	9.5561E-06	659.06	1,318.13	0.00E+00	6.30E-03	1.26E-02
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
Tl-208	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
U-234	1.8450E-04	659.06	1,318.13	0.00E+00	1.22E-01	2.43E-01
U-235	-2.7235E-06	659.06	0.00	1.49E-02	1.31E-02	1.49E-02
U-236	1.5493E-05	659.06	1,318.13	0.00E+00	1.02E-02	2.04E-02
U-238	-4.2851E-09	659.06	0.00	9.38E-03	9.37E-03	9.38E-03
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.391E+14
0.0250	2.893E+13
0.0375	2.524E+13
0.0575	2.703E+13
0.0850	1.633E+13
0.1250	1.105E+13
0.2250	1.409E+13
0.3750	6.135E+12
0.5750	1.001E+14
0.8500	1.892E+12
1.2500	9.861E+11
1.7500	4.434E+10
2.2500	3.890E+06
2.7500	2.199E+06
3.5000	1.015E+04
5.0000	5.926E+02
7.0000	6.552E+01
11.0000	7.351E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.57E+01	3.14E+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 %:	19.83000026	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:		659.06
Bounding:		1,318.13

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	3,933.54	7,867.08	0.00E+00	2.61E-06	5.22E-06
Am-241	2.0060E-03	3,933.54	7,867.08	0.00E+00	7.89E+00	1.58E+01
Am-242m	4.2429E-07	3,933.54	7,867.08	0.00E+00	1.67E-03	3.34E-03
Am-243	1.4899E-06	3,933.54	7,867.08	0.00E+00	5.86E-03	1.17E-02
C-14	5.7135E-09	3,933.54	7,867.08	0.00E+00	2.25E-05	4.49E-05
Cl-36	1.3124E-32	3,933.54	7,867.08	0.00E+00	5.16E-29	1.03E-28
Cm-243	1.6443E-07	3,933.54	7,867.08	0.00E+00	6.47E-04	1.29E-03
Cm-244	2.9330E-05	3,933.54	7,867.08	0.00E+00	1.15E-01	2.31E-01
Co-60	5.3186E-06	3,933.54	7,867.08	0.00E+00	2.09E-02	4.18E-02
Cs-134	3.1563E-03	3,933.54	7,867.08	0.00E+00	1.24E+01	2.48E+01
Cs-135	3.4477E-06	3,933.54	7,867.08	0.00E+00	1.36E-02	2.71E-02
Cs-137	2.0313E+00	3,933.54	7,867.08	0.00E+00	7.99E+03	1.60E+04
Eu-154	2.4513E-02	3,933.54	7,867.08	0.00E+00	9.64E+01	1.93E+02
Eu-155	4.8175E-03	3,933.54	7,867.08	0.00E+00	1.89E+01	3.79E+01
Fe-55	1.2397E-04	3,933.54	7,867.08	0.00E+00	4.88E-01	9.75E-01
H-3	4.5697E-03	3,933.54	7,867.08	0.00E+00	1.80E+01	3.60E+01
I-129	7.5300E-07	3,933.54	7,867.08	0.00E+00	2.96E-03	5.92E-03
Kr-85	1.0850E-01	3,933.54	7,867.08	0.00E+00	4.27E+02	8.54E+02
Np-237	9.5561E-06	3,933.54	7,867.08	0.00E+00	3.76E-02	7.52E-02
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
Tl-208	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
U-234	1.8450E-04	3,933.54	7,867.08	0.00E+00	7.26E-01	1.45E+00
U-235	-2.7235E-06	3,933.54	0.00	1.87E-02	7.96E-03	1.87E-02
U-236	1.5493E-05	3,933.54	7,867.08	0.00E+00	6.09E-02	1.22E-01
U-238	-4.2851E-09	3,933.54	0.00	1.16E-02	1.16E-02	1.16E-02
Y-90	1.9254E+00	3,933.54	7,867.08	0.00E+00	7.57E+03	1.51E+04
Other Radionuclides					7.61E+03	1.52E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.304E+14
0.0250	1.727E+14
0.0375	1.506E+14
0.0575	1.613E+14
0.0850	9.749E+13
0.1250	6.597E+13
0.2250	8.412E+13
0.3750	3.662E+13
0.5750	5.973E+14
0.8500	1.010E+13
1.2500	5.766E+12
1.7500	2.646E+11
2.2500	2.321E+07
2.7500	1.312E+07
3.5000	6.035E+04
5.0000	3.434E+03
7.0000	3.793E+02
11.0000	4.252E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.38E+01	1.88E+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 %:	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:		3,933.54
Bounding:		7,867.08

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	
Bounding:	0.58	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-MEU) JAPAN
SNF ID #: 565
Fuel Units & Descr: 30 - MTR TYPE
Heavy Metal Mass: BOL=21.543kg; EOL=21.525kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	17.05	34.09	0.00E+00	1.13E-08	2.26E-08
Am-241	2.0060E-03	17.05	34.09	0.00E+00	3.42E-02	6.84E-02
Am-242m	4.2429E-07	17.05	34.09	0.00E+00	7.23E-06	1.45E-05
Am-243	1.4899E-06	17.05	34.09	0.00E+00	2.54E-05	5.08E-05
C-14	5.7135E-09	17.05	34.09	0.00E+00	9.74E-08	1.95E-07
Cl-36	1.3124E-32	17.05	34.09	0.00E+00	2.24E-31	4.47E-31
Cm-243	1.6443E-07	17.05	34.09	0.00E+00	2.80E-06	5.61E-06
Cm-244	2.9330E-05	17.05	34.09	0.00E+00	5.00E-04	1.00E-03
Co-60	5.3186E-06	17.05	34.09	0.00E+00	9.07E-05	1.81E-04
Cs-134	3.1563E-03	17.05	34.09	0.00E+00	5.38E-02	1.08E-01
Cs-135	3.4477E-06	17.05	34.09	0.00E+00	5.88E-05	1.18E-04
Cs-137	2.0313E+00	17.05	34.09	0.00E+00	3.46E+01	6.93E+01
Eu-154	2.4513E-02	17.05	34.09	0.00E+00	4.18E-01	8.36E-01
Eu-155	4.8175E-03	17.05	34.09	0.00E+00	8.21E-02	1.64E-01
Fe-55	1.2397E-04	17.05	34.09	0.00E+00	2.11E-03	4.23E-03
H-3	4.5697E-03	17.05	34.09	0.00E+00	7.79E-02	1.56E-01
I-129	7.5300E-07	17.05	34.09	0.00E+00	1.28E-05	2.57E-05
Kr-85	1.0850E-01	17.05	34.09	0.00E+00	1.85E+00	3.70E+00
Np-237	9.5561E-06	17.05	34.09	0.00E+00	1.63E-04	3.26E-04
Pa-231	2.0359E-09	17.05	34.09	0.00E+00	3.47E-08	6.94E-08
Pb-210	4.9728E-11	17.05	34.09	0.00E+00	8.48E-10	1.70E-09
Pm-147	4.8502E-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	5.70E-01	1.14E+00
Pu-242	3.6329E-07	17.05	34.09	0.00E+00	6.19E-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	6.3589E-06	17.05	34.09	0.00E+00	1.08E-04	2.17E-04
Se-79	1.2933E-05	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
Sr-90	1.9248E+00	17.05	34.09	0.00E+00	3.28E+01	6.56E+01
Tc-99	4.2239E-04	17.05	34.09	0.00E+00	7.20E-03	1.44E-02
Th-229	5.0953E-12	17.05	34.09	0.00E+00	8.69E-11	1.74E-10
Th-230	4.1885E-08	17.05	34.09	0.00E+00	7.14E-07	1.43E-06
Th-232	1.9270E-14	17.05	34.09	0.00E+00	3.28E-13	6.57E-13
Tl-208	4.6024E-08	17.05	34.09	0.00E+00	7.85E-07	1.57E-06
U-232	1.2582E-07	17.05	34.09	0.00E+00	2.14E-06	4.29E-06
U-233	2.5825E-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	1.9254E+00	17.05	34.09	0.00E+00	3.28E+01	6.56E+01
Other Radionuclides					3.30E+01	6.59E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.599E+12
0.0250	7.484E+11
0.0375	6.527E+11
0.0575	6.991E+11
0.0850	4.225E+11
0.1250	2.860E+11
0.2250	3.649E+11
0.3750	1.587E+11
0.5750	2.588E+12
0.8500	4.376E+10
1.2500	2.499E+10
1.7500	1.147E+09
2.2500	1.006E+05
2.7500	5.690E+04
3.5000	2.832E+02
5.0000	2.418E+01
7.0000	2.712E+00
11.0000	3.070E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.07E-01	8.13E-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 %:	44.97911463	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:		17.05
Bounding:		34.09

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:	0.00	
Bounding:	0.01	

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: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	10.61	21.21	0.00E+00	7.03E-09	1.41E-08
Am-241	2.0060E-03	10.61	21.21	0.00E+00	2.13E-02	4.26E-02
Am-242m	4.2429E-07	10.61	21.21	0.00E+00	4.50E-06	9.00E-06
Am-243	1.4899E-06	10.61	21.21	0.00E+00	1.58E-05	3.16E-05
C-14	5.7135E-09	10.61	21.21	0.00E+00	6.06E-08	1.21E-07
Cl-36	1.3124E-32	10.61	21.21	0.00E+00	1.39E-31	2.78E-31
Cm-243	1.6443E-07	10.61	21.21	0.00E+00	1.74E-06	3.49E-06
Cm-244	2.9330E-05	10.61	21.21	0.00E+00	3.11E-04	6.22E-04
Co-60	5.3186E-06	10.61	21.21	0.00E+00	5.64E-05	1.13E-04
Cs-134	3.1563E-03	10.61	21.21	0.00E+00	3.35E-02	6.70E-02
Cs-135	3.4477E-06	10.61	21.21	0.00E+00	3.66E-05	7.31E-05
Cs-137	2.0313E+00	10.61	21.21	0.00E+00	2.15E+01	4.31E+01
Eu-154	2.4513E-02	10.61	21.21	0.00E+00	2.60E-01	5.20E-01
Eu-155	4.8175E-03	10.61	21.21	0.00E+00	5.11E-02	1.02E-01
Fe-55	1.2397E-04	10.61	21.21	0.00E+00	1.31E-03	2.63E-03
H-3	4.5697E-03	10.61	21.21	0.00E+00	4.85E-02	9.69E-02
I-129	7.5300E-07	10.61	21.21	0.00E+00	7.99E-06	1.60E-05
Kr-85	1.0850E-01	10.61	21.21	0.00E+00	1.15E+00	2.30E+00
Np-237	9.5561E-06	10.61	21.21	0.00E+00	1.01E-04	2.03E-04
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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.239E+12
0.0250	4.656E+11
0.0375	4.062E+11
0.0575	4.350E+11
0.0850	2.629E+11
0.1250	1.779E+11
0.2250	2.269E+11
0.3750	9.874E+10
0.5750	1.611E+12
0.8500	2.723E+10
1.2500	1.555E+10
1.7500	7.136E+08
2.2500	6.260E+04
2.7500	3.539E+04
3.5000	1.630E+02
5.0000	9.366E+00
7.0000	1.034E+00
11.0000	1.160E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.53E-01	5.06E-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 %:	93.09999644	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		10.61	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		21.21	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	312.52	625.03	0.00E+00	2.07E-07	4.14E-07
Am-241	2.0060E-03	312.52	625.03	0.00E+00	6.27E-01	1.25E+00
Am-242m	4.2429E-07	312.52	625.03	0.00E+00	1.33E-04	2.65E-04
Am-243	1.4899E-06	312.52	625.03	0.00E+00	4.66E-04	9.31E-04
C-14	5.7135E-09	312.52	625.03	0.00E+00	1.79E-06	3.57E-06
Cl-36	1.3124E-32	312.52	625.03	0.00E+00	4.10E-30	8.20E-30
Cm-243	1.6443E-07	312.52	625.03	0.00E+00	5.14E-05	1.03E-04
Cm-244	2.9330E-05	312.52	625.03	0.00E+00	9.17E-03	1.83E-02
Co-60	5.3186E-06	312.52	625.03	0.00E+00	1.66E-03	3.32E-03
Cs-134	3.1563E-03	312.52	625.03	0.00E+00	9.86E-01	1.97E+00
Cs-135	3.4477E-06	312.52	625.03	0.00E+00	1.08E-03	2.15E-03
Cs-137	2.0313E+00	312.52	625.03	0.00E+00	6.35E+02	1.27E+03
Eu-154	2.4513E-02	312.52	625.03	0.00E+00	7.66E+00	1.53E+01
Eu-155	4.8175E-03	312.52	625.03	0.00E+00	1.51E+00	3.01E+00
Fe-55	1.2397E-04	312.52	625.03	0.00E+00	3.87E-02	7.75E-02
H-3	4.5697E-03	312.52	625.03	0.00E+00	1.43E+00	2.86E+00
I-129	7.5300E-07	312.52	625.03	0.00E+00	2.35E-04	4.71E-04
Kr-85	1.0850E-01	312.52	625.03	0.00E+00	3.39E+01	6.78E+01
Np-237	9.5561E-06	312.52	625.03	0.00E+00	2.99E-03	5.97E-03
Pa-231	2.0359E-09	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.598E+13
0.0250	1.372E+13
0.0375	1.197E+13
0.0575	1.282E+13
0.0850	7.745E+12
0.1250	5.241E+12
0.2250	6.683E+12
0.3750	2.909E+12
0.5750	4.745E+13
0.8500	8.023E+11
1.2500	4.581E+11
1.7500	2.103E+10
2.2500	1.844E+06
2.7500	1.043E+06
3.5000	4.799E+03
5.0000	2.745E+02
7.0000	3.032E+01
11.0000	3.399E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.45E+00	1.49E+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 %:	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:		312.52
Bounding:		625.03

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:	0.17	
Bounding:	0.33	

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: FRR MTR-C (U3Si2 LEU) CANADA
SNF ID #: 512
Fuel Units & Descr: 8 - ASSEMBLY
Heavy Metal Mass: BOL=6.52kg; EOL=5.868kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	617.46	1,234.91	0.00E+00	4.09E-07	8.19E-07
Am-241	2.0060E-03	617.46	1,234.91	0.00E+00	1.24E+00	2.48E+00
Am-242m	4.2429E-07	617.46	1,234.91	0.00E+00	2.62E-04	5.24E-04
Am-243	1.4899E-06	617.46	1,234.91	0.00E+00	9.20E-04	1.84E-03
C-14	5.7135E-09	617.46	1,234.91	0.00E+00	3.53E-06	7.06E-06
Cl-36	1.3124E-32	617.46	1,234.91	0.00E+00	8.10E-30	1.62E-29
Cm-243	1.6443E-07	617.46	1,234.91	0.00E+00	1.02E-04	2.03E-04
Cm-244	2.9330E-05	617.46	1,234.91	0.00E+00	1.81E-02	3.62E-02
Co-60	5.3186E-06	617.46	1,234.91	0.00E+00	3.28E-03	6.57E-03
Cs-134	3.1563E-03	617.46	1,234.91	0.00E+00	1.95E+00	3.90E+00
Cs-135	3.4477E-06	617.46	1,234.91	0.00E+00	2.13E-03	4.26E-03
Cs-137	2.0313E+00	617.46	1,234.91	0.00E+00	1.25E+03	2.51E+03
Eu-154	2.4513E-02	617.46	1,234.91	0.00E+00	1.51E+01	3.03E+01
Eu-155	4.8175E-03	617.46	1,234.91	0.00E+00	2.97E+00	5.95E+00
Fe-55	1.2397E-04	617.46	1,234.91	0.00E+00	7.65E-02	1.53E-01
H-3	4.5697E-03	617.46	1,234.91	0.00E+00	2.82E+00	5.64E+00
I-129	7.5300E-07	617.46	1,234.91	0.00E+00	4.65E-04	9.30E-04
Kr-85	1.0850E-01	617.46	1,234.91	0.00E+00	6.70E+01	1.34E+02
Np-237	9.5561E-06	617.46	1,234.91	0.00E+00	5.90E-03	1.18E-02
Pa-231	2.0359E-09	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
Tl-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
U-233	2.5825E-09	617.46	1,234.91	0.00E+00	1.59E-06	3.19E-06
U-234	1.8450E-04	617.46	1,234.91	0.00E+00	1.14E-01	2.28E-01
U-235	-2.7235E-06	617.46	0.00	2.82E-03	1.14E-03	2.82E-03
U-236	1.5493E-05	617.46	1,234.91	0.00E+00	9.57E-03	1.91E-02
U-238	-4.2851E-09	617.46	0.00	1.75E-03	1.75E-03	1.75E-03
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	-
0.0150	1.304E+14
0.0250	2.711E+13
0.0375	2.364E+13
0.0575	2.532E+13
0.0850	1.530E+13
0.1250	1.036E+13
0.2250	1.320E+13
0.3750	5.748E+12
0.5750	9.376E+13
0.8500	1.585E+12
1.2500	9.051E+11
1.7500	4.154E+10
2.2500	3.644E+08
2.7500	2.060E+08
3.5000	9.473E+09
5.0000	5.390E+02
7.0000	5.952E+01
11.0000	6.672E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.47E+01	2.94E+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 %:	20.00000037	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
1.06

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.4556E-09	4,606.13	9,212.25	0.00E+00	1.13E-05	2.26E-05
Am-241	3.8752E-03	4,606.13	9,212.25	0.00E+00	1.78E+01	3.57E+01
Am-242m	1.8617E-06	4,606.13	9,212.25	0.00E+00	8.58E-03	1.72E-02
Am-243	2.3293E-07	4,606.13	9,212.25	0.00E+00	1.07E-03	2.15E-03
C-14	4.3233E-05	4,606.13	9,212.25	0.00E+00	1.99E-01	3.98E-01
Cl-36	4.3023E-08	4,606.13	9,212.25	0.00E+00	1.98E-04	3.96E-04
Cm-243	1.9053E-07	4,606.13	9,212.25	0.00E+00	8.78E-04	1.76E-03
Cm-244	1.7744E-06	4,606.13	9,212.25	0.00E+00	8.17E-03	1.63E-02
Co-60	4.3188E-03	4,606.13	9,212.25	0.00E+00	1.99E+01	3.98E+01
Cs-134	6.7188E-04	4,606.13	9,212.25	0.00E+00	3.09E+00	6.19E+00
Cs-135	3.1549E-05	4,606.13	9,212.25	0.00E+00	1.45E-01	2.91E-01
Cs-137	1.9489E+00	4,606.13	9,212.25	0.00E+00	8.98E+03	1.80E+04
Eu-154	4.0301E-01	4,606.13	9,212.25	0.00E+00	1.86E+03	3.71E+03
Eu-155	5.4000E-02	4,606.13	9,212.25	0.00E+00	2.49E+02	4.97E+02
Fe-55	1.5955E-04	4,606.13	9,212.25	0.00E+00	7.35E-01	1.47E+00
H-3	4.6571E-03	4,606.13	9,212.25	0.00E+00	2.15E+01	4.29E+01
I-129	7.3805E-07	4,606.13	9,212.25	0.00E+00	3.40E-03	6.80E-03
Kr-85	9.5684E-02	4,606.13	9,212.25	0.00E+00	4.41E+02	8.81E+02
Np-237	1.4618E-06	4,606.13	9,212.25	0.00E+00	6.73E-03	1.35E-02
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
Tl-208	1.8195E-08	4,606.13	9,212.25	0.00E+00	8.38E-05	1.68E-04
U-232	4.9098E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.454E+14
0.0250	1.952E+14
0.0375	2.043E+14
0.0575	1.889E+14
0.0850	1.150E+14
0.1250	1.291E+14
0.2250	1.042E+14
0.3750	4.282E+13
0.5750	6.821E+14
0.8500	7.258E+13
1.2500	7.818E+13
1.7500	2.342E+12
2.2500	3.712E+07
2.7500	6.179E+06
3.5000	4.231E+04
5.0000	5.197E+03
7.0000	5.866E+02
11.0000	6.671E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.20E+02	2.39E+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 %:	19.9999995	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		4,606.13	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		9,212.25	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) GREECE
SNF ID #: 531
Fuel Units & Descr: 18 - ASSEMBLY
Heavy Metal Mass: BOL=11.07kg; EOL=10.294kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: $18^{*}x10^{7}$ 0.75

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	734.70	1,469.40	0.00E+00	4.87E-07	9.74E-07
Am-241	2.0060E-03	734.70	1,469.40	0.00E+00	1.47E+00	2.95E+00
Am-242m	4.2429E-07	734.70	1,469.40	0.00E+00	3.12E-04	6.23E-04
Am-243	1.4899E-06	734.70	1,469.40	0.00E+00	1.09E-03	2.19E-03
C-14	5.7135E-09	734.70	1,469.40	0.00E+00	4.20E-06	8.40E-06
Cl-36	1.3124E-32	734.70	1,469.40	0.00E+00	9.64E-30	1.93E-29
Cm-243	1.6443E-07	734.70	1,469.40	0.00E+00	1.21E-04	2.42E-04
Cm-244	2.9330E-05	734.70	1,469.40	0.00E+00	2.15E-02	4.31E-02
Co-60	5.3186E-06	734.70	1,469.40	0.00E+00	3.91E-03	7.82E-03
Cs-134	3.1563E-03	734.70	1,469.40	0.00E+00	2.32E+00	4.64E+00
Cs-135	3.4477E-06	734.70	1,469.40	0.00E+00	2.53E-03	5.07E-03
Cs-137	2.0313E+00	734.70	1,469.40	0.00E+00	1.49E+03	2.98E+03
Eu-154	2.4513E-02	734.70	1,469.40	0.00E+00	1.80E+01	3.60E+01
Eu-155	4.8175E-03	734.70	1,469.40	0.00E+00	3.54E+00	7.08E+00
Fe-55	1.2397E-04	734.70	1,469.40	0.00E+00	9.11E-02	1.82E-01
H-3	4.5697E-03	734.70	1,469.40	0.00E+00	3.36E+00	6.71E+00
I-129	7.5300E-07	734.70	1,469.40	0.00E+00	5.53E-04	1.11E-03
Kr-85	1.0850E-01	734.70	1,469.40	0.00E+00	7.97E+01	1.59E+02
Np-237	9.5561E-06	734.70	1,469.40	0.00E+00	7.02E-03	1.40E-02
Pa-231	2.0359E-09	734.70	1,469.40	0.00E+00	1.50E-06	2.99E-06
Pb-210	4.9728E-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	3.15E-01	6.29E-01
Pu-240	2.4368E-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
Ra-226	2.2854E-10	734.70	1,469.40	0.00E+00	1.68E-07	3.36E-07
Ra-228	1.2426E-14	734.70	1,469.40	0.00E+00	9.13E-12	1.83E-11
Ru-106	6.3589E-06	734.70	1,469.40	0.00E+00	4.67E-03	9.34E-03
Se-79	1.2933E-05	734.70	1,469.40	0.00E+00	9.50E-03	1.90E-02
Sn-126	1.1574E-05	734.70	1,469.40	0.00E+00	8.50E-03	1.70E-02
Sr-90	1.9248E+00	734.70	1,469.40	0.00E+00	1.41E+03	2.83E+03
Tc-99	4.2239E-04	734.70	1,469.40	0.00E+00	3.10E-01	6.21E-01
Th-229	5.0953E-12	734.70	1,469.40	0.00E+00	3.74E-09	7.49E-09
Th-230	4.1885E-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
Tl-208	4.6024E-08	734.70	1,469.40	0.00E+00	3.38E-05	6.76E-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-06	3.79E-06
U-234	1.8450E-04	734.70	1,469.40	0.00E+00	1.36E-01	2.71E-01
U-235	-2.7235E-06	734.70	0.00	4.78E-03	2.78E-03	4.78E-03
U-236	1.5493E-05	734.70	1,469.40	0.00E+00	1.14E-02	2.28E-02
U-238	-4.2851E-09	734.70	0.00	2.98E-03	2.97E-03	2.98E-03
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.551E+14
0.0250	3.225E+13
0.0375	2.813E+13
0.0575	3.013E+13
0.0850	1.821E+13
0.1250	1.232E+13
0.2250	1.571E+13
0.3750	6.839E+12
0.5750	1.116E+14
0.8500	1.886E+12
1.2500	1.077E+12
1.7500	4.943E+10
2.2500	4.336E+06
2.7500	2.451E+06
3.5000	1.128E+04
5.0000	6.434E+02
7.0000	7.105E+01
11.0000	7.966E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+01	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 HM Constituents:	U	U
BOL Enrichment %:	20.00000024	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:		734.70
Bounding:		1,469.40

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:	0.21	
Bounding:	0.42	

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: FRR MTR-C (U3Si2 LEU) JAPAN
SNF ID #: 289
Fuel Units & Descr: 17 - ASSEMBLY
Heavy Metal Mass: BOL=8.925kg; EOL=8.6kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	307.50	614.99	0.00E+00	2.04E-07	4.08E-07
Am-241	2.0060E-03	307.50	614.99	0.00E+00	6.17E-01	1.23E+00
Am-242m	4.2429E-07	307.50	614.99	0.00E+00	1.30E-04	2.61E-04
Am-243	1.4899E-06	307.50	614.99	0.00E+00	4.58E-04	9.16E-04
C-14	5.7135E-09	307.50	614.99	0.00E+00	1.76E-06	3.51E-06
Cl-36	1.3124E-32	307.50	614.99	0.00E+00	4.04E-30	8.07E-30
Cm-243	1.6443E-07	307.50	614.99	0.00E+00	5.06E-05	1.01E-04
Cm-244	2.9330E-05	307.50	614.99	0.00E+00	9.02E-03	1.80E-02
Co-60	5.3186E-06	307.50	614.99	0.00E+00	1.64E-03	3.27E-03
Cs-134	3.1563E-03	307.50	614.99	0.00E+00	9.71E-01	1.94E+00
Cs-135	3.4477E-06	307.50	614.99	0.00E+00	1.06E-03	2.12E-03
Cs-137	2.0313E+00	307.50	614.99	0.00E+00	6.25E+02	1.25E+03
Eu-154	2.4513E-02	307.50	614.99	0.00E+00	7.54E+00	1.51E+01
Eu-155	4.8175E-03	307.50	614.99	0.00E+00	1.48E+00	2.96E+00
Fe-55	1.2397E-04	307.50	614.99	0.00E+00	3.81E-02	7.62E-02
H-3	4.5697E-03	307.50	614.99	0.00E+00	1.41E+00	2.81E+00
I-129	7.5300E-07	307.50	614.99	0.00E+00	2.32E-04	4.63E-04
Kr-85	1.0850E-01	307.50	614.99	0.00E+00	3.34E+01	6.67E+01
Np-237	9.5561E-06	307.50	614.99	0.00E+00	2.94E-03	5.88E-03
Pa-231	2.0359E-09	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	5.92E+02	1.18E+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	1.9270E-14	307.50	614.99	0.00E+00	5.93E-12	1.19E-11
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.492E+13
0.0250	1.350E+13
0.0375	1.177E+13
0.0575	1.261E+13
0.0850	7.621E+12
0.1250	5.157E+12
0.2250	6.576E+12
0.3750	2.862E+12
0.5750	4.669E+13
0.8500	7.894E+11
1.2500	4.507E+11
1.7500	2.069E+10
2.2500	1.815E+06
2.7500	1.026E+06
3.5000	4.726E+03
5.0000	2.719E+02
7.0000	3.005E+01
11.0000	3.369E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.33E+00	1.47E+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 %:	20.00000028	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:		307.50
Bounding:		614.99

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:	0.11	
Bounding:	0.22	

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: FRR MTR-C (U3Si2 LEU) NETHERLANDS
SNF ID #: 509
Fuel Units & Descr: 7 - ASSEMBLY
Heavy Metal Mass: BOL=5.53kg; EOL=4.866kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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 Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	628.44	1,256.88	0.00E+00	4.17E-07	8.33E-07
Am-241	2.0060E-03	628.44	1,256.88	0.00E+00	1.26E+00	2.52E+00
Am-242m	4.2429E-07	628.44	1,256.88	0.00E+00	2.67E-04	5.33E-04
Am-243	1.4899E-06	628.44	1,256.88	0.00E+00	9.36E-04	1.87E-03
C-14	5.7135E-09	628.44	1,256.88	0.00E+00	3.59E-06	7.18E-06
Cl-36	1.3124E-32	628.44	1,256.88	0.00E+00	8.25E-30	1.65E-29
Cm-243	1.6443E-07	628.44	1,256.88	0.00E+00	1.03E-04	2.07E-04
Cm-244	2.9330E-05	628.44	1,256.88	0.00E+00	1.84E-02	3.69E-02
Co-60	5.3186E-06	628.44	1,256.88	0.00E+00	3.34E-03	6.68E-03
Cs-134	3.1563E-03	628.44	1,256.88	0.00E+00	1.98E+00	3.97E+00
Cs-135	3.4477E-06	628.44	1,256.88	0.00E+00	2.17E-03	4.33E-03
Cs-137	2.0313E+00	628.44	1,256.88	0.00E+00	1.28E+03	2.55E+03
Eu-154	2.4513E-02	628.44	1,256.88	0.00E+00	1.54E+01	3.08E+01
Eu-155	4.8175E-03	628.44	1,256.88	0.00E+00	3.03E+00	6.06E+00
Fe-55	1.2397E-04	628.44	1,256.88	0.00E+00	7.79E-02	1.56E-01
H-3	4.5697E-03	628.44	1,256.88	0.00E+00	2.87E+00	5.74E+00
I-129	7.5300E-07	628.44	1,256.88	0.00E+00	4.73E-04	9.46E-04
Kr-85	1.0850E-01	628.44	1,256.88	0.00E+00	6.82E+01	1.36E+02
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
Tl-208	4.6024E-08	628.44	1,256.88	0.00E+00	2.89E-05	5.78E-05
U-232	1.2582E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.327E+14
0.0250	2.759E+13
0.0375	2.406E+13
0.0575	2.577E+13
0.0850	1.557E+13
0.1250	1.054E+13
0.2250	1.344E+13
0.3750	5.850E+12
0.5750	9.543E+13
0.8500	1.613E+12
1.2500	9.212E+11
1.7500	4.228E+10
2.2500	3.709E+08
2.7500	2.097E+08
3.5000	9.640E+03
5.0000	5.479E+02
7.0000	6.050E+01
11.0000	6.781E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.50E+01	3.00E+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 %:	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 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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	161,099.36	322,198.73	0.00E+00	1.07E-04	2.14E-04
Am-241	2.0060E-03	161,099.36	322,198.73	0.00E+00	3.23E+02	6.46E+02
Am-242m	4.2429E-07	161,099.36	322,198.73	0.00E+00	6.84E-02	1.37E-01
Am-243	1.4899E-06	161,099.36	322,198.73	0.00E+00	2.40E-01	4.80E-01
C-14	5.7135E-09	161,099.36	322,198.73	0.00E+00	9.20E-04	1.84E-03
Cl-36	1.3124E-32	161,099.36	322,198.73	0.00E+00	2.11E-27	4.23E-27
Cm-243	1.6443E-07	161,099.36	322,198.73	0.00E+00	2.65E-02	5.30E-02
Cm-244	2.9330E-05	161,099.36	322,198.73	0.00E+00	4.73E+00	9.45E+00
Co-60	5.3186E-06	161,099.36	322,198.73	0.00E+00	8.57E-01	1.71E+00
Cs-134	3.1563E-03	161,099.36	322,198.73	0.00E+00	5.08E+02	1.02E+03
Cs-135	3.4477E-06	161,099.36	322,198.73	0.00E+00	5.55E-01	1.11E+00
Cs-137	2.0313E+00	161,099.36	322,198.73	0.00E+00	3.27E+05	6.54E+05
Eu-154	2.4513E-02	161,099.36	322,198.73	0.00E+00	3.95E+03	7.90E+03
Eu-155	4.8175E-03	161,099.36	322,198.73	0.00E+00	7.76E+02	1.55E+03
Fe-55	1.2397E-04	161,099.36	322,198.73	0.00E+00	2.00E+01	3.99E+01
H-3	4.5697E-03	161,099.36	322,198.73	0.00E+00	7.36E+02	1.47E+03
I-129	7.5300E-07	161,099.36	322,198.73	0.00E+00	1.21E-01	2.43E-01
Kr-85	1.0850E-01	161,099.36	322,198.73	0.00E+00	1.75E+04	3.50E+04
Np-237	9.5561E-06	161,099.36	322,198.73	0.00E+00	1.54E+00	3.08E+00
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
Tl-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
U-233	2.5825E-09	161,099.36	322,198.73	0.00E+00	4.16E-04	8.32E-04
U-234	1.8450E-04	161,099.36	322,198.73	0.00E+00	2.97E+01	5.94E+01
U-235	-2.7235E-06	161,099.36	0.00	4.15E-01	0.00E+00	4.15E-01
U-236	1.5493E-05	161,099.36	322,198.73	0.00E+00	2.50E+00	4.99E+00
U-238	-4.2851E-09	161,099.36	0.00	2.58E-01	2.57E-01	2.58E-01
Y-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.401E+16
0.0250	7.072E+15
0.0375	6.169E+15
0.0575	6.607E+15
0.0850	3.993E+15
0.1250	2.702E+15
0.2250	3.445E+15
0.3750	1.500E+15
0.5750	2.446E+16
0.8500	4.136E+14
1.2500	2.361E+14
1.7500	1.084E+13
2.2500	9.508E+08
2.7500	5.375E+08
3.5000	2.471E+06
5.0000	1.402E+05
7.0000	1.548E+04
11.0000	1.735E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.84E+03	7.68E+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:	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) ARGENTINA
SNF ID #: 635
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=2.395kg; EOL=1.749kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	612.53	1,225.06	0.00E+00	4.06E-07	8.12E-07
Am-241	2.0060E-03	612.53	1,225.06	0.00E+00	1.23E+00	2.46E+00
Am-242m	4.2429E-07	612.53	1,225.06	0.00E+00	2.60E-04	5.20E-04
Am-243	1.4899E-06	612.53	1,225.06	0.00E+00	9.13E-04	1.83E-03
C-14	5.7135E-09	612.53	1,225.06	0.00E+00	3.50E-06	7.00E-06
Cl-36	1.3124E-32	612.53	1,225.06	0.00E+00	8.04E-30	1.61E-29
Cm-243	1.6443E-07	612.53	1,225.06	0.00E+00	1.01E-04	2.01E-04
Cm-244	2.9330E-05	612.53	1,225.06	0.00E+00	1.80E-02	3.59E-02
Co-60	5.3186E-06	612.53	1,225.06	0.00E+00	3.26E-03	6.52E-03
Cs-134	3.1563E-03	612.53	1,225.06	0.00E+00	1.93E+00	3.87E+00
Cs-135	3.4477E-06	612.53	1,225.06	0.00E+00	2.11E-03	4.22E-03
Cs-137	2.0313E+00	612.53	1,225.06	0.00E+00	1.24E+03	2.49E+03
Eu-154	2.4513E-02	612.53	1,225.06	0.00E+00	1.50E+01	3.00E+01
Eu-155	4.8175E-03	612.53	1,225.06	0.00E+00	2.95E+00	5.90E+00
Fe-55	1.2397E-04	612.53	1,225.06	0.00E+00	7.59E-02	1.52E-01
H-3	4.5697E-03	612.53	1,225.06	0.00E+00	2.80E+00	5.60E+00
I-129	7.5300E-07	612.53	1,225.06	0.00E+00	4.61E-04	9.22E-04
Kr-85	1.0850E-01	612.53	1,225.06	0.00E+00	6.65E+01	1.33E+02
Np-237	9.5561E-06	612.53	1,225.06	0.00E+00	5.85E-03	1.17E-02
Pa-231	2.0359E-09	612.53	1,225.06	0.00E+00	1.25E-06	2.49E-06
Pb-210	4.9728E-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	2.4368E-04	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
Ra-226	2.2854E-10	612.53	1,225.06	0.00E+00	1.40E-07	2.80E-07
Ra-228	1.2426E-14	612.53	1,225.06	0.00E+00	7.61E-12	1.52E-11
Ru-106	6.3589E-06	612.53	1,225.06	0.00E+00	3.90E-03	7.79E-03
Se-79	1.2933E-05	612.53	1,225.06	0.00E+00	7.92E-03	1.58E-02
Sn-126	1.1574E-05	612.53	1,225.06	0.00E+00	7.09E-03	1.42E-02
Sr-90	1.9248E+00	612.53	1,225.06	0.00E+00	1.18E+03	2.36E+03
Tc-99	4.2239E-04	612.53	1,225.06	0.00E+00	2.59E-01	5.17E-01
Th-229	5.0953E-12	612.53	1,225.06	0.00E+00	3.12E-09	6.24E-09
Th-230	4.1885E-08	612.53	1,225.06	0.00E+00	2.57E-05	5.13E-05
Th-232	1.9270E-14	612.53	1,225.06	0.00E+00	1.18E-11	2.36E-11
Tl-208	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	0.00	4.66E-03	2.99E-03	4.66E-03
U-236	-1.5493E-05	612.53	1,225.06	0.00E+00	9.49E-03	1.90E-02
U-238	-4.2851E-09	612.53	0.00	8.05E-05	7.79E-05	8.05E-05
Y-90	1.9254E+00	612.53	1,225.06	0.00E+00	1.18E+03	2.36E+03
Other Radionuclides					1.18E+03	2.37E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.293E+14
0.0250	2.689E+13
0.0375	2.345E+13
0.0575	2.512E+13
0.0850	1.518E+13
0.1250	1.027E+13
0.2250	1.310E+13
0.3750	5.702E+12
0.5750	9.301E+13
0.8500	1.572E+12
1.2500	8.979E+11
1.7500	4.121E+10
2.2500	3.615E+08
2.7500	2.044E+06
3.5000	9.389E+03
5.0000	5.309E+02
7.0000	5.861E+01
11.0000	6.569E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.46E+01	2.92E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	90.00000174	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		612.53	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,225.06	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.81	
Bounding:	1.63	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) CANADA
SNF ID #: 612
Fuel Units & Descr: 23 - MTR TYPE
Heavy Metal Mass: BOL=2.721kg; EOL=1.76kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	910.46	1,820.93	0.00E+00	6.04E-07	1.21E-06
Am-241	2.0060E-03	910.46	1,820.93	0.00E+00	1.83E+00	3.65E+00
Am-242m	4.2429E-07	910.46	1,820.93	0.00E+00	3.86E-04	7.73E-04
Am-243	1.4899E-06	910.46	1,820.93	0.00E+00	1.36E-03	2.71E-03
C-14	5.7135E-09	910.46	1,820.93	0.00E+00	5.20E-06	1.04E-05
Cl-36	1.3124E-32	910.46	1,820.93	0.00E+00	1.19E-29	2.39E-29
Cm-243	1.6443E-07	910.46	1,820.93	0.00E+00	1.50E-04	2.99E-04
Cm-244	2.9330E-05	910.46	1,820.93	0.00E+00	2.67E-02	5.34E-02
Co-60	5.3186E-06	910.46	1,820.93	0.00E+00	4.84E-03	9.68E-03
Cs-134	3.1563E-03	910.46	1,820.93	0.00E+00	2.87E+00	5.75E+00
Cs-135	3.4477E-06	910.46	1,820.93	0.00E+00	3.14E-03	6.28E-03
Cs-137	2.0313E+00	910.46	1,820.93	0.00E+00	1.85E+03	3.70E+03
Eu-154	2.4513E-02	910.46	1,820.93	0.00E+00	2.23E+01	4.46E+01
Eu-155	4.8175E-03	910.46	1,820.93	0.00E+00	4.39E+00	8.77E+00
Fe-55	1.2397E-04	910.46	1,820.93	0.00E+00	1.13E-01	2.26E-01
H-3	4.5697E-03	910.46	1,820.93	0.00E+00	4.16E+00	8.32E+00
I-129	7.5300E-07	910.46	1,820.93	0.00E+00	6.86E-04	1.37E-03
Kr-85	1.0850E-01	910.46	1,820.93	0.00E+00	9.88E+01	1.98E+02
Np-237	9.5561E-06	910.46	1,820.93	0.00E+00	8.70E-03	1.74E-02
Pa-231	2.0359E-09	910.46	1,820.93	0.00E+00	1.85E-06	3.71E-06
Pb-210	4.9728E-11	910.46	1,820.93	0.00E+00	4.53E-08	9.06E-08
Pm-147	4.8502E-02	910.46	1,820.93	0.00E+00	4.42E+01	8.83E+01
Pu-238	1.8254E-02	910.46	1,820.93	0.00E+00	1.66E+01	3.32E+01
Pu-239	4.2810E-04	910.46	1,820.93	0.00E+00	3.90E-01	7.80E-01
Pu-240	2.4368E-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
Ra-226	2.2854E-10	910.46	1,820.93	0.00E+00	2.08E-07	4.16E-07
Ra-228	1.2426E-14	910.46	1,820.93	0.00E+00	1.13E-11	2.26E-11
Ru-106	6.3589E-06	910.46	1,820.93	0.00E+00	5.79E-03	1.16E-02
Se-79	1.2933E-05	910.46	1,820.93	0.00E+00	1.18E-02	2.36E-02
Sn-126	1.1574E-05	910.46	1,820.93	0.00E+00	1.05E-02	2.11E-02
Sr-90	1.9248E+00	910.46	1,820.93	0.00E+00	1.75E+03	3.50E+03
Tc-99	4.2239E-04	910.46	1,820.93	0.00E+00	3.85E-01	7.69E-01
Th-229	5.0953E-12	910.46	1,820.93	0.00E+00	4.64E-09	9.28E-09
Th-230	4.1885E-06	910.46	1,820.93	0.00E+00	3.81E-05	7.63E-05
Th-232	1.9270E-14	910.46	1,820.93	0.00E+00	1.75E-11	3.51E-11
Tl-208	4.6024E-08	910.46	1,820.93	0.00E+00	4.19E-05	8.38E-05
U-232	1.2582E-07	910.46	1,820.93	0.00E+00	1.15E-04	2.29E-04
U-233	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	2.99E-03	5.47E-03
U-236	1.5493E-05	910.46	1,820.93	0.00E+00	1.41E-02	2.82E-02
U-238	-4.2851E-09	910.46	0.00	6.40E-05	6.01E-05	6.40E-05
Y-90	1.9254E+00	910.46	1,820.93	0.00E+00	1.75E+03	3.51E+03
Other Radionuclides					1.76E+03	3.52E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.922E+14
0.0250	3.997E+13
0.0375	3.486E+13
0.0575	3.734E+13
0.0850	2.256E+13
0.1250	1.527E+13
0.2250	1.947E+13
0.3750	8.475E+12
0.5750	1.382E+14
0.8500	2.337E+12
1.2500	1.335E+12
1.7500	6.126E+10
2.2500	5.373E+06
2.7500	3.038E+06
3.5000	1.395E+04
5.0000	7.890E+02
7.0000	8.710E+01
11.0000	9.762E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E+01	4.34E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99997633	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		910.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,820.93	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) GERMANY
SNF ID #: 579
Fuel Units & Descr: 33 - MTR TYPE
Heavy Metal Mass: BOL=3.336kg; EOL=2.062kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10" 1.38

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	1,206.31	2,412.63	0.00E+00	8.00E-07	1.60E-06
Am-241	2.0060E-03	1,206.31	2,412.63	0.00E+00	2.42E+00	4.84E+00
Am-242m	4.2429E-07	1,206.31	2,412.63	0.00E+00	5.12E-04	1.02E-03
Am-243	1.4899E-06	1,206.31	2,412.63	0.00E+00	1.80E-03	3.59E-03
C-14	5.7135E-09	1,206.31	2,412.63	0.00E+00	6.89E-06	1.38E-05
Cl-36	1.3124E-32	1,206.31	2,412.63	0.00E+00	1.58E-29	3.17E-29
Cm-243	1.6443E-07	1,206.31	2,412.63	0.00E+00	1.98E-04	3.97E-04
Cm-244	2.9330E-05	1,206.31	2,412.63	0.00E+00	3.54E-02	7.08E-02
Co-60	5.3186E-06	1,206.31	2,412.63	0.00E+00	6.42E-03	1.28E-02
Cs-134	3.1563E-03	1,206.31	2,412.63	0.00E+00	3.81E+00	7.62E+00
Cs-135	3.4477E-06	1,206.31	2,412.63	0.00E+00	4.16E-03	8.32E-03
Cs-137	2.0313E+00	1,206.31	2,412.63	0.00E+00	2.45E+03	4.90E+03
Eu-154	2.4513E-02	1,206.31	2,412.63	0.00E+00	2.96E+01	5.91E+01
Eu-155	4.8175E-03	1,206.31	2,412.63	0.00E+00	5.81E+00	1.16E+01
Fe-55	1.2397E-04	1,206.31	2,412.63	0.00E+00	1.50E-01	2.99E-01
H-3	4.5697E-03	1,206.31	2,412.63	0.00E+00	5.51E+00	1.10E+01
I-129	7.5300E-07	1,206.31	2,412.63	0.00E+00	9.08E-04	1.82E-03
Kr-85	1.0850E-01	1,206.31	2,412.63	0.00E+00	1.31E+02	2.62E+02
Np-237	9.5561E-06	1,206.31	2,412.63	0.00E+00	1.15E-02	2.31E-02
Pa-231	2.0359E-09	1,206.31	2,412.63	0.00E+00	2.46E-06	4.91E-06
Pb-210	4.9728E-11	1,206.31	2,412.63	0.00E+00	6.00E-08	1.20E-07
Pm-147	4.8502E-02	1,206.31	2,412.63	0.00E+00	5.85E+01	1.17E+02
Pu-238	1.8254E-02	1,206.31	2,412.63	0.00E+00	2.20E+01	4.40E+01
Pu-239	4.2810E-04	1,206.31	2,412.63	0.00E+00	5.16E-01	1.03E+00
Pu-240	2.4368E-04	1,206.31	2,412.63	0.00E+00	2.94E-01	5.88E-01
Pu-241	3.3415E-02	1,206.31	2,412.63	0.00E+00	4.03E+01	8.06E+01
Pu-242	3.6329E-07	1,206.31	2,412.63	0.00E+00	4.38E-04	8.76E-04
Ra-226	2.2854E-10	1,206.31	2,412.63	0.00E+00	2.76E-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-06	1,206.31	2,412.63	0.00E+00	7.67E-03	1.53E-02
Se-79	1.2933E-05	1,206.31	2,412.63	0.00E+00	1.56E-02	3.12E-02
Sn-126	1.1574E-05	1,206.31	2,412.63	0.00E+00	1.40E-02	2.79E-02
Sr-90	1.9248E+00	1,206.31	2,412.63	0.00E+00	2.32E+03	4.64E+03
Tc-99	4.2239E-04	1,206.31	2,412.63	0.00E+00	5.10E-01	1.02E+00
Th-229	5.0953E-12	1,206.31	2,412.63	0.00E+00	6.15E-09	1.23E-08
Th-230	4.1885E-06	1,206.31	2,412.63	0.00E+00	5.05E-05	1.01E-04
Th-232	1.9270E-14	1,206.31	2,412.63	0.00E+00	2.32E-11	4.65E-11
Tl-208	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	6.23E-06
U-234	1.8450E-04	1,206.31	2,412.63	0.00E+00	2.23E-01	4.45E-01
U-235	-2.7235E-06	1,206.31	0.00	6.71E-03	3.42E-03	6.71E-03
U-236	1.5493E-05	1,206.31	2,412.63	0.00E+00	1.87E-02	3.74E-02
U-238	-4.2851E-09	1,206.31	0.00	7.85E-05	7.33E-05	7.85E-05
Y-90	1.9254E+00	1,206.31	2,412.63	0.00E+00	2.32E+03	4.65E+03
Other Radionuclides					2.33E+03	4.67E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.547E+14
0.0250	5.296E+13
0.0375	4.619E+13
0.0575	4.947E+13
0.0850	2.990E+13
0.1250	2.023E+13
0.2250	2.580E+13
0.3750	1.123E+13
0.5750	1.832E+14
0.8500	3.097E+12
1.2500	1.768E+12
1.7500	8.116E+10
2.2500	7.119E+06
2.7500	4.025E+06
3.5000	1.849E+04
5.0000	1.045E+03
7.0000	1.154E+02
11.0000	1.293E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.88E+01	5.75E+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 %:	92.99997131	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,206.31
Bounding:		2,412.63

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:	1.15	
Bounding:	2.30	

Estimated EOL HM/Given EOL HM: 1.04

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) JAPAN
SNF ID #: 600
Fuel Units & Descr: 54 - MTR TYPE
Heavy Metal Mass: BOL=5.227kg; EOL=4.158kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	1,012.55	2,025.11	0.00E+00	6.71E-07	1.34E-06
Am-241	2.0060E-03	1,012.55	2,025.11	0.00E+00	2.03E+00	4.06E+00
Am-242m	4.2429E-07	1,012.55	2,025.11	0.00E+00	4.30E-04	8.59E-04
Am-243	1.4899E-06	1,012.55	2,025.11	0.00E+00	1.51E-03	3.02E-03
C-14	5.7135E-09	1,012.55	2,025.11	0.00E+00	5.79E-06	1.16E-05
Cl-36	1.3124E-32	1,012.55	2,025.11	0.00E+00	1.33E-29	2.66E-29
Cm-243	1.6443E-07	1,012.55	2,025.11	0.00E+00	1.66E-04	3.33E-04
Cm-244	2.9330E-05	1,012.55	2,025.11	0.00E+00	2.97E-02	5.94E-02
Co-60	5.3186E-06	1,012.55	2,025.11	0.00E+00	5.39E-03	1.08E-02
Cs-134	3.1563E-03	1,012.55	2,025.11	0.00E+00	3.20E+00	6.39E+00
Cs-135	3.4477E-06	1,012.55	2,025.11	0.00E+00	3.49E-03	6.98E-03
Cs-137	2.0313E+00	1,012.55	2,025.11	0.00E+00	2.06E+03	4.11E+03
Eu-154	2.4513E-02	1,012.55	2,025.11	0.00E+00	2.48E+01	4.96E+01
Eu-155	4.8175E-03	1,012.55	2,025.11	0.00E+00	4.88E+00	9.76E+00
Fe-55	1.2397E-04	1,012.55	2,025.11	0.00E+00	1.26E-01	2.51E-01
H-3	4.5697E-03	1,012.55	2,025.11	0.00E+00	4.63E+00	9.25E+00
I-129	7.5300E-07	1,012.55	2,025.11	0.00E+00	7.62E-04	1.52E-03
Kr-85	1.0850E-01	1,012.55	2,025.11	0.00E+00	1.10E+02	2.20E+02
Np-237	9.5561E-06	1,012.55	2,025.11	0.00E+00	9.68E-03	1.94E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.138E+14
0.0250	4.445E+13
0.0375	3.877E+13
0.0575	4.153E+13
0.0850	2.509E+13
0.1250	1.698E+13
0.2250	2.165E+13
0.3750	9.426E+12
0.5750	1.538E+14
0.8500	2.599E+12
1.2500	1.484E+12
1.7500	6.812E+10
2.2500	5.976E+06
2.7500	3.378E+06
3.5000	1.552E+04
5.0000	8.776E+02
7.0000	9.688E+01
11.0000	1.086E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.41E+01	4.83E+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 %:	92.99999931	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,012.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,025.11	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) PORTUGAL
SNF ID #: 631
Fuel Units & Descr: 9 - MTR TYPE
Heavy Metal Mass: BOL=1.423kg; EOL=0.894kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	501.16	1,002.33	0.00E+00	3.32E-07	6.65E-07
Am-241	2.0060E-03	501.16	1,002.33	0.00E+00	1.01E+00	2.01E+00
Am-242m	4.2429E-07	501.16	1,002.33	0.00E+00	2.13E-04	4.25E-04
Am-243	1.4899E-06	501.16	1,002.33	0.00E+00	7.47E-04	1.49E-03
C-14	5.7135E-09	501.16	1,002.33	0.00E+00	2.86E-06	5.73E-06
Cl-36	1.3124E-32	501.16	1,002.33	0.00E+00	6.58E-30	1.32E-29
Cm-243	1.6443E-07	501.16	1,002.33	0.00E+00	8.24E-05	1.65E-04
Cm-244	2.9330E-05	501.16	1,002.33	0.00E+00	1.47E-02	2.94E-02
Co-60	5.3186E-06	501.16	1,002.33	0.00E+00	2.67E-03	5.33E-03
Cs-134	3.1563E-03	501.16	1,002.33	0.00E+00	1.58E+00	3.16E+00
Cs-135	3.4477E-06	501.16	1,002.33	0.00E+00	1.73E-03	3.46E-03
Cs-137	2.0313E+00	501.16	1,002.33	0.00E+00	1.02E+03	2.04E+03
Eu-154	2.4513E-02	501.16	1,002.33	0.00E+00	1.23E+01	2.46E+01
Eu-155	4.8175E-03	501.16	1,002.33	0.00E+00	2.41E+00	4.83E+00
Fe-55	1.2397E-04	501.16	1,002.33	0.00E+00	6.21E-02	1.24E-01
H-3	4.5697E-03	501.16	1,002.33	0.00E+00	2.29E+00	4.58E+00
I-129	7.5300E-07	501.16	1,002.33	0.00E+00	3.77E-04	7.55E-04
Kr-85	1.0850E-01	501.16	1,002.33	0.00E+00	5.44E+01	1.09E+02
Np-237	9.5561E-06	501.16	1,002.33	0.00E+00	4.79E-03	9.58E-03
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-05	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	9.66E-12	1.93E-11
Tl-208	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
U-234	1.8450E-04	501.16	1,002.33	0.00E+00	9.25E-02	1.85E-01
U-235	-2.7235E-06	501.16	0.00	2.86E-03	1.49E-03	2.86E-03
U-236	1.5493E-05	501.16	1,002.33	0.00E+00	7.76E-03	1.55E-02
U-238	-4.2851E-09	501.16	0.00	3.35E-05	3.13E-05	3.35E-05
Y-90	1.9254E+00	501.16	1,002.33	0.00E+00	9.65E+02	1.93E+03
Other Radionuclides					9.69E+02	1.94E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.058E+14
0.0250	2.200E+13
0.0375	1.919E+13
0.0575	2.055E+13
0.0850	1.242E+13
0.1250	8.405E+12
0.2250	1.072E+13
0.3750	4.665E+12
0.5750	7.610E+13
0.8500	1.287E+12
1.2500	7.346E+11
1.7500	3.372E+10
2.2500	2.958E+08
2.7500	1.672E+08
3.5000	7.681E+03
5.0000	4.343E+02
7.0000	4.794E+01
11.0000	5.373E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.19E+01	2.39E+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 %:	93.00000971	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		501.16
Bounding:		1,002.33

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:	1.12	
Bounding:	2.24	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) TURKEY
SNF ID #: 643
Fuel Units & Descr: 8 - MTR TYPE
Heavy Metal Mass: BOL=1.781kg; EOL=0.953kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	784.13	1,568.26	0.00E+00	5.20E-07	1.04E-06
Am-241	2.0060E-03	784.13	1,568.26	0.00E+00	1.57E+00	3.15E+00
Am-242m	4.2429E-07	784.13	1,568.26	0.00E+00	3.33E-04	6.65E-04
Am-243	1.4899E-06	784.13	1,568.26	0.00E+00	1.17E-03	2.34E-03
C-14	5.7135E-09	784.13	1,568.26	0.00E+00	4.48E-06	8.96E-06
Cl-36	1.3124E-32	784.13	1,568.26	0.00E+00	1.03E-29	2.06E-29
Cm-243	1.6443E-07	784.13	1,568.26	0.00E+00	1.29E-04	2.58E-04
Cm-244	2.9330E-05	784.13	1,568.26	0.00E+00	2.30E-02	4.60E-02
Co-60	5.3186E-06	784.13	1,568.26	0.00E+00	4.17E-03	8.34E-03
Cs-134	3.1563E-03	784.13	1,568.26	0.00E+00	2.47E+00	4.95E+00
Cs-135	3.4477E-06	784.13	1,568.26	0.00E+00	2.70E-03	5.41E-03
Cs-137	2.0313E+00	784.13	1,568.26	0.00E+00	1.59E+03	3.19E+03
Eu-154	2.4513E-02	784.13	1,568.26	0.00E+00	1.92E+01	3.84E+01
Eu-155	4.8175E-03	784.13	1,568.26	0.00E+00	3.78E+00	7.56E+00
Fe-55	1.2397E-04	784.13	1,568.26	0.00E+00	9.72E-02	1.94E-01
H-3	4.5697E-03	784.13	1,568.26	0.00E+00	3.58E+00	7.17E+00
I-129	7.5300E-07	784.13	1,568.26	0.00E+00	5.90E-04	1.18E-03
Kr-85	1.0850E-01	784.13	1,568.26	0.00E+00	8.51E+01	1.70E+02
Np-237	9.5561E-06	784.13	1,568.26	0.00E+00	7.49E-03	1.50E-02
Pa-231	2.0359E-09	784.13	1,568.26	0.00E+00	1.60E-06	3.19E-06
Pb-210	4.9728E-11	784.13	1,568.26	0.00E+00	3.90E-08	7.80E-08
Pm-147	4.8502E-02	784.13	1,568.26	0.00E+00	3.80E+01	7.61E+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	3.6329E-07	784.13	1,568.26	0.00E+00	2.85E-04	5.70E-04
Ra-226	2.2854E-10	784.13	1,568.26	0.00E+00	1.79E-07	3.58E-07
Ra-228	1.2426E-14	784.13	1,568.26	0.00E+00	9.74E-12	1.95E-11
Ru-106	6.3589E-06	784.13	1,568.26	0.00E+00	4.99E-03	9.97E-03
Se-79	1.2933E-05	784.13	1,568.26	0.00E+00	1.01E-02	2.03E-02
Sn-126	1.1574E-05	784.13	1,568.26	0.00E+00	9.08E-03	1.82E-02
Sr-90	1.9248E+00	784.13	1,568.26	0.00E+00	1.51E+03	3.02E+03
Tc-99	4.2239E-04	784.13	1,568.26	0.00E+00	3.31E-01	6.62E-01
Th-229	5.0953E-12	784.13	1,568.26	0.00E+00	4.00E-09	7.99E-09
Th-230	4.1885E-08	784.13	1,568.26	0.00E+00	3.28E-05	6.57E-05
Th-232	1.9270E-14	784.13	1,568.26	0.00E+00	1.51E-11	3.02E-11
Tl-208	4.6024E-08	784.13	1,568.26	0.00E+00	3.61E-05	7.22E-05
U-232	1.2582E-07	784.13	1,568.26	0.00E+00	9.87E-05	1.97E-04
U-233	2.5825E-09	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	3.58E-03	1.44E-03	3.58E-03
U-236	1.5493E-05	784.13	1,568.26	0.00E+00	1.21E-02	2.43E-02
U-238	-4.2851E-09	784.13	0.00	4.19E-05	3.85E-05	4.19E-05
Y-90	1.9254E+00	784.13	1,568.26	0.00E+00	1.51E+03	3.02E+03
Other Radionuclides					1.52E+03	3.03E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.655E+14
0.0250	3.442E+13
0.0375	3.003E+13
0.0575	3.216E+13
0.0850	1.943E+13
0.1250	1.315E+13
0.2250	1.677E+13
0.3750	7.299E+12
0.5750	1.191E+14
0.8500	2.013E+12
1.2500	1.149E+12
1.7500	5.276E+10
2.2500	4.628E+06
2.7500	2.616E+06
3.5000	1.202E+04
5.0000	6.794E+02
7.0000	7.501E+01
11.0000	8.407E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.87E+01	3.74E+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 %:	93.00002122	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		784.13	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,568.26	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: 1.06

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-LEU) JAPAN
SNF ID #: 552
Fuel Units & Descr: 99 - ASSEMBLY
Heavy Metal Mass: BOL=94.05kg; EOL=84.645kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%. U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	8,939.12	17,878.25	0.00E+00	7.63E-06	1.53E-05
Am-241	2.2753E-02	8,939.12	17,878.25	0.00E+00	2.03E+02	4.07E+02
Am-242m	8.9133E-06	8,939.12	17,878.25	0.00E+00	7.97E-02	1.59E-01
Am-243	6.4007E-06	8,939.12	17,878.25	0.00E+00	5.72E-02	1.14E-01
C-14	2.9620E-08	8,939.12	17,878.25	0.00E+00	2.65E-04	5.30E-04
Cl-36	5.9513E-35	8,939.12	17,878.25	0.00E+00	5.32E-31	1.06E-30
Cm-243	2.2087E-06	8,939.12	17,878.25	0.00E+00	1.97E-02	3.95E-02
Cm-244	1.1007E-04	8,939.12	17,878.25	0.00E+00	9.84E-01	1.97E+00
Co-60	1.6340E-05	8,939.12	17,878.25	0.00E+00	1.46E-01	2.92E-01
Cs-134	2.1353E-03	8,939.12	17,878.25	0.00E+00	1.91E+01	3.82E+01
Cs-135	4.8607E-06	8,939.12	17,878.25	0.00E+00	4.35E-02	8.69E-02
Cs-137	2.0227E+00	8,939.12	17,878.25	0.00E+00	1.81E+04	3.62E+04
Eu-154	2.0887E-02	8,939.12	17,878.25	0.00E+00	1.87E+02	3.73E+02
Eu-155	4.0867E-03	8,939.12	17,878.25	0.00E+00	3.65E+01	7.31E+01
Fe-55	1.4167E-03	8,939.12	17,878.25	0.00E+00	1.27E+01	2.53E+01
H-3	4.6653E-03	8,939.12	17,878.25	0.00E+00	4.17E+01	8.34E+01
I-129	7.1600E-07	8,939.12	17,878.25	0.00E+00	6.40E-03	1.28E-02
Kr-85	1.0240E-01	8,939.12	17,878.25	0.00E+00	9.15E+02	1.83E+03
Np-237	3.7227E-06	8,939.12	17,878.25	0.00E+00	3.33E-02	6.66E-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	1.0607E-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
Tl-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-06	7.87E-06
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.812E+15
0.0250	3.763E+14
0.0375	3.306E+14
0.0575	3.561E+14
0.0850	2.120E+14
0.1250	1.427E+14
0.2250	1.827E+14
0.3750	7.952E+13
0.5750	1.349E+15
0.8500	2.062E+13
1.2500	1.162E+13
1.7500	5.482E+11
2.2500	5.141E+07
2.7500	6.084E+06
3.5000	2.465E+06
5.0000	3.744E+04
7.0000	4.237E+03
11.0000	4.821E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E+02	4.28E+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 HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		8,939.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		17,878.25	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-LEU) PORTUGAL
SNF ID #: 540
Fuel Units & Descr: 9 - ASSEMBLY
Heavy Metal Mass: BOL=4.05kg; EOL=3.912kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	130.40	260.81	0.00E+00	8.65E-06	1.73E-07
Am-241	2.0060E-03	130.40	260.81	0.00E+00	2.62E-01	5.23E-01
Am-242m	4.2429E-07	130.40	260.81	0.00E+00	5.53E-05	1.11E-04
Am-243	1.4899E-06	130.40	260.81	0.00E+00	1.94E-04	3.89E-04
C-14	5.7135E-09	130.40	260.81	0.00E+00	7.45E-07	1.49E-06
Cl-36	1.3124E-32	130.40	260.81	0.00E+00	1.71E-30	3.42E-30
Cm-243	1.6443E-07	130.40	260.81	0.00E+00	2.14E-05	4.29E-05
Cm-244	2.9330E-05	130.40	260.81	0.00E+00	3.82E-03	7.65E-03
Co-60	5.3186E-06	130.40	260.81	0.00E+00	6.94E-04	1.39E-03
Cs-134	3.1563E-03	130.40	260.81	0.00E+00	4.12E-01	8.23E-01
Cs-135	3.4477E-06	130.40	260.81	0.00E+00	4.50E-04	8.99E-04
Cs-137	2.0313E+00	130.40	260.81	0.00E+00	2.65E+02	5.30E+02
Eu-154	2.4513E-02	130.40	260.81	0.00E+00	3.20E+00	6.39E+00
Eu-155	4.8175E-03	130.40	260.81	0.00E+00	6.28E-01	1.26E+00
Fe-55	1.2397E-04	130.40	260.81	0.00E+00	1.62E-02	3.23E-02
H-3	4.5697E-03	130.40	260.81	0.00E+00	5.96E-01	1.19E+00
I-129	7.5300E-07	130.40	260.81	0.00E+00	9.82E-05	1.96E-04
Kr-85	1.0850E-01	130.40	260.81	0.00E+00	1.41E+01	2.83E+01
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	4.2810E-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	6.64E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.753E+13
0.0250	5.725E+12
0.0375	4.993E+12
0.0575	5.348E+12
0.0850	3.232E+12
0.1250	2.187E+12
0.2250	2.789E+12
0.3750	1.214E+12
0.5750	1.980E+13
0.8500	3.348E+11
1.2500	1.912E+11
1.7500	8.774E+09
2.2500	7.896E+05
2.7500	4.351E+05
3.5000	2.005E+03
5.0000	1.155E+02
7.0000	1.276E+01
11.0000	1.431E+00

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

	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	Basis for burnup used in estimate:
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	
Bounding:	0.20	

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: FRR MTR-C1 (UALX-HEU) SWITZERLAND
SNF ID #: 656
Fuel Units & Descr: 7 - MTR TYPE
Heavy Metal Mass: BOL=1.28kg; EOL=0.518kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	721.25	1,211.81	0.00E+00	4.78E-07	8.04E-07
Am-241	2.0060E-03	721.25	1,211.81	0.00E+00	1.45E+00	2.43E+00
Am-242m	4.2429E-07	721.25	1,211.81	0.00E+00	3.06E-04	5.14E-04
Am-243	1.4899E-06	721.25	1,211.81	0.00E+00	1.07E-03	1.81E-03
C-14	5.7135E-09	721.25	1,211.81	0.00E+00	4.12E-06	6.92E-06
Cl-36	1.3124E-32	721.25	1,211.81	0.00E+00	9.47E-30	1.59E-29
Cm-243	1.6443E-07	721.25	1,211.81	0.00E+00	1.19E-04	1.99E-04
Cm-244	2.9330E-05	721.25	1,211.81	0.00E+00	2.12E-02	3.55E-02
Co-60	5.3186E-06	721.25	1,211.81	0.00E+00	3.84E-03	6.45E-03
Cs-134	3.1563E-03	721.25	1,211.81	0.00E+00	2.28E+00	3.82E+00
Cs-135	3.4477E-06	721.25	1,211.81	0.00E+00	2.49E-03	4.18E-03
Cs-137	2.0313E+00	721.25	1,211.81	0.00E+00	1.47E+03	2.46E+03
Eu-154	2.4513E-02	721.25	1,211.81	0.00E+00	1.77E+01	2.97E+01
Eu-155	4.8175E-03	721.25	1,211.81	0.00E+00	3.47E+00	5.84E+00
Fe-55	1.2397E-04	721.25	1,211.81	0.00E+00	8.94E-02	1.50E-01
H-3	4.5697E-03	721.25	1,211.81	0.00E+00	3.30E+00	5.54E+00
I-129	7.5300E-07	721.25	1,211.81	0.00E+00	5.43E-04	9.12E-04
Kr-85	1.0850E-01	721.25	1,211.81	0.00E+00	7.83E+01	1.31E+02
Np-237	9.5561E-06	721.25	1,211.81	0.00E+00	6.89E-03	1.16E-02
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	1.76E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.279E+14
0.0250	2.660E+13
0.0375	2.320E+13
0.0575	2.485E+13
0.0850	1.502E+13
0.1250	1.016E+13
0.2250	1.296E+13
0.3750	5.640E+12
0.5750	9.200E+13
0.8500	1.555E+12
1.2500	8.882E+11
1.7500	4.076E+10
2.2500	3.576E+08
2.7500	2.022E+06
3.5000	9.287E+03
5.0000	5.250E+02
7.0000	5.796E+01
11.0000	6.496E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.72E+01	2.69E+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 %:	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		721.25
Bounding:		1,211.81

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.79	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.09

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,585.31	3,170.62	0.00E+00	1.05E-06	2.10E-06
Am-241	2.0060E-03	1,585.31	3,170.62	0.00E+00	3.18E+00	6.36E+00
Am-242m	4.2429E-07	1,585.31	3,170.62	0.00E+00	6.73E-04	1.35E-03
Am-243	1.4899E-06	1,585.31	3,170.62	0.00E+00	2.36E-03	4.72E-03
C-14	5.7135E-09	1,585.31	3,170.62	0.00E+00	9.06E-06	1.81E-05
Cl-36	1.3124E-32	1,585.31	3,170.62	0.00E+00	2.08E-29	4.16E-29
Cm-243	1.6443E-07	1,585.31	3,170.62	0.00E+00	2.61E-04	5.21E-04
Cm-244	2.9330E-05	1,585.31	3,170.62	0.00E+00	4.65E-02	9.30E-02
Co-60	5.3186E-06	1,585.31	3,170.62	0.00E+00	8.43E-03	1.69E-02
Cs-134	3.1563E-03	1,585.31	3,170.62	0.00E+00	5.00E+00	1.00E+01
Cs-135	3.4477E-06	1,585.31	3,170.62	0.00E+00	5.47E-03	1.09E-02
Cs-137	2.0313E+00	1,585.31	3,170.62	0.00E+00	3.22E+03	6.44E+03
Eu-154	2.4513E-02	1,585.31	3,170.62	0.00E+00	3.89E+01	7.77E+01
Eu-155	4.8175E-03	1,585.31	3,170.62	0.00E+00	7.64E+00	1.53E+01
Fe-55	1.2397E-04	1,585.31	3,170.62	0.00E+00	1.97E-01	3.93E-01
H-3	4.5697E-03	1,585.31	3,170.62	0.00E+00	7.24E+00	1.45E+01
I-129	7.5300E-07	1,585.31	3,170.62	0.00E+00	1.19E-03	2.39E-03
Kr-85	1.0850E-01	1,585.31	3,170.62	0.00E+00	1.72E+02	3.44E+02
Np-237	9.5561E-06	1,585.31	3,170.62	0.00E+00	1.51E-02	3.03E-02
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	3.62E-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	5.0953E-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	6.64E-05	1.33E-04
Th-232	1.9270E-14	1,585.31	3,170.62	0.00E+00	3.05E-11	6.11E-11
Tl-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
U-233	2.5825E-09	1,585.31	3,170.62	0.00E+00	4.09E-06	8.19E-06
U-234	1.8450E-04	1,585.31	3,170.62	0.00E+00	2.92E-01	5.85E-01
U-235	-2.7235E-06	1,585.31	0.00	6.03E-03	1.71E-03	6.03E-03
U-236	1.5493E-05	1,585.31	3,170.62	0.00E+00	2.46E-02	4.91E-02
U-238	-4.2851E-09	1,585.31	0.00	3.75E-03	3.74E-03	3.75E-03
Y-90	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

Gamma Sources

Photon Energy Group (Avg. MeV)	Total Photons/sec (bounding)
0.0150	3.347E+14
0.0250	6.960E+13
0.0375	6.070E+13
0.0575	6.502E+13
0.0850	3.929E+13
0.1250	2.659E+13
0.2250	3.390E+13
0.3750	1.476E+13
0.5750	2.407E+14
0.8500	4.070E+12
1.2500	2.324E+12
1.7500	1.067E+11
2.2500	9.356E+06
2.7500	5.289E+06
3.5000	2.432E+04
5.0000	1.382E+03
7.0000	1.526E+02
11.0000	1.711E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.78E+01	7.56E+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 %:	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	Basis for burnup used in estimate:
Nominal:		1,585.31	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,170.62	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C2 (UALX-HEU) SWITZERLAND
SNF ID #: 657
Fuel Units & Descr: 11 - MTR TYPE
Heavy Metal Mass: BOL=2.461kg; EOL=0.995kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
0.46

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,387.57	2,330.33	0.00E+00	9.20E-07	1.55E-06
Am-241	2.0060E-03	1,387.57	2,330.33	0.00E+00	2.78E+00	4.67E+00
Am-242m	4.2429E-07	1,387.57	2,330.33	0.00E+00	5.89E-04	9.89E-04
Am-243	1.4899E-06	1,387.57	2,330.33	0.00E+00	2.07E-03	3.47E-03
C-14	5.7135E-09	1,387.57	2,330.33	0.00E+00	7.93E-06	1.33E-05
Cl-36	1.3124E-32	1,387.57	2,330.33	0.00E+00	1.82E-29	3.06E-29
Cm-243	1.6443E-07	1,387.57	2,330.33	0.00E+00	2.28E-04	3.83E-04
Cm-244	2.9330E-05	1,387.57	2,330.33	0.00E+00	4.07E-02	6.83E-02
Co-60	5.3186E-06	1,387.57	2,330.33	0.00E+00	7.38E-03	1.24E-02
Cs-134	3.1563E-03	1,387.57	2,330.33	0.00E+00	4.38E+00	7.36E+00
Cs-135	3.4477E-06	1,387.57	2,330.33	0.00E+00	4.78E-03	8.03E-03
Cs-137	2.0313E+00	1,387.57	2,330.33	0.00E+00	2.82E+03	4.73E+03
Eu-154	2.4513E-02	1,387.57	2,330.33	0.00E+00	3.40E+01	5.71E+01
Eu-155	4.8175E-03	1,387.57	2,330.33	0.00E+00	6.68E+00	1.12E+01
Fe-55	1.2397E-04	1,387.57	2,330.33	0.00E+00	1.72E-01	2.89E-01
H-3	4.5697E-03	1,387.57	2,330.33	0.00E+00	6.34E+00	1.06E+01
I-129	7.5300E-07	1,387.57	2,330.33	0.00E+00	1.04E-03	1.75E-03
Kr-85	1.0850E-01	1,387.57	2,330.33	0.00E+00	1.51E+02	2.53E+02
Np-237	9.5561E-06	1,387.57	2,330.33	0.00E+00	1.33E-02	2.23E-02
Pa-231	2.0359E-09	1,387.57	2,330.33	0.00E+00	2.83E-06	4.74E-06
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	1.13E+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	5.68E-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
Ra-226	2.2854E-10	1,387.57	2,330.33	0.00E+00	3.17E-07	5.33E-07
Ra-228	1.2426E-14	1,387.57	2,330.33	0.00E+00	1.72E-11	2.90E-11
Ru-106	6.3589E-06	1,387.57	2,330.33	0.00E+00	8.82E-03	1.48E-02
Se-79	1.2933E-05	1,387.57	2,330.33	0.00E+00	1.79E-02	3.01E-02
Sn-126	1.1574E-05	1,387.57	2,330.33	0.00E+00	1.61E-02	2.70E-02
Sr-90	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	5.86E-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	9.76E-05
Th-232	1.9270E-14	1,387.57	2,330.33	0.00E+00	2.67E-11	4.49E-11
Tl-208	4.6024E-08	1,387.57	2,330.33	0.00E+00	6.39E-05	1.07E-04
U-232	1.2582E-07	1,387.57	2,330.33	0.00E+00	1.75E-04	2.93E-04
U-233	2.5825E-09	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	0.00	4.95E-03	1.17E-03	4.95E-03
U-236	1.5493E-05	1,387.57	2,330.33	0.00E+00	2.15E-02	3.61E-02
U-238	-4.2851E-09	1,387.57	0.00	5.79E-05	5.19E-05	5.79E-05
Y-90	1.9254E+00	1,387.57	2,330.33	0.00E+00	2.67E+03	4.49E+03
Other Radionuclides					2.68E+03	4.51E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.460E+14
0.0250	5.115E+13
0.0375	4.462E+13
0.0575	4.779E+13
0.0850	2.888E+13
0.1250	1.954E+13
0.2250	2.492E+13
0.3750	1.085E+13
0.5750	1.769E+14
0.8500	2.991E+12
1.2500	1.708E+12
1.7500	7.839E+10
2.2500	6.877E+08
2.7500	3.888E+08
3.5000	1.786E+04
5.0000	1.010E+03
7.0000	1.115E+02
11.0000	1.249E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.31E+01	5.56E+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 %:	93.00001006	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,387.57	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,330.33	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.79	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.09

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (UALX-HEU) TURKEY
SNF ID #: 642
Fuel Units & Descr: 2 - MTR TYPE
Heavy Metal Mass: BOL=0.366kg; EOL=0.196kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	160.99	321.99	0.00E+00	1.07E-07	2.14E-07
Am-241	2.0060E-03	160.99	321.99	0.00E+00	3.23E-01	6.46E-01
Am-242m	4.2429E-07	160.99	321.99	0.00E+00	6.83E-05	1.37E-04
Am-243	1.4899E-06	160.99	321.99	0.00E+00	2.40E-04	4.80E-04
C-14	5.7135E-09	160.99	321.99	0.00E+00	9.20E-07	1.84E-06
Cl-36	1.3124E-32	160.99	321.99	0.00E+00	2.11E-30	4.23E-30
Cm-243	1.6443E-07	160.99	321.99	0.00E+00	2.65E-05	5.29E-05
Cm-244	2.9330E-05	160.99	321.99	0.00E+00	4.72E-03	9.44E-03
Co-60	5.3186E-06	160.99	321.99	0.00E+00	8.56E-04	1.71E-03
Cs-134	3.1563E-03	160.99	321.99	0.00E+00	5.08E-01	1.02E+00
Cs-135	3.4477E-06	160.99	321.99	0.00E+00	5.55E-04	1.11E-03
Cs-137	2.0313E+00	160.99	321.99	0.00E+00	3.27E+02	6.54E+02
Eu-154	2.4513E-02	160.99	321.99	0.00E+00	3.95E+00	7.89E+00
Eu-155	4.8175E-03	160.99	321.99	0.00E+00	7.76E-01	1.55E+00
Fe-55	1.2397E-04	160.99	321.99	0.00E+00	2.00E-02	3.99E-02
H-3	4.5697E-03	160.99	321.99	0.00E+00	7.36E-01	1.47E+00
I-129	7.5300E-07	160.99	321.99	0.00E+00	1.21E-04	2.42E-04
Kr-85	1.0850E-01	160.99	321.99	0.00E+00	1.75E+01	3.49E+01
Np-237	9.5561E-06	160.99	321.99	0.00E+00	1.54E-03	3.08E-03
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	3.92E-02	7.85E-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	2.08E-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
Tl-208	4.6024E-06	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	2.96E-04	7.35E-04
U-236	1.5493E-05	160.99	321.99	0.00E+00	2.49E-03	4.99E-03
U-238	-4.2851E-09	160.99	0.00	8.60E-06	7.91E-06	8.60E-06
Y-90	1.9254E+00	160.99	321.99	0.00E+00	3.10E+02	6.20E+02
Other Radionuclides					3.11E+02	6.23E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.399E+13
0.0250	7.068E+12
0.0375	6.165E+12
0.0575	6.603E+12
0.0850	3.990E+12
0.1250	2.700E+12
0.2250	3.443E+12
0.3750	1.499E+12
0.5750	2.445E+13
0.8500	4.133E+11
1.2500	2.360E+11
1.7500	1.083E+10
2.2500	9.501E+05
2.7500	5.372E+05
3.5000	2.468E+03
5.0000	1.395E+02
7.0000	1.540E+01
11.0000	1.726E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.84E+00	7.68E+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 %:	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		160.99	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		321.99	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	25.57	51.14	0.00E+00	1.70E-08	3.39E-08
Am-241	2.0060E-03	25.57	51.14	0.00E+00	5.13E-02	1.03E-01
Am-242m	4.2429E-07	25.57	51.14	0.00E+00	1.08E-05	2.17E-05
Am-243	1.4899E-06	25.57	51.14	0.00E+00	3.81E-05	7.62E-05
C-14	5.7135E-09	25.57	51.14	0.00E+00	1.46E-07	2.92E-07
Cl-36	1.3124E-32	25.57	51.14	0.00E+00	3.36E-31	6.71E-31
Cm-243	1.6443E-07	25.57	51.14	0.00E+00	4.20E-06	8.41E-06
Cm-244	2.9330E-05	25.57	51.14	0.00E+00	7.50E-04	1.50E-03
Co-60	5.3186E-06	25.57	51.14	0.00E+00	1.36E-04	2.72E-04
Cs-134	3.1563E-03	25.57	51.14	0.00E+00	8.07E-02	1.61E-01
Cs-135	3.4477E-06	25.57	51.14	0.00E+00	8.82E-05	1.76E-04
Cs-137	2.0313E+00	25.57	51.14	0.00E+00	5.19E+01	1.04E+02
Eu-154	2.4513E-02	25.57	51.14	0.00E+00	6.27E-01	1.25E+00
Eu-155	4.8175E-03	25.57	51.14	0.00E+00	1.23E-01	2.46E-01
Fe-55	1.2397E-04	25.57	51.14	0.00E+00	3.17E-03	6.34E-03
H-3	4.5697E-03	25.57	51.14	0.00E+00	1.17E-01	2.34E-01
I-129	7.5300E-07	25.57	51.14	0.00E+00	1.93E-05	3.85E-05
Kr-85	1.0850E-01	25.57	51.14	0.00E+00	2.77E+00	5.55E+00
Np-237	9.5561E-06	25.57	51.14	0.00E+00	2.44E-04	4.89E-04
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	2.4368E-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
Tl-208	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

Gamma Sources

Photon Energy Group Avg. MeV	Total Photons/sec (bounding)
0.0150	5.398E+12
0.0250	1.123E+12
0.0375	9.791E+11
0.0575	1.049E+12
0.0850	6.337E+11
0.1250	4.288E+11
0.2250	5.468E+11
0.3750	2.380E+11
0.5750	3.883E+12
0.8500	6.564E+10
1.2500	3.748E+10
1.7500	1.720E+09
2.2500	1.509E+05
2.7500	8.532E+04
3.5000	3.938E+02
5.0000	2.299E+01
7.0000	2.542E+00
11.0000	2.852E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.10E-01	1.22E+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 %:	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: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	16,809.59	33,619.19	0.00E+00	1.11E-05	2.23E-05
Am-241	2.0060E-03	16,809.59	33,619.19	0.00E+00	3.37E+01	6.74E+01
Am-242m	4.2429E-07	16,809.59	33,619.19	0.00E+00	7.13E-03	1.43E-02
Am-243	1.4899E-06	16,809.59	33,619.19	0.00E+00	2.50E-02	5.01E-02
C-14	5.7135E-09	16,809.59	33,619.19	0.00E+00	9.60E-05	1.92E-04
Cl-36	1.3124E-32	16,809.59	33,619.19	0.00E+00	2.21E-28	4.41E-28
Cm-243	1.6443E-07	16,809.59	33,619.19	0.00E+00	2.76E-03	5.53E-03
Cm-244	2.9330E-05	16,809.59	33,619.19	0.00E+00	4.93E-01	9.86E-01
Co-60	5.3186E-06	16,809.59	33,619.19	0.00E+00	8.94E-02	1.79E-01
Cs-134	3.1563E-03	16,809.59	33,619.19	0.00E+00	5.31E+01	1.06E+02
Cs-135	3.4477E-06	16,809.59	33,619.19	0.00E+00	5.80E-02	1.16E-01
Cs-137	2.0313E+00	16,809.59	33,619.19	0.00E+00	3.41E+04	6.83E+04
Eu-154	2.4513E-02	16,809.59	33,619.19	0.00E+00	4.12E+02	8.24E+02
Eu-155	4.8175E-03	16,809.59	33,619.19	0.00E+00	8.10E+01	1.62E+02
Fe-55	1.2397E-04	16,809.59	33,619.19	0.00E+00	2.08E+00	4.17E+00
H-3	4.5697E-03	16,809.59	33,619.19	0.00E+00	7.68E+01	1.54E+02
I-129	7.5300E-07	16,809.59	33,619.19	0.00E+00	1.27E-02	2.53E-02
Kr-85	1.0850E-01	16,809.59	33,619.19	0.00E+00	1.82E+03	3.65E+03
Np-237	9.5561E-06	16,809.59	33,619.19	0.00E+00	1.61E-01	3.21E-01
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	1.9248E+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	1.9270E-14	16,809.59	33,619.19	0.00E+00	3.24E-10	6.48E-10
Tl-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	1.9254E+00	16,809.59	33,619.19	0.00E+00	3.24E+04	6.47E+04
Other Radionuclides					3.25E+04	6.50E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.549E+15
0.0250	7.360E+14
0.0375	6.437E+14
0.0575	6.894E+14
0.0850	4.166E+14
0.1250	2.819E+14
0.2250	3.595E+14
0.3750	1.565E+14
0.5750	2.652E+15
0.8500	4.315E+13
1.2500	2.464E+13
1.7500	1.131E+12
2.2500	9.921E+07
2.7500	5.609E+07
3.5000	2.579E+05
5.0000	1.467E+04
7.0000	1.620E+03
11.0000	1.816E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.01E+02	8.01E+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 %:	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	Basis for burnup used in estimate:
Nominal:		16,809.59	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		33,619.19	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 0.98

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	3,049.40	6,098.80	0.00E+00	2.02E-06	4.04E-06
Am-241	2.0060E-03	3,049.40	6,098.80	0.00E+00	6.12E+00	1.22E+01
Am-242m	4.2429E-07	3,049.40	6,098.80	0.00E+00	1.29E-03	2.59E-03
Am-243	1.4899E-06	3,049.40	6,098.80	0.00E+00	4.54E-03	9.09E-03
C-14	5.7135E-09	3,049.40	6,098.80	0.00E+00	1.74E-05	3.48E-05
Cl-36	1.3124E-32	3,049.40	6,098.80	0.00E+00	4.00E-29	8.00E-29
Cm-243	1.6443E-07	3,049.40	6,098.80	0.00E+00	5.01E-04	1.00E-03
Cm-244	2.9330E-05	3,049.40	6,098.80	0.00E+00	8.94E-02	1.79E-01
Co-60	5.3186E-06	3,049.40	6,098.80	0.00E+00	1.62E-02	3.24E-02
Cs-134	3.1563E-03	3,049.40	6,098.80	0.00E+00	9.62E+00	1.92E+01
Cs-135	3.4477E-06	3,049.40	6,098.80	0.00E+00	1.05E-02	2.10E-02
Cs-137	2.0313E+00	3,049.40	6,098.80	0.00E+00	6.19E+03	1.24E+04
Eu-154	2.4513E-02	3,049.40	6,098.80	0.00E+00	7.47E+01	1.49E+02
Eu-155	4.8175E-03	3,049.40	6,098.80	0.00E+00	1.47E+01	2.94E+01
Fe-55	1.2397E-04	3,049.40	6,098.80	0.00E+00	3.78E-01	7.56E-01
H-3	4.5697E-03	3,049.40	6,098.80	0.00E+00	1.39E+01	2.79E+01
I-129	7.5300E-07	3,049.40	6,098.80	0.00E+00	2.30E-03	4.59E-03
Kr-85	1.0850E-01	3,049.40	6,098.80	0.00E+00	3.31E+02	6.62E+02
Np-237	9.5561E-06	3,049.40	6,098.80	0.00E+00	2.91E-02	5.83E-02
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
Tl-208	4.6024E-08	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
U-234	1.8450E-04	3,049.40	6,098.80	0.00E+00	5.63E-01	1.13E+00
U-235	-2.7235E-06	3,049.40	0.00	1.14E-02	3.13E-03	1.14E-02
U-236	1.5493E-05	3,049.40	6,098.80	0.00E+00	4.72E-02	9.45E-02
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.438E+14
0.0250	1.339E+14
0.0375	1.168E+14
0.0575	1.251E+14
0.0850	7.557E+13
0.1250	5.114E+13
0.2250	6.521E+13
0.3750	2.839E+13
0.5750	4.630E+14
0.8500	7.828E+12
1.2500	4.470E+12
1.7500	2.052E+11
2.2500	1.800E+07
2.7500	1.017E+07
3.5000	4.679E+04
5.0000	2.663E+03
7.0000	2.940E+02
11.0000	3.296E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.27E+01	1.45E+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 %:	16.42857201	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:		3,049.40
Bounding:		6,098.80

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) CANADA
SNF ID #: 513
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=50.75kg; EOL=45.675kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage:
16"x10'
1.46

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	4,806.12	9,612.25	0.00E+00	3.19E-06	6.37E-06
Am-241	2.0060E-03	4,806.12	9,612.25	0.00E+00	9.64E+00	1.93E+01
Am-242m	4.2429E-07	4,806.12	9,612.25	0.00E+00	2.04E-03	4.08E-03
Am-243	1.4899E-06	4,806.12	9,612.25	0.00E+00	7.16E-03	1.43E-02
C-14	5.7135E-09	4,806.12	9,612.25	0.00E+00	2.75E-05	5.49E-05
Cl-36	1.3124E-32	4,806.12	9,612.25	0.00E+00	6.31E-29	1.26E-28
Cm-243	1.6443E-07	4,806.12	9,612.25	0.00E+00	7.90E-04	1.58E-03
Cm-244	2.9330E-05	4,806.12	9,612.25	0.00E+00	1.41E-01	2.82E-01
Co-60	5.3186E-06	4,806.12	9,612.25	0.00E+00	2.56E-02	5.11E-02
Cs-134	3.1563E-03	4,806.12	9,612.25	0.00E+00	1.52E+01	3.03E+01
Cs-135	3.4477E-06	4,806.12	9,612.25	0.00E+00	1.66E-02	3.31E-02
Cs-137	2.0313E+00	4,806.12	9,612.25	0.00E+00	9.76E+03	1.95E+04
Eu-154	2.4513E-02	4,806.12	9,612.25	0.00E+00	1.18E+02	2.36E+02
Eu-155	4.8175E-03	4,806.12	9,612.25	0.00E+00	2.32E+01	4.63E+01
Fe-55	1.2397E-04	4,806.12	9,612.25	0.00E+00	5.96E-01	1.19E+00
H-3	4.5697E-03	4,806.12	9,612.25	0.00E+00	2.20E+01	4.39E+01
I-129	7.5300E-07	4,806.12	9,612.25	0.00E+00	3.62E-03	7.24E-03
Kr-85	1.0850E-01	4,806.12	9,612.25	0.00E+00	5.21E+02	1.04E+03
Np-237	9.5561E-06	4,806.12	9,612.25	0.00E+00	4.59E-02	9.19E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.015E+15
0.0250	2.110E+14
0.0375	1.840E+14
0.0575	1.971E+14
0.0850	1.191E+14
0.1250	8.060E+13
0.2250	1.028E+14
0.3750	4.474E+13
0.5750	7.298E+14
0.8500	1.234E+13
1.2500	7.045E+12
1.7500	3.234E+11
2.2500	2.836E+07
2.7500	1.604E+07
3.5000	7.374E+04
5.0000	4.195E+03
7.0000	4.633E+02
11.0000	5.193E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.15E+02	2.29E+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 %:	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:		4,806.12
Bounding:		9,612.25

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:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 4.04

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.4556E-09	22,332.30	44,664.59	0.00E+00	5.48E-05	1.10E-04
Am-241	3.8752E-03	22,332.30	44,664.59	0.00E+00	8.65E+01	1.73E+02
Am-242m	1.8617E-06	22,332.30	44,664.59	0.00E+00	4.16E-02	8.32E-02
Am-243	2.3293E-07	22,332.30	44,664.59	0.00E+00	5.20E-03	1.04E-02
C-14	4.3233E-05	22,332.30	44,664.59	0.00E+00	9.65E-01	1.93E+00
Cl-36	4.3023E-08	22,332.30	44,664.59	0.00E+00	9.61E-04	1.92E-03
Cm-243	1.9053E-07	22,332.30	44,664.59	0.00E+00	4.25E-03	8.51E-03
Cm-244	1.7744E-06	22,332.30	44,664.59	0.00E+00	3.96E-02	7.93E-02
Co-60	4.3188E-03	22,332.30	44,664.59	0.00E+00	9.64E+01	1.93E+02
Cs-134	6.7188E-04	22,332.30	44,664.59	0.00E+00	1.50E+01	3.00E+01
Cs-135	3.1549E-05	22,332.30	44,664.59	0.00E+00	7.05E-01	1.41E+00
Cs-137	1.9489E+00	22,332.30	44,664.59	0.00E+00	4.35E+04	8.70E+04
Eu-154	4.0301E-01	22,332.30	44,664.59	0.00E+00	9.00E+03	1.80E+04
Eu-155	5.4000E-02	22,332.30	44,664.59	0.00E+00	1.21E+03	2.41E+03
Fe-55	1.5955E-04	22,332.30	44,664.59	0.00E+00	3.56E+00	7.13E+00
H-3	4.6571E-03	22,332.30	44,664.59	0.00E+00	1.04E+02	2.08E+02
I-129	7.3805E-07	22,332.30	44,664.59	0.00E+00	1.65E-02	3.30E-02
Kr-85	9.5684E-02	22,332.30	44,664.59	0.00E+00	2.14E+03	4.27E+03
Np-237	1.4618E-06	22,332.30	44,664.59	0.00E+00	3.26E-02	6.53E-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
Tl-208	1.8195E-08	22,332.30	44,664.59	0.00E+00	4.06E-04	8.13E-04
U-232	4.9098E-06	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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.584E+15
0.0250	9.465E+14
0.0375	9.907E+14
0.0575	9.157E+14
0.0850	5.575E+14
0.1250	6.258E+14
0.2250	5.052E+14
0.3750	2.076E+14
0.5750	3.307E+15
0.8500	3.519E+14
1.2500	3.791E+14
1.7500	1.136E+13
2.2500	1.800E+08
2.7500	2.996E+07
3.5000	2.051E+05
5.0000	2.520E+04
7.0000	2.845E+03
11.0000	3.235E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.80E+02	1.16E+03
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 %:	19.99999963	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		22,332.30
Bounding:		44,664.59

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.89	
Bounding:	7.79	

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: FRR MTR-S (U3Si2 LEU) GERMANY
SNF ID #: 1067
Fuel Units & Descr: 7 - ASSEMBLY
Heavy Metal Mass: BOL=14.7kg; EOL=12.936kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,670.54	3,341.08	0.00E+00	1.11E-06	2.22E-06
Am-241	2.0060E-03	1,670.54	3,341.08	0.00E+00	3.35E+00	6.70E+00
Am-242m	4.2429E-07	1,670.54	3,341.08	0.00E+00	7.09E-04	1.42E-03
Am-243	1.4899E-06	1,670.54	3,341.08	0.00E+00	2.49E-03	4.98E-03
C-14	5.7135E-09	1,670.54	3,341.08	0.00E+00	9.54E-06	1.91E-05
Cl-36	1.3124E-32	1,670.54	3,341.08	0.00E+00	2.19E-29	4.38E-29
Cm-243	1.6443E-07	1,670.54	3,341.08	0.00E+00	2.75E-04	5.49E-04
Cm-244	2.9330E-05	1,670.54	3,341.08	0.00E+00	4.90E-02	9.80E-02
Co-60	5.3186E-06	1,670.54	3,341.08	0.00E+00	8.88E-03	1.78E-02
Cs-134	3.1563E-03	1,670.54	3,341.08	0.00E+00	5.27E+00	1.05E+01
Cs-135	3.4477E-06	1,670.54	3,341.08	0.00E+00	5.76E-03	1.15E-02
Cs-137	2.0313E+00	1,670.54	3,341.08	0.00E+00	3.39E+03	6.79E+03
Eu-154	2.4513E-02	1,670.54	3,341.08	0.00E+00	4.09E+01	8.19E+01
Eu-155	4.8175E-03	1,670.54	3,341.08	0.00E+00	8.05E+00	1.61E+01
Fe-55	1.2397E-04	1,670.54	3,341.08	0.00E+00	2.07E-01	4.14E-01
H-3	4.5697E-03	1,670.54	3,341.08	0.00E+00	7.63E+00	1.53E+01
I-129	7.5300E-07	1,670.54	3,341.08	0.00E+00	1.26E-03	2.52E-03
Kr-85	1.0850E-01	1,670.54	3,341.08	0.00E+00	1.81E+02	3.62E+02
Np-237	9.5561E-06	1,670.54	3,341.08	0.00E+00	1.60E-02	3.19E-02
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	6.3589E-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	1.9248E+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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.527E+14
0.0250	7.334E+13
0.0375	6.397E+13
0.0575	6.851E+13
0.0850	4.140E+13
0.1250	2.802E+13
0.2250	3.572E+13
0.3750	1.555E+13
0.5750	2.537E+14
0.8500	4.289E+12
1.2500	2.449E+12
1.7500	1.124E+11
2.2500	9.859E+06
2.7500	5.574E+06
3.5000	2.563E+04
5.0000	1.456E+03
7.0000	1.808E+02
11.0000	1.803E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.96E+01	7.96E+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 %:	20.00000028	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:		1,670.54
Bounding:		3,341.08

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	6,332.34	12,664.68	0.00E+00	4.20E-06	8.40E-06
Am-241	2.0060E-03	6,332.34	12,664.68	0.00E+00	1.27E+01	2.54E+01
Am-242m	4.2429E-07	6,332.34	12,664.68	0.00E+00	2.69E-03	5.37E-03
Am-243	1.4899E-06	6,332.34	12,664.68	0.00E+00	9.43E-03	1.89E-02
C-14	5.7135E-09	6,332.34	12,664.68	0.00E+00	3.62E-05	7.24E-05
Cl-36	1.3124E-32	6,332.34	12,664.68	0.00E+00	8.31E-29	1.66E-28
Cm-243	1.6443E-07	6,332.34	12,664.68	0.00E+00	1.04E-03	2.08E-03
Cm-244	2.9330E-05	6,332.34	12,664.68	0.00E+00	1.86E-01	3.71E-01
Co-60	5.3186E-06	6,332.34	12,664.68	0.00E+00	3.37E-02	6.74E-02
Cs-134	3.1563E-03	6,332.34	12,664.68	0.00E+00	2.00E+01	4.00E+01
Cs-135	3.4477E-06	6,332.34	12,664.68	0.00E+00	2.18E-02	4.37E-02
Cs-137	2.0313E+00	6,332.34	12,664.68	0.00E+00	1.29E+04	2.57E+04
Eu-154	2.4513E-02	6,332.34	12,664.68	0.00E+00	1.55E+02	3.10E+02
Eu-155	4.8175E-03	6,332.34	12,664.68	0.00E+00	3.05E+01	6.10E+01
Fe-55	1.2397E-04	6,332.34	12,664.68	0.00E+00	7.85E-01	1.57E+00
H-3	4.5697E-03	6,332.34	12,664.68	0.00E+00	2.89E+01	5.79E+01
I-129	7.5300E-07	6,332.34	12,664.68	0.00E+00	4.77E-03	9.54E-03
Kr-85	1.0850E-01	6,332.34	12,664.68	0.00E+00	6.87E+02	1.37E+03
Np-237	9.5561E-06	6,332.34	12,664.68	0.00E+00	6.05E-02	1.21E-01
Pa-231	2.0359E-09	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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.337E+15
0.0250	2.780E+14
0.0375	2.425E+14
0.0575	2.597E+14
0.0850	1.569E+14
0.1250	1.062E+14
0.2250	1.354E+14
0.3750	5.895E+13
0.5750	9.615E+14
0.8500	1.626E+13
1.2500	9.282E+12
1.7500	4.260E+11
2.2500	3.737E+07
2.7500	2.113E+07
3.5000	9.716E+04
5.0000	5.532E+03
7.0000	6.109E+02
11.0000	6.848E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.51E+02	3.02E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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:		6,332.34	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		12,664.68	Bounding burnup assumed to be twice nominal burnup.

Basis for burnup used in estimate:

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.27	
Bounding:	0.54	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) JAPAN
SNF ID #: 506
Fuel Units & Descr: 70 - ASSEMBLY
Heavy Metal Mass: BOL=73.5kg; EOL=70.413kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	2,923.45	5,846.90	0.00E+00	1.94E-06	3.88E-06
Am-241	2.0060E-03	2,923.45	5,846.90	0.00E+00	5.86E+00	1.17E+01
Am-242m	4.2429E-07	2,923.45	5,846.90	0.00E+00	1.24E-03	2.48E-03
Am-243	1.4899E-06	2,923.45	5,846.90	0.00E+00	4.36E-03	8.71E-03
C-14	5.7135E-09	2,923.45	5,846.90	0.00E+00	1.67E-05	3.34E-05
Cl-36	1.3124E-32	2,923.45	5,846.90	0.00E+00	3.84E-29	7.67E-29
Cm-243	1.6443E-07	2,923.45	5,846.90	0.00E+00	4.81E-04	9.61E-04
Cm-244	2.9330E-05	2,923.45	5,846.90	0.00E+00	8.57E-02	1.71E-01
Co-60	5.3186E-06	2,923.45	5,846.90	0.00E+00	1.55E-02	3.11E-02
Cs-134	3.1563E-03	2,923.45	5,846.90	0.00E+00	9.23E+00	1.85E+01
Cs-135	3.4477E-06	2,923.45	5,846.90	0.00E+00	1.01E-02	2.02E-02
Cs-137	2.0313E+00	2,923.45	5,846.90	0.00E+00	5.94E+03	1.19E+04
Eu-154	2.4513E-02	2,923.45	5,846.90	0.00E+00	7.17E+01	1.43E+02
Eu-155	4.8175E-03	2,923.45	5,846.90	0.00E+00	1.41E+01	2.82E+01
Fe-55	1.2397E-04	2,923.45	5,846.90	0.00E+00	3.62E-01	7.25E-01
H-3	4.5697E-03	2,923.45	5,846.90	0.00E+00	1.34E+01	2.67E+01
I-129	7.5300E-07	2,923.45	5,846.90	0.00E+00	2.20E-03	4.40E-03
Kr-85	1.0850E-01	2,923.45	5,846.90	0.00E+00	3.17E+02	6.34E+02
Np-237	9.5561E-06	2,923.45	5,846.90	0.00E+00	2.79E-02	5.59E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.172E+14
0.0250	1.283E+14
0.0375	1.119E+14
0.0575	1.199E+14
0.0850	7.245E+13
0.1250	4.903E+13
0.2250	6.252E+13
0.3750	2.721E+13
0.5750	4.439E+14
0.8500	7.505E+12
1.2500	4.285E+12
1.7500	1.967E+11
2.2500	1.725E+07
2.7500	9.754E+06
3.5000	4.491E+04
5.0000	2.578E+03
7.0000	2.848E+02
11.0000	3.194E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.97E+01	1.39E+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 %:	20.00000028	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:		2,923.45
Bounding:		5,846.90

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:	0.13	
Bounding:	0.25	

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: FRR MTR-S (U3Si2 LEU) JAPAN
SNF ID #: 508
Fuel Units & Descr: 149 - ASSEMBLY
Heavy Metal Mass: BOL=205.62kg; EOL=193.283kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 6.21

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	11,683.57	23,367.15	0.00E+00	7.75E-06	1.55E-05
Am-241	2.0060E-03	11,683.57	23,367.15	0.00E+00	2.34E+01	4.69E+01
Am-242m	4.2429E-07	11,683.57	23,367.15	0.00E+00	4.96E-03	9.91E-03
Am-243	1.4899E-06	11,683.57	23,367.15	0.00E+00	1.74E-02	3.48E-02
C-14	5.7135E-09	11,683.57	23,367.15	0.00E+00	6.68E-05	1.34E-04
Cl-36	1.3124E-32	11,683.57	23,367.15	0.00E+00	1.53E-28	3.07E-28
Cm-243	1.6443E-07	11,683.57	23,367.15	0.00E+00	1.92E-03	3.84E-03
Cm-244	2.9330E-05	11,683.57	23,367.15	0.00E+00	3.43E-01	6.85E-01
Co-60	5.3186E-06	11,683.57	23,367.15	0.00E+00	6.21E-02	1.24E-01
Cs-134	3.1563E-03	11,683.57	23,367.15	0.00E+00	3.69E+01	7.38E+01
Cs-135	3.4477E-06	11,683.57	23,367.15	0.00E+00	4.03E-02	8.06E-02
Cs-137	2.0313E+00	11,683.57	23,367.15	0.00E+00	2.37E+04	4.75E+04
Eu-154	2.4513E-02	11,683.57	23,367.15	0.00E+00	2.86E+02	5.73E+02
Eu-155	4.8175E-03	11,683.57	23,367.15	0.00E+00	5.63E+01	1.13E+02
Fe-55	1.2397E-04	11,683.57	23,367.15	0.00E+00	1.45E+00	2.90E+00
H-3	4.5697E-03	11,683.57	23,367.15	0.00E+00	5.34E+01	1.07E+02
I-129	7.5300E-07	11,683.57	23,367.15	0.00E+00	8.80E-03	1.76E-02
Kr-85	1.0850E-01	11,683.57	23,367.15	0.00E+00	1.27E+03	2.54E+03
Np-237	9.5561E-06	11,683.57	23,367.15	0.00E+00	1.12E-01	2.23E-01
Pa-231	2.0359E-09	11,683.57	23,367.15	0.00E+00	2.38E-05	4.76E-05
Pb-210	4.9728E-11	11,683.57	23,367.15	0.00E+00	5.81E-07	1.16E-06
Pm-147	4.8502E-02	11,683.57	23,367.15	0.00E+00	5.67E+02	1.13E+03
Pu-238	1.8254E-02	11,683.57	23,367.15	0.00E+00	2.13E+02	4.27E+02
Pu-239	4.2810E-04	11,683.57	23,367.15	0.00E+00	5.00E+00	1.00E+01
Pu-240	2.4368E-04	11,683.57	23,367.15	0.00E+00	2.85E+00	5.69E+00
Pu-241	3.3415E-02	11,683.57	23,367.15	0.00E+00	3.90E+02	7.81E+02
Pu-242	3.6329E-07	11,683.57	23,367.15	0.00E+00	4.24E-03	8.49E-03
Ra-226	2.2854E-10	11,683.57	23,367.15	0.00E+00	2.67E-06	5.34E-06
Ra-228	1.2426E-14	11,683.57	23,367.15	0.00E+00	1.45E-10	2.90E-10
Ru-106	6.3589E-06	11,683.57	23,367.15	0.00E+00	7.43E-02	1.49E-01
Se-79	1.2933E-05	11,683.57	23,367.15	0.00E+00	1.51E-01	3.02E-01
Sn-126	1.1574E-05	11,683.57	23,367.15	0.00E+00	1.35E-01	2.70E-01
Sr-90	1.9248E+00	11,683.57	23,367.15	0.00E+00	2.25E+04	4.50E+04
Tc-99	4.2239E-04	11,683.57	23,367.15	0.00E+00	4.93E+00	9.87E+00
Th-229	5.0953E-12	11,683.57	23,367.15	0.00E+00	5.95E-06	1.19E-07
Th-230	4.1885E-06	11,683.57	23,367.15	0.00E+00	4.89E-04	9.79E-04
Th-232	1.9270E-14	11,683.57	23,367.15	0.00E+00	2.25E-10	4.50E-10
Tl-208	4.6024E-06	11,683.57	23,367.15	0.00E+00	5.38E-04	1.08E-03
U-232	1.2582E-07	11,683.57	23,367.15	0.00E+00	1.47E-03	2.94E-03
U-233	2.5825E-09	11,683.57	23,367.15	0.00E+00	3.02E-05	6.03E-05
U-234	1.8450E-04	11,683.57	23,367.15	0.00E+00	2.16E+00	4.31E+00
U-235	-2.7235E-06	11,683.57	0.00	8.89E-02	5.70E-02	8.89E-02
U-236	1.5493E-05	11,683.57	23,367.15	0.00E+00	1.81E-01	3.62E-01
U-238	-4.2851E-09	11,683.57	0.00	5.53E-02	5.52E-02	5.53E-02
Y-90	1.9254E+00	11,683.57	23,367.15	0.00E+00	2.25E+04	4.50E+04
Other Radionuclides					2.26E+04	4.52E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.467E+15
0.0250	5.129E+14
0.0375	4.474E+14
0.0575	4.792E+14
0.0850	2.896E+14
0.1250	1.959E+14
0.2250	2.498E+14
0.3750	1.088E+14
0.5750	1.774E+15
0.8500	2.999E+13
1.2500	1.713E+13
1.7500	7.861E+11
2.2500	6.895E+07
2.7500	3.898E+07
3.5000	1.794E+05
5.0000	1.025E+04
7.0000	1.132E+03
11.0000	1.269E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.79E+02	5.57E+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 %:	19.99999957	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:		11,683.57
Bounding:		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 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: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	7,329.93	14,659.86	0.00E+00	4.86E-06	9.72E-06
Am-241	2.0060E-03	7,329.93	14,659.86	0.00E+00	1.47E+01	2.94E+01
Am-242m	4.2429E-07	7,329.93	14,659.86	0.00E+00	3.11E-03	6.22E-03
Am-243	1.4899E-06	7,329.93	14,659.86	0.00E+00	1.09E-02	2.18E-02
C-14	5.7135E-09	7,329.93	14,659.86	0.00E+00	4.19E-05	8.38E-05
Cl-36	1.3124E-32	7,329.93	14,659.86	0.00E+00	9.62E-29	1.92E-28
Cm-243	1.6443E-07	7,329.93	14,659.86	0.00E+00	1.21E-03	2.41E-03
Cm-244	2.9330E-05	7,329.93	14,659.86	0.00E+00	2.15E-01	4.30E-01
Co-60	5.3186E-06	7,329.93	14,659.86	0.00E+00	3.90E-02	7.80E-02
Cs-134	3.1563E-03	7,329.93	14,659.86	0.00E+00	2.31E+01	4.63E+01
Cs-135	3.4477E-06	7,329.93	14,659.86	0.00E+00	2.53E-02	5.05E-02
Cs-137	2.0313E+00	7,329.93	14,659.86	0.00E+00	1.49E+04	2.98E+04
Eu-154	2.4513E-02	7,329.93	14,659.86	0.00E+00	1.80E+02	3.59E+02
Eu-155	4.8175E-03	7,329.93	14,659.86	0.00E+00	3.53E+01	7.06E+01
Fe-55	1.2397E-04	7,329.93	14,659.86	0.00E+00	9.09E-01	1.82E+00
H-3	4.5697E-03	7,329.93	14,659.86	0.00E+00	3.35E+01	6.70E+01
I-129	7.5300E-07	7,329.93	14,659.86	0.00E+00	5.52E-03	1.10E-02
Kr-85	1.0850E-01	7,329.93	14,659.86	0.00E+00	7.95E+02	1.59E+03
Np-237	9.5561E-06	7,329.93	14,659.86	0.00E+00	7.00E-02	1.40E-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	3.65E-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	6.3589E-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	1.90E-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
Tl-208	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	1.9254E+00	7,329.93	14,659.86	0.00E+00	1.41E+04	2.82E+04
Other Radionuclides					1.42E+04	2.84E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.547E+15
0.0250	3.218E+14
0.0375	2.807E+14
0.0575	3.006E+14
0.0850	1.817E+14
0.1250	1.229E+14
0.2250	1.567E+14
0.3750	6.823E+13
0.5750	1.113E+15
0.8500	1.882E+13
1.2500	1.074E+13
1.7500	4.932E+11
2.2500	4.326E+07
2.7500	2.446E+07
3.5000	1.124E+05
5.0000	6.390E+03
7.0000	7.056E+02
11.0000	7.910E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+02	3.49E+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 %:	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)[2]

	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) TURKEY
SNF ID #: 528
Fuel Units & Descr: 32 - ASSEMBLY
Heavy Metal Mass: BOL=67.2kg; EOL=59.136kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
1.33

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	7,636.76	15,273.53	0.00E+00	5.06E-06	1.01E-05
Am-241	2.0060E-03	7,636.76	15,273.53	0.00E+00	1.53E+01	3.06E+01
Am-242m	4.2429E-07	7,636.76	15,273.53	0.00E+00	3.24E-03	6.48E-03
Am-243	1.4899E-06	7,636.76	15,273.53	0.00E+00	1.14E-02	2.28E-02
C-14	5.7135E-09	7,636.76	15,273.53	0.00E+00	4.36E-05	8.73E-05
Cl-36	1.3124E-32	7,636.76	15,273.53	0.00E+00	1.00E-28	2.00E-28
Cm-243	1.6443E-07	7,636.76	15,273.53	0.00E+00	1.26E-03	2.51E-03
Cm-244	2.9330E-05	7,636.76	15,273.53	0.00E+00	2.24E-01	4.48E-01
Co-60	5.3186E-06	7,636.76	15,273.53	0.00E+00	4.06E-02	8.12E-02
Cs-134	3.1563E-03	7,636.76	15,273.53	0.00E+00	2.41E+01	4.82E+01
Cs-135	3.4477E-06	7,636.76	15,273.53	0.00E+00	2.63E-02	5.27E-02
Cs-137	2.0313E+00	7,636.76	15,273.53	0.00E+00	1.55E+04	3.10E+04
Eu-154	2.4513E-02	7,636.76	15,273.53	0.00E+00	1.87E+02	3.74E+02
Eu-155	4.8175E-03	7,636.76	15,273.53	0.00E+00	3.68E+01	7.36E+01
Fe-55	1.2397E-04	7,636.76	15,273.53	0.00E+00	9.47E-01	1.89E+00
H-3	4.5697E-03	7,636.76	15,273.53	0.00E+00	3.49E+01	6.98E+01
I-129	7.5300E-07	7,636.76	15,273.53	0.00E+00	5.75E-03	1.15E-02
Kr-85	1.0850E-01	7,636.76	15,273.53	0.00E+00	8.29E+02	1.66E+03
Np-237	9.5561E-06	7,636.76	15,273.53	0.00E+00	7.30E-02	1.46E-01
Pa-231	2.0359E-09	7,636.76	15,273.53	0.00E+00	1.55E-05	3.11E-05
Pb-210	4.9728E-11	7,636.76	15,273.53	0.00E+00	3.80E-07	7.60E-07
Pm-147	4.8502E-02	7,636.76	15,273.53	0.00E+00	3.70E+02	7.41E+02
Pu-238	1.8254E-02	7,636.76	15,273.53	0.00E+00	1.39E+02	2.79E+02
Pu-239	4.2810E-04	7,636.76	15,273.53	0.00E+00	3.27E+00	6.54E+00
Pu-240	2.4368E-04	7,636.76	15,273.53	0.00E+00	1.86E+00	3.72E+00
Pu-241	3.3415E-02	7,636.76	15,273.53	0.00E+00	2.55E+02	5.10E+02
Pu-242	3.6329E-07	7,636.76	15,273.53	0.00E+00	2.77E-03	5.55E-03
Ra-226	2.2854E-10	7,636.76	15,273.53	0.00E+00	1.75E-06	3.49E-06
Ra-228	1.2426E-14	7,636.76	15,273.53	0.00E+00	9.49E-11	1.90E-10
Ru-106	6.3589E-06	7,636.76	15,273.53	0.00E+00	4.86E-02	9.71E-02
Se-79	1.2933E-05	7,636.76	15,273.53	0.00E+00	9.88E-02	1.98E-01
Sn-126	1.1574E-05	7,636.76	15,273.53	0.00E+00	8.84E-02	1.77E-01
Sr-90	1.9248E+00	7,636.76	15,273.53	0.00E+00	1.47E+04	2.94E+04
Tc-99	4.2239E-04	7,636.76	15,273.53	0.00E+00	3.23E+00	6.45E+00
Th-229	5.0953E-12	7,636.76	15,273.53	0.00E+00	3.89E-08	7.78E-08
Th-230	4.1885E-08	7,636.76	15,273.53	0.00E+00	3.20E-04	6.40E-04
Th-232	1.9270E-14	7,636.76	15,273.53	0.00E+00	1.47E-10	2.94E-10
Tl-208	4.6024E-08	7,636.76	15,273.53	0.00E+00	3.51E-04	7.03E-04
U-232	1.2582E-07	7,636.76	15,273.53	0.00E+00	9.61E-04	1.92E-03
U-233	2.5825E-09	7,636.76	15,273.53	0.00E+00	1.97E-05	3.94E-05
U-234	1.8450E-04	7,636.76	15,273.53	0.00E+00	1.41E+00	2.82E+00
U-235	-2.7235E-06	7,636.76	0.00	2.90E-02	8.24E-03	2.90E-02
U-236	1.5493E-05	7,636.76	15,273.53	0.00E+00	1.18E-01	2.37E-01
U-238	-4.2851E-09	7,636.76	0.00	1.81E-02	1.80E-02	1.81E-02
Y-90	1.9254E+00	7,636.76	15,273.53	0.00E+00	1.47E+04	2.94E+04
Other Radionuclides					1.48E+04	2.95E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.612E+15
0.0250	3.353E+14
0.0375	2.924E+14
0.0575	3.132E+14
0.0850	1.893E+14
0.1250	1.281E+14
0.2250	1.633E+14
0.3750	7.109E+13
0.5750	1.160E+15
0.8500	1.960E+13
1.2500	1.119E+13
1.7500	5.138E+11
2.2500	4.507E+07
2.7500	2.548E+07
3.5000	1.171E+05
5.0000	6.658E+03
7.0000	7.351E+02
11.0000	8.241E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.82E+02	3.64E+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 %:	20.00000028	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:		7,636.76
Bounding:		15,273.53

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:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) CANADA
SNF ID #: 720
Fuel Units & Descr: 21 - MTR TYPE
Heavy Metal Mass: BOL=4.427kg; EOL=2.862kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,481.61	2,963.22	0.00E+00	9.82E-07	1.96E-06
Am-241	2.0060E-03	1,481.61	2,963.22	0.00E+00	2.97E+00	5.94E+00
Am-242m	4.2429E-07	1,481.61	2,963.22	0.00E+00	6.29E-04	1.26E-03
Am-243	1.4899E-06	1,481.61	2,963.22	0.00E+00	2.21E-03	4.41E-03
C-14	5.7135E-09	1,481.61	2,963.22	0.00E+00	8.47E-06	1.69E-05
Cl-36	1.3124E-32	1,481.61	2,963.22	0.00E+00	1.94E-29	3.89E-29
Cm-243	1.6443E-07	1,481.61	2,963.22	0.00E+00	2.44E-04	4.87E-04
Cm-244	2.9330E-05	1,481.61	2,963.22	0.00E+00	4.35E-02	8.69E-02
Co-60	5.3186E-06	1,481.61	2,963.22	0.00E+00	7.88E-03	1.58E-02
Cs-134	3.1563E-03	1,481.61	2,963.22	0.00E+00	4.68E+00	9.35E+00
Cs-135	3.4477E-06	1,481.61	2,963.22	0.00E+00	5.11E-03	1.02E-02
Cs-137	2.0313E+00	1,481.61	2,963.22	0.00E+00	3.01E+03	6.02E+03
Eu-154	2.4513E-02	1,481.61	2,963.22	0.00E+00	3.63E+01	7.26E+01
Eu-155	4.8175E-03	1,481.61	2,963.22	0.00E+00	7.14E+00	1.43E+01
Fe-55	1.2397E-04	1,481.61	2,963.22	0.00E+00	1.84E-01	3.67E-01
H-3	4.5697E-03	1,481.61	2,963.22	0.00E+00	6.77E+00	1.35E+01
I-129	7.5300E-07	1,481.61	2,963.22	0.00E+00	1.12E-03	2.23E-03
Kr-85	1.0850E-01	1,481.61	2,963.22	0.00E+00	1.61E+02	3.22E+02
Np-237	9.5561E-06	1,481.61	2,963.22	0.00E+00	1.42E-02	2.83E-02
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	2.4368E-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	1.92E-02	3.83E-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
Tl-208	4.6024E-06	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

Gamma Sources

Photon Energy Group (Avg. MeV)	Total Photons/sec (bounding)
0.0150	3.128E+14
0.0250	6.504E+13
0.0375	5.673E+13
0.0575	6.076E+13
0.0850	3.672E+13
0.1250	2.485E+13
0.2250	3.168E+13
0.3750	1.379E+13
0.5750	2.250E+14
0.8500	3.803E+12
1.2500	2.172E+12
1.7500	9.968E+10
2.2500	8.744E+06
2.7500	4.943E+06
3.5000	2.271E+04
5.0000	1.284E+03
7.0000	1.417E+02
11.0000	1.589E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.63E+01	7.06E+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 %:	92.99999478	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,481.61	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,963.22	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	48.11	96.22	0.00E+00	3.19E-08	6.38E-08
Am-241	2.0060E-03	48.11	96.22	0.00E+00	9.65E-02	1.93E-01
Am-242m	4.2429E-07	48.11	96.22	0.00E+00	2.04E-05	4.08E-05
Am-243	1.4899E-06	48.11	96.22	0.00E+00	7.17E-05	1.43E-04
C-14	5.7135E-09	48.11	96.22	0.00E+00	2.75E-07	5.50E-07
Cl-36	1.3124E-32	48.11	96.22	0.00E+00	6.31E-31	1.26E-30
Cm-243	1.6443E-07	48.11	96.22	0.00E+00	7.91E-06	1.58E-05
Cm-244	2.9330E-05	48.11	96.22	0.00E+00	1.41E-03	2.82E-03
Co-60	5.3186E-06	48.11	96.22	0.00E+00	2.56E-04	5.12E-04
Cs-134	3.1563E-03	48.11	96.22	0.00E+00	1.52E-01	3.04E-01
Cs-135	3.4477E-06	48.11	96.22	0.00E+00	1.66E-04	3.32E-04
Cs-137	2.0313E+00	48.11	96.22	0.00E+00	9.77E+01	1.95E+02
Eu-154	2.4513E-02	48.11	96.22	0.00E+00	1.18E+00	2.36E+00
Eu-155	4.8175E-03	48.11	96.22	0.00E+00	2.32E-01	4.64E-01
Fe-55	1.2397E-04	48.11	96.22	0.00E+00	5.96E-03	1.19E-02
H-3	4.5697E-03	48.11	96.22	0.00E+00	2.20E-01	4.40E-01
I-129	7.5300E-07	48.11	96.22	0.00E+00	3.62E-05	7.25E-05
Kr-85	1.0850E-01	48.11	96.22	0.00E+00	5.22E+00	1.04E+01
Np-237	9.5561E-06	48.11	96.22	0.00E+00	4.60E-04	9.19E-04
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
Tl-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-236	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-06	3.94E-06	4.15E-06
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.016E+13
0.0250	2.112E+12
0.0375	1.842E+12
0.0575	1.973E+12
0.0850	1.192E+12
0.1250	8.068E+11
0.2250	1.029E+12
0.3750	4.478E+11
0.5750	7.305E+12
0.8500	1.235E+11
1.2500	7.052E+10
1.7500	3.237E+09
2.2500	2.839E+08
2.7500	1.605E+05
3.5000	7.374E+02
5.0000	4.169E+01
7.0000	4.602E+00
11.0000	5.158E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.15E+00	2.29E+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 %:	92.99999263	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		48.11	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		96.22	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.87	
Bounding:	1.73	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	2,075.11	4,150.22	0.00E+00	1.38E-06	2.75E-06
Am-241	2.0060E-03	2,075.11	4,150.22	0.00E+00	4.16E+00	8.33E+00
Am-242m	4.2429E-07	2,075.11	4,150.22	0.00E+00	8.80E-04	1.76E-03
Am-243	1.4899E-06	2,075.11	4,150.22	0.00E+00	3.09E-03	6.18E-03
C-14	5.7135E-09	2,075.11	4,150.22	0.00E+00	1.19E-05	2.37E-05
Cl-36	1.3124E-32	2,075.11	4,150.22	0.00E+00	2.72E-29	5.45E-29
Cm-243	1.6443E-07	2,075.11	4,150.22	0.00E+00	3.41E-04	6.82E-04
Cm-244	2.9330E-05	2,075.11	4,150.22	0.00E+00	6.09E-02	1.22E-01
Co-60	5.3186E-06	2,075.11	4,150.22	0.00E+00	1.10E-02	2.21E-02
Cs-134	3.1563E-03	2,075.11	4,150.22	0.00E+00	6.55E+00	1.31E+01
Cs-135	3.4477E-06	2,075.11	4,150.22	0.00E+00	7.15E-03	1.43E-02
Cs-137	2.0313E+00	2,075.11	4,150.22	0.00E+00	4.22E+03	8.43E+03
Eu-154	2.4513E-02	2,075.11	4,150.22	0.00E+00	5.09E+01	1.02E+02
Eu-155	4.8175E-03	2,075.11	4,150.22	0.00E+00	1.00E+01	2.00E+01
Fe-55	1.2397E-04	2,075.11	4,150.22	0.00E+00	2.57E-01	5.14E-01
H-3	4.5697E-03	2,075.11	4,150.22	0.00E+00	9.48E+00	1.90E+01
I-129	7.5300E-07	2,075.11	4,150.22	0.00E+00	1.56E-03	3.13E-03
Kr-85	1.0850E-01	2,075.11	4,150.22	0.00E+00	2.25E+02	4.50E+02
Np-237	9.5561E-06	2,075.11	4,150.22	0.00E+00	1.98E-02	3.97E-02
Pa-231	2.0359E-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	4.2810E-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-05	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
Tl-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	2.61E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.381E+14
0.0250	9.110E+13
0.0375	7.946E+13
0.0575	8.510E+13
0.0850	5.143E+13
0.1250	3.480E+13
0.2250	4.438E+13
0.3750	1.932E+13
0.5750	3.151E+14
0.8500	5.327E+12
1.2500	3.042E+12
1.7500	1.396E+11
2.2500	1.225E+07
2.7500	6.924E+06
3.5000	3.181E+04
5.0000	1.798E+03
7.0000	1.985E+02
11.0000	2.225E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.95E+01	9.89E+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 %:	93.00001838	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,075.11	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,150.22	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.81	
Bounding:	1.62	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
2.08

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.4556E-09	4,810.77	9,234.97	0.00E+00	1.18E-05	2.27E-05
Am-241	3.8752E-03	4,810.77	9,234.97	0.00E+00	1.86E+01	3.58E+01
Am-242m	1.8617E-06	4,810.77	9,234.97	0.00E+00	8.96E-03	1.72E-02
Am-243	2.3293E-07	4,810.77	9,234.97	0.00E+00	1.12E-03	2.15E-03
C-14	4.3233E-05	4,810.77	9,234.97	0.00E+00	2.08E-01	3.99E-01
Cl-36	4.3023E-08	4,810.77	9,234.97	0.00E+00	2.07E-04	3.97E-04
Cm-243	1.9053E-07	4,810.77	9,234.97	0.00E+00	9.17E-04	1.76E-03
Cm-244	1.7744E-06	4,810.77	9,234.97	0.00E+00	8.54E-03	1.64E-02
Co-60	4.3188E-03	4,810.77	9,234.97	0.00E+00	2.08E+01	3.99E+01
Cs-134	6.7188E-04	4,810.77	9,234.97	0.00E+00	3.23E+00	6.20E+00
Cs-135	3.1549E-05	4,810.77	9,234.97	0.00E+00	1.52E-01	2.91E-01
Cs-137	1.9489E+00	4,810.77	9,234.97	0.00E+00	9.38E+03	1.80E+04
Eu-154	4.0301E-01	4,810.77	9,234.97	0.00E+00	1.94E+03	3.72E+03
Eu-155	5.4000E-02	4,810.77	9,234.97	0.00E+00	2.60E+02	4.99E+02
Fe-55	1.5955E-04	4,810.77	9,234.97	0.00E+00	7.68E-01	1.47E+00
H-3	4.6571E-03	4,810.77	9,234.97	0.00E+00	2.24E+01	4.30E+01
I-129	7.3805E-07	4,810.77	9,234.97	0.00E+00	3.55E-03	6.82E-03
Kr-85	9.5684E-02	4,810.77	9,234.97	0.00E+00	4.60E+02	8.84E+02
Np-237	1.4618E-06	4,810.77	9,234.97	0.00E+00	7.03E-03	1.35E-02
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
Tl-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	6.86E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.477E+14
0.0250	1.957E+14
0.0375	2.048E+14
0.0575	1.893E+14
0.0850	1.153E+14
0.1250	1.294E+14
0.2250	1.045E+14
0.3750	4.292E+13
0.5750	6.838E+14
0.8500	7.276E+13
1.2500	7.837E+13
1.7500	2.348E+12
2.2500	3.722E+07
2.7500	6.194E+06
3.5000	4.237E+04
5.0000	5.191E+03
7.0000	5.859E+02
11.0000	6.663E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.25E+02	2.40E+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 %:	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)[2]

	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	124.06	248.12	0.00E+00	8.23E-08	1.65E-07
Am-241	2.0060E-03	124.06	248.12	0.00E+00	2.49E-01	4.98E-01
Am-242m	4.2429E-07	124.06	248.12	0.00E+00	5.26E-05	1.05E-04
Am-243	1.4899E-06	124.06	248.12	0.00E+00	1.85E-04	3.70E-04
C-14	5.7135E-09	124.06	248.12	0.00E+00	7.09E-07	1.42E-06
Cl-36	1.3124E-32	124.06	248.12	0.00E+00	1.63E-30	3.26E-30
Cm-243	1.6443E-07	124.06	248.12	0.00E+00	2.04E-05	4.08E-05
Cm-244	2.9330E-05	124.06	248.12	0.00E+00	3.64E-03	7.28E-03
Co-60	5.3186E-06	124.06	248.12	0.00E+00	6.60E-04	1.32E-03
Cs-134	3.1563E-03	124.06	248.12	0.00E+00	3.92E-01	7.83E-01
Cs-135	3.4477E-06	124.06	248.12	0.00E+00	4.28E-04	8.55E-04
Cs-137	2.0313E+00	124.06	248.12	0.00E+00	2.52E+02	5.04E+02
Eu-154	2.4513E-02	124.06	248.12	0.00E+00	3.04E+00	6.08E+00
Eu-155	4.8175E-03	124.06	248.12	0.00E+00	5.98E-01	1.20E+00
Fe-55	1.2397E-04	124.06	248.12	0.00E+00	1.54E-02	3.08E-02
H-3	4.5697E-03	124.06	248.12	0.00E+00	5.67E-01	1.13E+00
I-129	7.5300E-07	124.06	248.12	0.00E+00	9.34E-05	1.87E-04
Kr-85	1.0850E-01	124.06	248.12	0.00E+00	1.35E+01	2.69E+01
Np-237	9.5561E-06	124.06	248.12	0.00E+00	1.19E-03	2.37E-03
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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.619E+13
0.0250	5.446E+12
0.0375	4.750E+12
0.0575	5.068E+12
0.0850	3.075E+12
0.1250	2.081E+12
0.2250	2.653E+12
0.3750	1.155E+12
0.5750	1.884E+13
0.8500	3.185E+11
1.2500	1.819E+11
1.7500	8.347E+09
2.2500	7.322E+05
2.7500	4.139E+05
3.5000	1.902E+03
5.0000	1.075E+02
7.0000	1.187E+01
11.0000	1.330E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.96E+00	6.91E+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 %:	90.00000989	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		124.06	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		248.12	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.97	
Bounding:	1.95	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) JAPAN
SNF ID #: 602
Fuel Units & Descr: 40 - MTR TYPE
Heavy Metal Mass: BOL=7.74kg; EOL=6.012kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	1,636.45	3,272.90	0.00E+00	1.09E-06	2.17E-06
Am-241	2.0060E-03	1,636.45	3,272.90	0.00E+00	3.28E+00	6.57E+00
Am-242m	4.2429E-07	1,636.45	3,272.90	0.00E+00	6.94E-04	1.39E-03
Am-243	1.4899E-06	1,636.45	3,272.90	0.00E+00	2.44E-03	4.88E-03
C-14	5.7135E-09	1,636.45	3,272.90	0.00E+00	9.35E-06	1.87E-05
Cl-36	1.3124E-32	1,636.45	3,272.90	0.00E+00	2.15E-29	4.30E-29
Cm-243	1.6443E-07	1,636.45	3,272.90	0.00E+00	2.69E-04	5.38E-04
Cm-244	2.9330E-05	1,636.45	3,272.90	0.00E+00	4.80E-02	9.60E-02
Co-60	5.3186E-06	1,636.45	3,272.90	0.00E+00	8.70E-03	1.74E-02
Cs-134	3.1563E-03	1,636.45	3,272.90	0.00E+00	5.17E+00	1.03E+01
Cs-135	3.4477E-06	1,636.45	3,272.90	0.00E+00	5.64E-03	1.13E-02
Cs-137	2.0313E+00	1,636.45	3,272.90	0.00E+00	3.32E+03	6.65E+03
Eu-154	2.4513E-02	1,636.45	3,272.90	0.00E+00	4.01E+01	8.02E+01
Eu-155	4.8175E-03	1,636.45	3,272.90	0.00E+00	7.88E+00	1.58E+01
Fe-55	1.2397E-04	1,636.45	3,272.90	0.00E+00	2.03E-01	4.06E-01
H-3	4.5697E-03	1,636.45	3,272.90	0.00E+00	7.48E+00	1.50E+01
I-129	7.5300E-07	1,636.45	3,272.90	0.00E+00	1.23E-03	2.46E-03
Kr-85	1.0850E-01	1,636.45	3,272.90	0.00E+00	1.78E+02	3.55E+02
Np-237	9.5561E-06	1,636.45	3,272.90	0.00E+00	1.56E-02	3.13E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.455E+14
0.0250	7.184E+13
0.0375	6.266E+13
0.0575	6.711E+13
0.0850	4.056E+13
0.1250	2.744E+13
0.2250	3.499E+13
0.3750	1.523E+13
0.5750	2.485E+14
0.8500	4.201E+12
1.2500	2.399E+12
1.7500	1.101E+11
2.2500	9.658E+08
2.7500	5.460E+08
3.5000	2.508E+04
5.0000	1.418E+03
7.0000	1.566E+02
11.0000	1.755E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.90E+01	7.80E+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 %:	92.99999931	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,636.45
Bounding:		3,272.90

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:	0.67	
Bounding:	1.34	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) NETHERLANDS
SNF ID #: 607
Fuel Units & Descr: 19 - MTR TYPE
Heavy Metal Mass: BOL=2.042kg; EOL=1.093kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	899.67	1,799.34	0.00E+00	5.97E-07	1.19E-06
Am-241	2.0060E-03	899.67	1,799.34	0.00E+00	1.80E+00	3.61E+00
Am-242m	4.2429E-07	899.67	1,799.34	0.00E+00	3.82E-04	7.63E-04
Am-243	1.4899E-06	899.67	1,799.34	0.00E+00	1.34E-03	2.68E-03
C-14	5.7135E-09	899.67	1,799.34	0.00E+00	5.14E-06	1.03E-05
Cl-36	1.3124E-32	899.67	1,799.34	0.00E+00	1.18E-29	2.36E-29
Cm-243	1.6443E-07	899.67	1,799.34	0.00E+00	1.48E-04	2.96E-04
Cm-244	2.9330E-05	899.67	1,799.34	0.00E+00	2.64E-02	5.28E-02
Co-60	5.3186E-06	899.67	1,799.34	0.00E+00	4.79E-03	9.57E-03
Cs-134	3.1563E-03	899.67	1,799.34	0.00E+00	2.84E+00	5.68E+00
Cs-135	3.4477E-06	899.67	1,799.34	0.00E+00	3.10E-03	6.20E-03
Cs-137	2.0313E+00	899.67	1,799.34	0.00E+00	1.83E+03	3.66E+03
Eu-154	2.4513E-02	899.67	1,799.34	0.00E+00	2.21E+01	4.41E+01
Eu-155	4.8175E-03	899.67	1,799.34	0.00E+00	4.33E+00	8.67E+00
Fe-55	1.2397E-04	899.67	1,799.34	0.00E+00	1.12E-01	2.23E-01
H-3	4.5697E-03	899.67	1,799.34	0.00E+00	4.11E+00	8.22E+00
I-129	7.5300E-07	899.67	1,799.34	0.00E+00	6.77E-04	1.35E-03
Kr-85	1.0850E-01	899.67	1,799.34	0.00E+00	9.76E+01	1.95E+02
Np-237	9.5561E-06	899.67	1,799.34	0.00E+00	8.60E-03	1.72E-02
Pa-231	2.0359E-09	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
Tl-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	2.79E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.899E+14
0.0250	3.950E+13
0.0375	3.445E+13
0.0575	3.690E+13
0.0850	2.230E+13
0.1250	1.509E+13
0.2250	1.924E+13
0.3750	8.375E+12
0.5750	1.366E+14
0.8500	2.310E+12
1.2500	1.319E+12
1.7500	6.053E+10
2.2500	5.310E+06
2.7500	3.002E+06
3.5000	1.379E+04
5.0000	7.796E+02
7.0000	8.606E+01
11.0000	9.645E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E+01	4.29E+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 %:	92.99998697	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		899.67	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,799.34	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	5,487.98	10,975.95	0.00E+00	3.64E-06	7.28E-06
Am-241	2.0060E-03	5,487.98	10,975.95	0.00E+00	1.10E+01	2.20E+01
Am-242m	4.2429E-07	5,487.98	10,975.95	0.00E+00	2.33E-03	4.66E-03
Am-243	1.4899E-06	5,487.98	10,975.95	0.00E+00	8.18E-03	1.64E-02
C-14	5.7135E-09	5,487.98	10,975.95	0.00E+00	3.14E-05	6.27E-05
Cl-36	1.3124E-32	5,487.98	10,975.95	0.00E+00	7.20E-29	1.44E-28
Cm-243	1.6443E-07	5,487.98	10,975.95	0.00E+00	9.02E-04	1.80E-03
Cm-244	2.9330E-05	5,487.98	10,975.95	0.00E+00	1.61E-01	3.22E-01
Co-60	5.3186E-06	5,487.98	10,975.95	0.00E+00	2.92E-02	5.84E-02
Cs-134	3.1563E-03	5,487.98	10,975.95	0.00E+00	1.73E+01	3.46E+01
Cs-135	3.4477E-06	5,487.98	10,975.95	0.00E+00	1.89E-02	3.78E-02
Cs-137	2.0313E+00	5,487.98	10,975.95	0.00E+00	1.11E+04	2.23E+04
Eu-154	2.4513E-02	5,487.98	10,975.95	0.00E+00	1.35E+02	2.69E+02
Eu-155	4.8175E-03	5,487.98	10,975.95	0.00E+00	2.64E+01	5.29E+01
Fe-55	1.2397E-04	5,487.98	10,975.95	0.00E+00	6.80E-01	1.36E+00
H-3	4.5697E-03	5,487.98	10,975.95	0.00E+00	2.51E+01	5.02E+01
I-129	7.5300E-07	5,487.98	10,975.95	0.00E+00	4.13E-03	8.26E-03
Kr-85	1.0850E-01	5,487.98	10,975.95	0.00E+00	5.95E+02	1.19E+03
Np-237	9.5561E-06	5,487.98	10,975.95	0.00E+00	5.24E-02	1.05E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.159E+15
0.0250	2.409E+14
0.0375	2.101E+14
0.0575	2.251E+14
0.0850	1.360E+14
0.1250	9.204E+13
0.2250	1.174E+14
0.3750	5.109E+13
0.5750	8.333E+14
0.8500	1.409E+13
1.2500	8.044E+12
1.7500	3.692E+11
2.2500	3.239E+07
2.7500	1.831E+07
3.5000	8.411E+04
5.0000	4.755E+03
7.0000	5.250E+02
11.0000	5.884E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.31E+02	2.62E+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 %:	92.99998578	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		5,487.98	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		10,975.95	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) PORTUGAL
SNF ID #: 632
Fuel Units & Descr: 22 - MTR TYPE
Heavy Metal Mass: BOL=6.246kg; EOL=3.923kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	2,200.12	4,400.23	0.00E+00	1.46E-06	2.92E-06
Am-241	2.0060E-03	2,200.12	4,400.23	0.00E+00	4.41E+00	8.83E+00
Am-242m	4.2429E-07	2,200.12	4,400.23	0.00E+00	9.33E-04	1.87E-03
Am-243	1.4899E-06	2,200.12	4,400.23	0.00E+00	3.28E-03	6.56E-03
C-14	5.7135E-09	2,200.12	4,400.23	0.00E+00	1.26E-05	2.51E-05
Cl-36	1.3124E-32	2,200.12	4,400.23	0.00E+00	2.89E-29	5.77E-29
Cm-243	1.6443E-07	2,200.12	4,400.23	0.00E+00	3.62E-04	7.24E-04
Cm-244	2.9330E-05	2,200.12	4,400.23	0.00E+00	6.45E-02	1.29E-01
Co-60	5.3186E-06	2,200.12	4,400.23	0.00E+00	1.17E-02	2.34E-02
Cs-134	3.1563E-03	2,200.12	4,400.23	0.00E+00	6.94E+00	1.39E+01
Cs-135	3.4477E-06	2,200.12	4,400.23	0.00E+00	7.59E-03	1.52E-02
Cs-137	2.0313E+00	2,200.12	4,400.23	0.00E+00	4.47E+03	8.94E+03
Eu-154	2.4513E-02	2,200.12	4,400.23	0.00E+00	5.39E+01	1.08E+02
Eu-155	4.8175E-03	2,200.12	4,400.23	0.00E+00	1.06E+01	2.12E+01
Fe-55	1.2397E-04	2,200.12	4,400.23	0.00E+00	2.73E-01	5.45E-01
H-3	4.5697E-03	2,200.12	4,400.23	0.00E+00	1.01E+01	2.01E+01
I-129	7.5300E-07	2,200.12	4,400.23	0.00E+00	1.66E-03	3.31E-03
Kr-85	1.0850E-01	2,200.12	4,400.23	0.00E+00	2.39E+02	4.77E+02
Np-237	9.5561E-06	2,200.12	4,400.23	0.00E+00	2.10E-02	4.20E-02
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	1.9270E-14	2,200.12	4,400.23	0.00E+00	4.24E-11	8.48E-11
Tl-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
U-233	2.5825E-09	2,200.12	4,400.23	0.00E+00	5.68E-06	1.14E-05
U-234	1.8450E-04	2,200.12	4,400.23	0.00E+00	4.06E-01	8.12E-01
U-235	-2.7235E-06	2,200.12	0.00	1.26E-02	6.56E-03	1.26E-02
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.645E+14
0.0250	9.659E+13
0.0375	8.425E+13
0.0575	9.023E+13
0.0850	5.453E+13
0.1250	3.690E+13
0.2250	4.705E+13
0.3750	2.048E+13
0.5750	3.341E+14
0.8500	5.648E+12
1.2500	3.225E+12
1.7500	1.480E+11
2.2500	1.298E+07
2.7500	7.341E+06
3.5000	3.372E+04
5.0000	1.906E+03
7.0000	2.105E+02
11.0000	2.359E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.24E+01	1.85E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999055	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,200.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,400.23	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	
Bounding:	2.24	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	10,135.95	15,792.50	0.00E+00	6.72E-06	1.05E-05
Am-241	2.0060E-03	10,135.95	15,792.50	0.00E+00	2.03E+01	3.17E+01
Am-242m	4.2429E-07	10,135.95	15,792.50	0.00E+00	4.30E-03	6.70E-03
Am-243	1.4899E-06	10,135.95	15,792.50	0.00E+00	1.51E-02	2.35E-02
C-14	5.7135E-09	10,135.95	15,792.50	0.00E+00	5.79E-05	9.02E-05
Cl-36	1.3124E-32	10,135.95	15,792.50	0.00E+00	1.33E-28	2.07E-28
Cm-243	1.6443E-07	10,135.95	15,792.50	0.00E+00	1.67E-03	2.60E-03
Cm-244	2.9330E-05	10,135.95	15,792.50	0.00E+00	2.97E-01	4.63E-01
Co-60	5.3186E-06	10,135.95	15,792.50	0.00E+00	5.39E-02	8.40E-02
Cs-134	3.1563E-03	10,135.95	15,792.50	0.00E+00	3.20E+01	4.98E+01
Cs-135	3.4477E-06	10,135.95	15,792.50	0.00E+00	3.49E-02	5.44E-02
Cs-137	2.0313E+00	10,135.95	15,792.50	0.00E+00	2.06E+04	3.21E+04
Eu-154	2.4513E-02	10,135.95	15,792.50	0.00E+00	2.48E+02	3.87E+02
Eu-155	4.8175E-03	10,135.95	15,792.50	0.00E+00	4.88E+01	7.61E+01
Fe-55	1.2397E-04	10,135.95	15,792.50	0.00E+00	1.26E+00	1.96E+00
H-3	4.5697E-03	10,135.95	15,792.50	0.00E+00	4.63E+01	7.22E+01
I-129	7.5300E-07	10,135.95	15,792.50	0.00E+00	7.63E-03	1.19E-02
Kr-85	1.0850E-01	10,135.95	15,792.50	0.00E+00	1.10E+03	1.71E+03
Np-237	9.5561E-06	10,135.95	15,792.50	0.00E+00	9.69E-02	1.51E-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
Se-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.667E+15
0.0250	3.467E+14
0.0375	3.024E+14
0.0575	3.238E+14
0.0850	1.957E+14
0.1250	1.324E+14
0.2250	1.689E+14
0.3750	7.351E+13
0.5750	1.199E+15
0.8500	2.027E+13
1.2500	1.157E+13
1.7500	5.313E+11
2.2500	4.660E+07
2.7500	2.635E+07
3.5000	1.210E+05
5.0000	6.842E+03
7.0000	7.553E+02
11.0000	8.465E+01

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 %:	93.00000616	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		10,135.95	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		15,792.50	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	2,386.49	4,772.98	0.00E+00	1.58E-06	3.17E-06
Am-241	2.0060E-03	2,386.49	4,772.98	0.00E+00	4.79E+00	9.57E+00
Am-242m	4.2429E-07	2,386.49	4,772.98	0.00E+00	1.01E-03	2.03E-03
Am-243	1.4899E-06	2,386.49	4,772.98	0.00E+00	3.56E-03	7.11E-03
C-14	5.7135E-09	2,386.49	4,772.98	0.00E+00	1.36E-05	2.73E-05
Cl-36	1.3124E-32	2,386.49	4,772.98	0.00E+00	3.13E-29	6.26E-29
Cm-243	1.6443E-07	2,386.49	4,772.98	0.00E+00	3.92E-04	7.85E-04
Cm-244	2.9330E-05	2,386.49	4,772.98	0.00E+00	7.00E-02	1.40E-01
Co-60	5.3186E-06	2,386.49	4,772.98	0.00E+00	1.27E-02	2.54E-02
Cs-134	3.1563E-03	2,386.49	4,772.98	0.00E+00	7.53E+00	1.51E+01
Cs-135	3.4477E-06	2,386.49	4,772.98	0.00E+00	8.23E-03	1.65E-02
Cs-137	2.0313E+00	2,386.49	4,772.98	0.00E+00	4.85E+03	9.70E+03
Eu-154	2.4513E-02	2,386.49	4,772.98	0.00E+00	5.85E+01	1.17E+02
Eu-155	4.8175E-03	2,386.49	4,772.98	0.00E+00	1.15E+01	2.30E+01
Fe-55	1.2397E-04	2,386.49	4,772.98	0.00E+00	2.96E-01	5.92E-01
H-3	4.5697E-03	2,386.49	4,772.98	0.00E+00	1.09E+01	2.18E+01
I-129	7.5300E-07	2,386.49	4,772.98	0.00E+00	1.80E-03	3.59E-03
Kr-85	1.0850E-01	2,386.49	4,772.98	0.00E+00	2.59E+02	5.18E+02
Np-237	9.5561E-06	2,386.49	4,772.98	0.00E+00	2.28E-02	4.56E-02
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	2.76E-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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.038E+14
0.0250	1.048E+14
0.0375	9.138E+13
0.0575	9.787E+13
0.0850	5.915E+13
0.1250	4.002E+13
0.2250	5.103E+13
0.3750	2.222E+13
0.5750	3.624E+14
0.8500	6.126E+12
1.2500	3.498E+12
1.7500	1.606E+11
2.2500	1.408E+07
2.7500	7.963E+06
3.5000	3.658E+04
5.0000	2.068E+03
7.0000	2.283E+02
11.0000	2.559E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.69E+01	1.14E+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 %:	92.99998782	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,386.49	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,772.98	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-LEU) JAPAN
SNF ID #: 553
Fuel Units & Descr: 476 - ASSEMBLY
Heavy Metal Mass: BOL=714kg; EOL=632.461kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 19.83

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	77,499.76	154,999.52	0.00E+00	6.61E-05	1.32E-04
Am-241	2.2753E-02	77,499.76	154,999.52	0.00E+00	1.76E+03	3.53E+03
Am-242m	8.9133E-06	77,499.76	154,999.52	0.00E+00	6.91E-01	1.38E+00
Am-243	6.4007E-06	77,499.76	154,999.52	0.00E+00	4.96E-01	9.92E-01
C-14	2.9620E-08	77,499.76	154,999.52	0.00E+00	2.30E-03	4.59E-03
Cl-36	5.9513E-35	77,499.76	154,999.52	0.00E+00	4.61E-30	9.22E-30
Cm-243	2.2087E-06	77,499.76	154,999.52	0.00E+00	1.71E-01	3.42E-01
Cm-244	1.1007E-04	77,499.76	154,999.52	0.00E+00	8.53E+00	1.71E+01
Co-60	1.6340E-05	77,499.76	154,999.52	0.00E+00	1.27E+00	2.53E+00
Cs-134	2.1353E-03	77,499.76	154,999.52	0.00E+00	1.65E+02	3.31E+02
Cs-135	4.8607E-06	77,499.76	154,999.52	0.00E+00	3.77E-01	7.53E-01
Cs-137	2.0227E+00	77,499.76	154,999.52	0.00E+00	1.57E+05	3.14E+05
Eu-154	2.0887E-02	77,499.76	154,999.52	0.00E+00	1.62E+03	3.24E+03
Eu-155	4.0867E-03	77,499.76	154,999.52	0.00E+00	3.17E+02	6.33E+02
Fe-55	1.4167E-03	77,499.76	154,999.52	0.00E+00	1.10E+02	2.20E+02
H-3	4.6653E-03	77,499.76	154,999.52	0.00E+00	3.62E+02	7.23E+02
I-129	7.1600E-07	77,499.76	154,999.52	0.00E+00	5.55E-02	1.11E-01
Kr-85	1.0240E-01	77,499.76	154,999.52	0.00E+00	7.94E+03	1.59E+04
Np-237	3.7227E-06	77,499.76	154,999.52	0.00E+00	2.89E-01	5.77E-01
Pa-231	2.6727E-09	77,499.76	154,999.52	0.00E+00	2.07E-04	4.14E-04
Pb-210	4.3313E-14	77,499.76	154,999.52	0.00E+00	3.36E-09	6.71E-09
Pm-147	4.6307E-02	77,499.76	154,999.52	0.00E+00	3.59E+03	7.18E+03
Pu-238	5.5273E-03	77,499.76	154,999.52	0.00E+00	4.28E+02	8.57E+02
Pu-239	1.0313E-02	77,499.76	154,999.52	0.00E+00	7.99E+02	1.60E+03
Pu-240	5.4180E-03	77,499.76	154,999.52	0.00E+00	4.20E+02	8.40E+02
Pu-241	3.7573E-01	77,499.76	154,999.52	0.00E+00	2.91E+04	5.82E+04
Pu-242	3.0713E-06	77,499.76	154,999.52	0.00E+00	2.38E-01	4.76E-01
Ra-226	2.3807E-13	77,499.76	154,999.52	0.00E+00	1.85E-08	3.69E-08
Ra-228	1.0607E-14	77,499.76	154,999.52	0.00E+00	8.22E-10	1.64E-09
Ru-106	8.4800E-06	77,499.76	154,999.52	0.00E+00	6.57E-01	1.31E+00
Se-79	1.2533E-05	77,499.76	154,999.52	0.00E+00	9.71E-01	1.94E+00
Sn-126	1.1393E-05	77,499.76	154,999.52	0.00E+00	8.83E-01	1.77E+00
Sr-90	1.8400E+00	77,499.76	154,999.52	0.00E+00	1.43E+05	2.85E+05
Tc-99	4.3533E-04	77,499.76	154,999.52	0.00E+00	3.37E+01	6.75E+01
Th-229	5.8947E-13	77,499.76	154,999.52	0.00E+00	4.57E-08	9.14E-08
Th-230	5.9500E-11	77,499.76	154,999.52	0.00E+00	4.61E-06	9.22E-06
Th-232	1.6360E-14	77,499.76	154,999.52	0.00E+00	1.27E-09	2.54E-09
Tl-208	7.6000E-09	77,499.76	154,999.52	0.00E+00	5.89E-04	1.18E-03
U-232	2.0747E-08	77,499.76	154,999.52	0.00E+00	1.61E-03	3.22E-03
U-233	4.4013E-10	77,499.76	154,999.52	0.00E+00	3.41E-05	6.82E-05
U-234	4.6500E-07	77,499.76	154,999.52	0.00E+00	3.60E-02	7.21E-02
U-235	-2.5335E-06	77,499.76	0.00	3.09E-01	1.12E-01	3.09E-01
U-236	1.3000E-05	77,499.76	154,999.52	0.00E+00	1.01E+00	2.01E+00
U-238	-1.4207E-08	77,499.76	0.00	1.92E-01	1.91E-01	1.92E-01
Y-90	1.8400E+00	77,499.76	154,999.52	0.00E+00	1.43E+05	2.85E+05
Other Radionuclides					1.49E+05	2.98E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.571E+16
0.0250	3.263E+15
0.0375	2.866E+15
0.0575	3.087E+15
0.0850	1.838E+15
0.1250	1.237E+15
0.2250	1.584E+15
0.3750	6.894E+14
0.5750	1.169E+16
0.8500	1.787E+14
1.2500	1.007E+14
1.7500	4.753E+12
2.2500	4.457E+08
2.7500	5.274E+07
3.5000	2.137E+06
5.0000	3.246E+05
7.0000	3.672E+04
11.0000	4.179E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+03	3.71E+03
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 %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		77,499.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		154,999.52	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.48	
Bounding:	4.96	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	235.24	470.48	0.00E+00	1.56E-07	3.12E-07
Am-241	2.0060E-03	235.24	470.48	0.00E+00	4.72E-01	9.44E-01
Am-242m	4.2429E-07	235.24	470.48	0.00E+00	9.98E-05	2.00E-04
Am-243	1.4899E-06	235.24	470.48	0.00E+00	3.50E-04	7.01E-04
C-14	5.7135E-09	235.24	470.48	0.00E+00	1.34E-06	2.69E-06
Cl-36	1.3124E-32	235.24	470.48	0.00E+00	3.09E-30	6.17E-30
Cm-243	1.6443E-07	235.24	470.48	0.00E+00	3.87E-05	7.74E-05
Cm-244	2.9330E-05	235.24	470.48	0.00E+00	6.90E-03	1.38E-02
Co-60	5.3186E-06	235.24	470.48	0.00E+00	1.25E-03	2.50E-03
Cs-134	3.1563E-03	235.24	470.48	0.00E+00	7.42E-01	1.48E+00
Cs-135	3.4477E-06	235.24	470.48	0.00E+00	8.11E-04	1.62E-03
Cs-137	2.0313E+00	235.24	470.48	0.00E+00	4.78E+02	9.56E+02
Eu-154	2.4513E-02	235.24	470.48	0.00E+00	5.77E+00	1.15E+01
Eu-155	4.8175E-03	235.24	470.48	0.00E+00	1.13E+00	2.27E+00
Fe-55	1.2397E-04	235.24	470.48	0.00E+00	2.92E-02	5.83E-02
H-3	4.5697E-03	235.24	470.48	0.00E+00	1.07E+00	2.15E+00
I-129	7.5300E-07	235.24	470.48	0.00E+00	1.77E-04	3.54E-04
Kr-85	1.0850E-01	235.24	470.48	0.00E+00	2.55E+01	5.10E+01
Np-237	9.5561E-06	235.24	470.48	0.00E+00	2.25E-03	4.50E-03
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-06	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.966E+13
0.0250	1.033E+13
0.0375	9.008E+12
0.0575	9.648E+12
0.0850	5.830E+12
0.1250	3.945E+12
0.2250	5.030E+12
0.3750	2.190E+12
0.5750	3.572E+13
0.8500	6.039E+11
1.2500	3.448E+11
1.7500	1.583E+10
2.2500	1.388E+06
2.7500	7.849E+05
3.5000	3.613E+03
5.0000	2.071E+02
7.0000	2.288E+01
11.0000	2.566E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.61E+00	1.12E+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 %:	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:		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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-MEU) GERMANY
SNF ID #: 1068
Fuel Units & Descr: 28 - MTR TYPE
Heavy Metal Mass: BOL=12.88kg; EOL=9.17kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10'
1.17

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	3,513.44	7,026.88	0.00E+00	2.33E-06	4.66E-06
Am-241	2.0060E-03	3,513.44	7,026.88	0.00E+00	7.05E+00	1.41E+01
Am-242m	4.2429E-07	3,513.44	7,026.88	0.00E+00	1.49E-03	2.98E-03
Am-243	1.4899E-06	3,513.44	7,026.88	0.00E+00	5.23E-03	1.05E-02
C-14	5.7135E-09	3,513.44	7,026.88	0.00E+00	2.01E-05	4.01E-05
Cl-36	1.3124E-32	3,513.44	7,026.88	0.00E+00	4.61E-29	9.22E-29
Cm-243	1.6443E-07	3,513.44	7,026.88	0.00E+00	5.78E-04	1.16E-03
Cm-244	2.9330E-05	3,513.44	7,026.88	0.00E+00	1.03E-01	2.06E-01
Co-60	5.3186E-06	3,513.44	7,026.88	0.00E+00	1.87E-02	3.74E-02
Cs-134	3.1563E-03	3,513.44	7,026.88	0.00E+00	1.11E+01	2.22E+01
Cs-135	3.4477E-06	3,513.44	7,026.88	0.00E+00	1.21E-02	2.42E-02
Cs-137	2.0313E+00	3,513.44	7,026.88	0.00E+00	7.14E+03	1.43E+04
Eu-154	2.4513E-02	3,513.44	7,026.88	0.00E+00	8.61E+01	1.72E+02
Eu-155	4.8175E-03	3,513.44	7,026.88	0.00E+00	1.69E+01	3.39E+01
Fe-55	1.2397E-04	3,513.44	7,026.88	0.00E+00	4.36E-01	8.71E-01
H-3	4.5697E-03	3,513.44	7,026.88	0.00E+00	1.61E+01	3.21E+01
I-129	7.5300E-07	3,513.44	7,026.88	0.00E+00	2.65E-03	5.29E-03
Kr-85	1.0850E-01	3,513.44	7,026.88	0.00E+00	3.81E+02	7.62E+02
Np-237	9.5561E-06	3,513.44	7,026.88	0.00E+00	3.36E-02	6.71E-02
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	6.41E+01	1.28E+02
Pu-239	4.2810E-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
Tl-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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.418E+14
0.0250	1.542E+14
0.0375	1.345E+14
0.0575	1.441E+14
0.0850	8.707E+13
0.1250	5.892E+13
0.2250	7.513E+13
0.3750	3.271E+13
0.5750	5.335E+14
0.8500	9.019E+12
1.2500	5.150E+12
1.7500	2.364E+11
2.2500	2.074E+07
2.7500	1.172E+07
3.5000	5.386E+04
5.0000	3.049E+03
7.0000	3.367E+02
11.0000	3.773E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.38E+01	1.68E+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 %:	45.07	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:		3,513.44
Bounding:		7,026.88

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:	0.87	
Bounding:	1.73	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3Si2-LEU CANADA
SNF ID #: 660
Fuel Units & Descr: 1527 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=3796.275kg; EOL=3226.398kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 20 years

Estimated Canister usage: 16"x15' 127.25

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	541,647.53	1,083,295.06	0.00E+00	4.62E-04	9.24E-04
Am-241	2.2753E-02	541,647.53	1,083,295.06	0.00E+00	1.23E+04	2.46E+04
Am-242m	8.9133E-06	541,647.53	1,083,295.06	0.00E+00	4.83E+00	9.66E+00
Am-243	6.4007E-06	541,647.53	1,083,295.06	0.00E+00	3.47E+00	6.93E+00
C-14	2.9620E-08	541,647.53	1,083,295.06	0.00E+00	1.60E-02	3.21E-02
Cl-36	5.9513E-35	541,647.53	1,083,295.06	0.00E+00	3.22E-29	6.45E-29
Cm-243	2.2087E-06	541,647.53	1,083,295.06	0.00E+00	1.20E+00	2.39E+00
Cm-244	1.1007E-04	541,647.53	1,083,295.06	0.00E+00	5.96E+01	1.19E+02
Co-60	1.6340E-05	541,647.53	1,083,295.06	0.00E+00	8.85E+00	1.77E+01
Cs-134	2.1353E-03	541,647.53	1,083,295.06	0.00E+00	1.16E+03	2.31E+03
Cs-135	4.8607E-06	541,647.53	1,083,295.06	0.00E+00	2.63E+00	5.27E+00
Cs-137	2.0227E+00	541,647.53	1,083,295.06	0.00E+00	1.10E+06	2.19E+06
Eu-154	2.0887E-02	541,647.53	1,083,295.06	0.00E+00	1.13E+04	2.26E+04
Eu-155	4.0867E-03	541,647.53	1,083,295.06	0.00E+00	2.21E+03	4.43E+03
Fe-55	1.4167E-03	541,647.53	1,083,295.06	0.00E+00	7.67E+02	1.53E+03
H-3	4.6653E-03	541,647.53	1,083,295.06	0.00E+00	2.53E+03	5.05E+03
I-129	7.1600E-07	541,647.53	1,083,295.06	0.00E+00	3.88E-01	7.76E-01
Kr-85	1.0240E-01	541,647.53	1,083,295.06	0.00E+00	5.55E+04	1.11E+05
Np-237	3.7227E-06	541,647.53	1,083,295.06	0.00E+00	2.02E+00	4.03E+00
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.098E+17
0.0250	2.280E+16
0.0375	2.003E+16
0.0575	2.158E+16
0.0850	1.284E+16
0.1250	8.648E+15
0.2250	1.107E+16
0.3750	4.818E+15
0.5750	8.172E+16
0.8500	1.249E+15
1.2500	7.038E+14
1.7500	3.322E+13
2.2500	3.115E+09
2.7500	3.886E+08
3.5000	1.493E+07
5.0000	2.268E+06
7.0000	2.566E+05
11.0000	2.920E+04

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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		541,647.53	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,083,295.06	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	6,991.28	13,982.55	0.00E+00	4.64E-06	9.27E-06
Am-241	2.0060E-03	6,991.28	13,982.55	0.00E+00	1.40E+01	2.80E+01
Am-242m	4.2429E-07	6,991.28	13,982.55	0.00E+00	2.97E-03	5.93E-03
Am-243	1.4899E-06	6,991.28	13,982.55	0.00E+00	1.04E-02	2.08E-02
C-14	5.7135E-09	6,991.28	13,982.55	0.00E+00	3.99E-05	7.99E-05
Cl-36	1.3124E-32	6,991.28	13,982.55	0.00E+00	9.18E-29	1.84E-28
Cm-243	1.6443E-07	6,991.28	13,982.55	0.00E+00	1.15E-03	2.30E-03
Cm-244	2.9330E-05	6,991.28	13,982.55	0.00E+00	2.05E-01	4.10E-01
Co-60	5.3186E-06	6,991.28	13,982.55	0.00E+00	3.72E-02	7.44E-02
Cs-134	3.1563E-03	6,991.28	13,982.55	0.00E+00	2.21E+01	4.41E+01
Cs-135	3.4477E-06	6,991.28	13,982.55	0.00E+00	2.41E-02	4.82E-02
Cs-137	2.0313E+00	6,991.28	13,982.55	0.00E+00	1.42E+04	2.84E+04
Eu-154	2.4513E-02	6,991.28	13,982.55	0.00E+00	1.71E+02	3.43E+02
Eu-155	4.8175E-03	6,991.28	13,982.55	0.00E+00	3.37E+01	6.74E+01
Fe-55	1.2397E-04	6,991.28	13,982.55	0.00E+00	8.67E-01	1.73E+00
H-3	4.5697E-03	6,991.28	13,982.55	0.00E+00	3.19E+01	6.39E+01
I-129	7.5300E-07	6,991.28	13,982.55	0.00E+00	5.26E-03	1.05E-02
Kr-85	1.0850E-01	6,991.28	13,982.55	0.00E+00	7.59E+02	1.52E+03
Np-237	9.5561E-06	6,991.28	13,982.55	0.00E+00	6.68E-02	1.34E-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-06	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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.476E+15
0.0250	3.069E+14
0.0375	2.677E+14
0.0575	2.867E+14
0.0850	1.733E+14
0.1250	1.172E+14
0.2250	1.495E+14
0.3750	6.508E+13
0.5750	1.062E+15
0.8500	1.795E+13
1.2500	1.025E+13
1.7500	4.704E+11
2.2500	4.128E+07
2.7500	2.333E+07
3.5000	1.072E+05
5.0000	6.094E+03
7.0000	6.729E+02
11.0000	7.543E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+02	3.33E+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 %:	19.99999952	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:		6,991.28
Bounding:		13,982.55

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	
Bounding:	0.75	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3Si2-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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	42,958.50	85,917.00	0.00E+00	2.85E-05	5.70E-05
Am-241	2.0060E-03	42,958.50	85,917.00	0.00E+00	8.62E+01	1.72E+02
Am-242m	4.2429E-07	42,958.50	85,917.00	0.00E+00	1.82E-02	3.65E-02
Am-243	1.4899E-06	42,958.50	85,917.00	0.00E+00	6.40E-02	1.28E-01
C-14	5.7135E-09	42,958.50	85,917.00	0.00E+00	2.45E-04	4.91E-04
Cl-36	1.3124E-32	42,958.50	85,917.00	0.00E+00	5.64E-28	1.13E-27
Cm-243	1.6443E-07	42,958.50	85,917.00	0.00E+00	7.06E-03	1.41E-02
Cm-244	2.9330E-05	42,958.50	85,917.00	0.00E+00	1.26E+00	2.52E+00
Co-60	5.3186E-06	42,958.50	85,917.00	0.00E+00	2.28E-01	4.57E-01
Cs-134	3.1563E-03	42,958.50	85,917.00	0.00E+00	1.36E+02	2.71E+02
Cs-135	3.4477E-06	42,958.50	85,917.00	0.00E+00	1.48E-01	2.96E-01
Cs-137	2.0313E+00	42,958.50	85,917.00	0.00E+00	8.73E+04	1.75E+05
Eu-154	2.4513E-02	42,958.50	85,917.00	0.00E+00	1.05E+03	2.11E+03
Eu-155	4.8175E-03	42,958.50	85,917.00	0.00E+00	2.07E+02	4.14E+02
Fe-55	1.2397E-04	42,958.50	85,917.00	0.00E+00	5.33E+00	1.07E+01
H-3	4.5697E-03	42,958.50	85,917.00	0.00E+00	1.96E+02	3.93E+02
I-129	7.5300E-07	42,958.50	85,917.00	0.00E+00	3.23E-02	6.47E-02
Kr-85	1.0850E-01	42,958.50	85,917.00	0.00E+00	4.66E+03	9.32E+03
Np-237	9.5561E-06	42,958.50	85,917.00	0.00E+00	4.11E-01	8.21E-01
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	6.3589E-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	1.9248E+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	1.9270E-14	42,958.50	85,917.00	0.00E+00	8.28E-10	1.66E-09
Tl-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	6.66E-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	1.9254E+00	42,958.50	85,917.00	0.00E+00	8.27E+04	1.65E+05
Other Radionuclides					8.31E+04	1.66E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.069E+15
0.0250	1.886E+15
0.0375	1.645E+15
0.0575	1.762E+15
0.0850	1.065E+15
0.1250	7.204E+14
0.2250	9.186E+14
0.3750	3.999E+14
0.5750	6.523E+15
0.8500	1.103E+14
1.2500	6.297E+13
1.7500	2.890E+12
2.2500	2.535E+08
2.7500	1.433E+08
3.5000	6.589E+05
5.0000	3.743E+04
7.0000	4.133E+03
11.0000	4.633E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.02E+03	2.05E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000055	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:		42,958.50
Bounding:		85,917.00

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:	0.40	
Bounding:	0.79	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	79,521.22	112,314.13	0.00E+00	5.27E-05	7.45E-05
Am-241	2.0060E-03	79,521.22	112,314.13	0.00E+00	1.60E+02	2.25E+02
Am-242m	4.2429E-07	79,521.22	112,314.13	0.00E+00	3.37E-02	4.77E-02
Am-243	1.4899E-06	79,521.22	112,314.13	0.00E+00	1.18E-01	1.67E-01
C-14	5.7135E-09	79,521.22	112,314.13	0.00E+00	4.54E-04	6.42E-04
Cl-36	1.3124E-32	79,521.22	112,314.13	0.00E+00	1.04E-27	1.47E-27
Cm-243	1.6443E-07	79,521.22	112,314.13	0.00E+00	1.31E-02	1.85E-02
Cm-244	2.9330E-05	79,521.22	112,314.13	0.00E+00	2.33E+00	3.29E+00
Co-60	5.3186E-06	79,521.22	112,314.13	0.00E+00	4.23E-01	5.97E-01
Cs-134	3.1563E-03	79,521.22	112,314.13	0.00E+00	2.51E+02	3.54E+02
Cs-135	3.4477E-06	79,521.22	112,314.13	0.00E+00	2.74E-01	3.87E-01
Cs-137	2.0313E+00	79,521.22	112,314.13	0.00E+00	1.62E+05	2.28E+05
Eu-154	2.4513E-02	79,521.22	112,314.13	0.00E+00	1.95E+03	2.75E+03
Eu-155	4.8175E-03	79,521.22	112,314.13	0.00E+00	3.83E+02	5.41E+02
Fe-55	1.2397E-04	79,521.22	112,314.13	0.00E+00	9.86E+00	1.39E+01
H-3	4.5697E-03	79,521.22	112,314.13	0.00E+00	3.63E+02	5.13E+02
I-129	7.5300E-07	79,521.22	112,314.13	0.00E+00	5.99E-02	8.46E-02
Kr-85	1.0850E-01	79,521.22	112,314.13	0.00E+00	8.63E+03	1.22E+04
Np-237	9.5561E-06	79,521.22	112,314.13	0.00E+00	7.60E-01	1.07E+00
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
Tl-208	4.6024E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.186E+16
0.0250	2.465E+15
0.0375	2.150E+15
0.0575	2.303E+15
0.0850	1.392E+15
0.1250	9.418E+14
0.2250	1.201E+15
0.3750	5.228E+14
0.5750	8.527E+15
0.8500	1.442E+14
1.2500	8.232E+13
1.7500	3.778E+12
2.2500	3.314E+08
2.7500	1.874E+08
3.5000	8.607E+05
5.0000	4.866E+04
7.0000	5.372E+03
11.0000	6.020E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.90E+03	2.58E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14999856	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		79,521.22
Bounding:		112,314.13

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:	2.13	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.14

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	3.1355E-10	274,584.76	364,474.92	0.00E+00	8.61E-05	1.14E-04
Am-241	8.0194E-03	274,584.76	364,474.92	0.00E+00	2.20E+03	2.92E+03
Am-242m	1.3694E-06	274,584.76	364,474.92	0.00E+00	3.76E-01	4.99E-01
Am-243	3.7096E-05	274,584.76	364,474.92	0.00E+00	1.02E+01	1.35E+01
C-14	2.6464E-08	274,584.76	364,474.92	0.00E+00	7.27E-03	9.65E-03
Cl-36	4.4441E-31	274,584.76	364,474.92	0.00E+00	1.22E-25	1.62E-25
Cm-243	5.7029E-06	274,584.76	364,474.92	0.00E+00	1.57E+00	2.08E+00
Cm-244	4.6555E-03	274,584.76	364,474.92	0.00E+00	1.28E+03	1.70E+03
Co-60	4.8663E-05	274,584.76	364,474.92	0.00E+00	1.34E+01	1.77E+01
Cs-134	1.0638E-02	274,584.76	364,474.92	0.00E+00	2.92E+03	3.88E+03
Cs-135	4.2564E-06	274,584.76	364,474.92	0.00E+00	1.17E+00	1.55E+00
Cs-137	2.0358E+00	274,584.76	364,474.92	0.00E+00	5.59E+05	7.42E+05
Eu-154	5.1956E-02	274,584.76	364,474.92	0.00E+00	1.43E+04	1.89E+04
Eu-155	1.4295E-02	274,584.76	364,474.92	0.00E+00	3.93E+03	5.21E+03
Fe-55	1.3560E-03	274,584.76	364,474.92	0.00E+00	3.72E+02	4.94E+02
H-3	4.6258E-03	274,584.76	364,474.92	0.00E+00	1.27E+03	1.69E+03
I-129	6.6403E-07	274,584.76	364,474.92	0.00E+00	1.82E-01	2.42E-01
Kr-85	1.0808E-01	274,584.76	364,474.92	0.00E+00	2.97E+04	3.94E+04
Np-237	3.1537E-05	274,584.76	364,474.92	0.00E+00	8.66E+00	1.15E+01
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	4.9198E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.853E+16
0.0250	7.942E+15
0.0375	7.057E+15
0.0575	7.471E+15
0.0850	4.522E+15
0.1250	3.203E+15
0.2250	3.893E+15
0.3750	1.685E+15
0.5750	2.789E+16
0.8500	7.303E+14
1.2500	4.682E+14
1.7500	1.804E+13
2.2500	1.154E+09
2.7500	6.750E+08
3.5000	2.852E+07
5.0000	1.097E+07
7.0000	1.259E+06
11.0000	1.442E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.94E+03	1.05E+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 %:	92.99999565	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		274,584.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		364,474.92	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	40,772.53	70,600.79	0.00E+00	1.28E-05	2.21E-05
Am-241	8.0194E-03	40,772.53	70,600.79	0.00E+00	3.27E+02	5.66E+02
Am-242m	1.3694E-06	40,772.53	70,600.79	0.00E+00	5.58E-02	9.67E-02
Am-243	3.7096E-05	40,772.53	70,600.79	0.00E+00	1.51E+00	2.62E+00
C-14	2.6464E-08	40,772.53	70,600.79	0.00E+00	1.08E-03	1.87E-03
Cl-36	4.4441E-31	40,772.53	70,600.79	0.00E+00	1.81E-26	3.14E-26
Cm-243	5.7029E-06	40,772.53	70,600.79	0.00E+00	2.33E-01	4.03E-01
Cm-244	4.6555E-03	40,772.53	70,600.79	0.00E+00	1.90E+02	3.29E+02
Co-60	4.8663E-05	40,772.53	70,600.79	0.00E+00	1.98E+00	3.44E+00
Cs-134	1.0638E-02	40,772.53	70,600.79	0.00E+00	4.34E+02	7.51E+02
Cs-135	4.2564E-06	40,772.53	70,600.79	0.00E+00	1.74E-01	3.01E-01
Cs-137	2.0358E+00	40,772.53	70,600.79	0.00E+00	8.30E+04	1.44E+05
Eu-154	5.1956E-02	40,772.53	70,600.79	0.00E+00	2.12E+03	3.67E+03
Eu-155	1.4295E-02	40,772.53	70,600.79	0.00E+00	5.83E+02	1.01E+03
Fe-55	1.3560E-03	40,772.53	70,600.79	0.00E+00	5.53E+01	9.57E+01
H-3	4.6258E-03	40,772.53	70,600.79	0.00E+00	1.89E+02	3.27E+02
I-129	6.6403E-07	40,772.53	70,600.79	0.00E+00	2.71E-02	4.69E-02
Kr-85	1.0808E-01	40,772.53	70,600.79	0.00E+00	4.41E+03	7.63E+03
Np-237	3.1537E-05	40,772.53	70,600.79	0.00E+00	1.29E+00	2.23E+00
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	1.26E-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	1.9064E+00	40,772.53	70,600.79	0.00E+00	7.77E+04	1.35E+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
Tl-208	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	-2.8661E-06	40,772.53	0.00	1.54E-01	3.74E-02	1.54E-01
U-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.464E+15
0.0250	1.538E+15
0.0375	1.367E+15
0.0575	1.447E+15
0.0850	8.760E+14
0.1250	6.204E+14
0.2250	7.540E+14
0.3750	3.263E+14
0.5750	5.402E+15
0.8500	1.415E+14
1.2500	9.069E+13
1.7500	3.495E+12
2.2500	2.235E+08
2.7500	1.308E+08
3.5000	5.525E+06
5.0000	2.124E+06
7.0000	2.438E+05
11.0000	2.794E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.18E+03	2.04E+03
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 %:	93.15000501	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		40,772.53	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		70,600.79	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00
Np-237	9.5561E-06	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
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
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.962E+12
0.0250	1.240E+12
0.0375	1.081E+12
0.0575	1.158E+12
0.0850	6.999E+11
0.1250	4.736E+11
0.2250	6.040E+11
0.3750	2.629E+11
0.5750	4.288E+12
0.8500	7.250E+10
1.2500	4.140E+10
1.7500	1.900E+09
2.2500	1.667E+05
2.7500	9.422E+04
3.5000	4.332E+02
5.0000	2.461E+01
7.0000	2.717E+00
11.0000	3.045E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.73E-01	1.35E+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 %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		28.24	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		56.48	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00
Np-237	9.5561E-06	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
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
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.962E+12
0.0250	1.240E+12
0.0375	1.081E+12
0.0575	1.158E+12
0.0850	6.999E+11
0.1250	4.736E+11
0.2250	6.040E+11
0.3750	2.629E+11
0.5750	4.288E+12
0.8500	7.250E+10
1.2500	4.140E+10
1.7500	1.900E+09
2.2500	1.667E+08
2.7500	9.422E+04
3.5000	4.332E+02
5.0000	2.461E+01
7.0000	2.717E+00
11.0000	3.045E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.73E-01	1.35E+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 %:	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
SNF ID #: 668
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00
Np-237	9.5561E-06	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
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
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.962E+12
0.0250	1.240E+12
0.0375	1.081E+12
0.0575	1.158E+12
0.0850	6.999E+11
0.1250	4.736E+11
0.2250	6.040E+11
0.3750	2.629E+11
0.5750	4.288E+12
0.8500	7.250E+10
1.2500	4.140E+10
1.7500	1.900E+09
2.2500	1.667E+05
2.7500	9.422E+04
3.5000	4.332E+02
5.0000	2.461E+01
7.0000	2.717E+00
11.0000	3.045E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.73E-01	1.35E+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 %:	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	28.22	56.44	0.00E+00	1.87E-08	3.74E-08
Am-241	2.0060E-03	28.22	56.44	0.00E+00	5.66E-02	1.13E-01
Am-242m	4.2429E-07	28.22	56.44	0.00E+00	1.20E-05	2.39E-05
Am-243	1.4899E-06	28.22	56.44	0.00E+00	4.20E-05	8.41E-05
C-14	5.7135E-09	28.22	56.44	0.00E+00	1.61E-07	3.22E-07
Cl-36	1.3124E-32	28.22	56.44	0.00E+00	3.70E-31	7.41E-31
Cm-243	1.6443E-07	28.22	56.44	0.00E+00	4.64E-06	9.28E-06
Cm-244	2.9330E-05	28.22	56.44	0.00E+00	8.28E-04	1.66E-03
Co-60	5.3186E-06	28.22	56.44	0.00E+00	1.50E-04	3.00E-04
Cs-134	3.1563E-03	28.22	56.44	0.00E+00	8.91E-02	1.78E-01
Cs-135	3.4477E-06	28.22	56.44	0.00E+00	9.73E-05	1.95E-04
Cs-137	2.0313E+00	28.22	56.44	0.00E+00	5.73E+01	1.15E+02
Eu-154	2.4513E-02	28.22	56.44	0.00E+00	6.92E-01	1.38E+00
Eu-155	4.8175E-03	28.22	56.44	0.00E+00	1.36E-01	2.72E-01
Fe-55	1.2397E-04	28.22	56.44	0.00E+00	3.50E-03	7.00E-03
H-3	4.5697E-03	28.22	56.44	0.00E+00	1.29E-01	2.58E-01
I-129	7.5300E-07	28.22	56.44	0.00E+00	2.13E-05	4.25E-05
Kr-85	1.0850E-01	28.22	56.44	0.00E+00	3.06E+00	6.12E+00
Np-237	9.5561E-06	28.22	56.44	0.00E+00	2.70E-04	5.39E-04
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-06	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
Tl-208	4.6024E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.958E+12
0.0250	1.239E+12
0.0375	1.081E+12
0.0575	1.157E+12
0.0850	6.994E+11
0.1250	4.733E+11
0.2250	6.036E+11
0.3750	2.627E+11
0.5750	4.285E+12
0.8500	7.245E+10
1.2500	4.137E+10
1.7500	1.899E+09
2.2500	1.666E+05
2.7500	9.416E+04
3.5000	4.329E+02
5.0000	2.459E+01
7.0000	2.715E+00
11.0000	3.043E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.73E-01	1.35E+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 %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		28.22	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		56.44	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name:	FRR SLOWPOKE (HEU) MONTREAL	[1]Fuel decay start date:	2010
SNF ID #:	667	Estimates as of:	2030
Fuel Units & Descr:	2 - 297 ROD ARRAY	Template:	ATR (Light Water, Alum., 60 to 100%, U)
Heavy Metal Mass:	BOL=1.772kg; EOL=1.742kg	[2]Template Burnup(MWd):	367.2
ROD Storage Site:	SRS	Template BOL Heavy Metal Mass (MT):	0.00116689
		Template Decay Time:	20 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	28.24	56.48	0.00E+00	1.87E-08	3.75E-08
Am-241	2.0060E-03	28.24	56.48	0.00E+00	5.66E-02	1.13E-01
Am-242m	4.2429E-07	28.24	56.48	0.00E+00	1.20E-05	2.40E-05
Am-243	1.4899E-06	28.24	56.48	0.00E+00	4.21E-05	8.42E-05
C-14	5.7135E-09	28.24	56.48	0.00E+00	1.61E-07	3.23E-07
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31
Cm-243	1.6443E-07	28.24	56.48	0.00E+00	4.64E-06	9.29E-06
Cm-244	2.9330E-05	28.24	56.48	0.00E+00	8.28E-04	1.66E-03
Co-60	5.3186E-06	28.24	56.48	0.00E+00	1.50E-04	3.00E-04
Cs-134	3.1563E-03	28.24	56.48	0.00E+00	8.91E-02	1.78E-01
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04
Cs-137	2.0313E+00	28.24	56.48	0.00E+00	5.74E+01	1.15E+02
Eu-154	2.4513E-02	28.24	56.48	0.00E+00	6.92E-01	1.38E+00
Eu-155	4.8175E-03	28.24	56.48	0.00E+00	1.36E-01	2.72E-01
Fe-55	1.2397E-04	28.24	56.48	0.00E+00	3.50E-03	7.00E-03
H-3	4.5697E-03	28.24	56.48	0.00E+00	1.29E-01	2.58E-01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05
Kr-85	1.0850E-01	28.24	56.48	0.00E+00	3.06E+00	6.13E+00
Np-237	9.5561E-06	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-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-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-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.962E+12
0.0250	1.240E+12
0.0375	1.061E+12
0.0575	1.158E+12
0.0850	6.999E+11
0.1250	4.736E+11
0.2250	6.040E+11
0.3750	2.629E+11
0.5750	4.288E+12
0.8500	7.250E+10
1.2500	4.140E+10
1.7500	1.900E+09
2.2500	1.667E+05
2.7500	9.422E+04
3.5000	4.332E+02
5.0000	2.461E+01
7.0000	2.717E+00
11.0000	3.045E-01

Thermal Power

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

	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET ARGENTINA
SNF ID #: 297
Fuel Units & Descr: 48 - PARTICULATE
Heavy Metal Mass: BOL=3.97kg; EOL=3.97kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 1.33

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.0233E-09	75.00	149.99	0.00E+00	6.02E-07	1.20E-06
Am-241	8.8502E-05	75.00	149.99	0.00E+00	6.64E-03	1.33E-02
Am-242m	9.1098E-09	75.00	149.99	0.00E+00	6.83E-07	1.37E-06
Am-243	9.8652E-10	75.00	149.99	0.00E+00	7.40E-08	1.48E-07
C-14	2.3062E-04	75.00	149.99	0.00E+00	1.73E-02	3.46E-02
Cl-36	1.2261E-06	75.00	149.99	0.00E+00	9.20E-05	1.84E-04
Cm-243	3.5824E-10	75.00	149.99	0.00E+00	2.69E-08	5.37E-08
Cm-244	4.1131E-09	75.00	149.99	0.00E+00	3.08E-07	6.17E-07
Co-60	5.0882E-01	75.00	149.99	0.00E+00	3.82E+01	7.63E+01
Cs-134	4.6705E-04	75.00	149.99	0.00E+00	3.50E-02	7.01E-02
Cs-135	3.0316E-05	75.00	149.99	0.00E+00	2.27E-03	4.55E-03
Cs-137	2.0516E+00	75.00	149.99	0.00E+00	1.54E+02	3.08E+02
Eu-154	2.2413E-03	75.00	149.99	0.00E+00	1.68E-01	3.36E-01
Eu-155	5.6772E-03	75.00	149.99	0.00E+00	4.26E-01	8.52E-01
Fe-55	6.6988E-02	75.00	149.99	0.00E+00	5.02E+00	1.00E+01
H-3	5.8303E-03	75.00	149.99	0.00E+00	4.37E-01	8.75E-01
I-129	7.3195E-07	75.00	149.99	0.00E+00	5.49E-05	1.10E-04
Kr-85	1.0880E-01	75.00	149.99	0.00E+00	8.16E+00	1.63E+01
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.615E+13
0.0250	3.357E+12
0.0375	2.893E+12
0.0575	3.120E+12
0.0850	1.889E+12
0.1250	1.227E+12
0.2250	1.615E+12
0.3750	7.064E+11
0.5750	1.147E+13
0.8500	1.234E+11
1.2500	5.694E+12
1.7500	3.139E+09
2.2500	3.036E+07
2.7500	2.310E+05
3.5000	8.733E+02
5.0000	5.350E+00
7.0000	5.981E-01
11.0000	6.761E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.35E+00	4.69E+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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	48.34531901	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		75.00
Bounding:		149.99

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET CANADA
SNF ID #: 671
Fuel Units & Descr: 5952 - PARTICULATE
Heavy Metal Mass: BOL=492.23kg; EOL=492.23kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.0233E-09	9,299.68	18,599.37	0.00E+00	7.46E-05	1.49E-04
Am-241	8.8502E-05	9,299.68	18,599.37	0.00E+00	8.23E-01	1.65E+00
Am-242m	9.1098E-09	9,299.68	18,599.37	0.00E+00	8.47E-05	1.69E-04
Am-243	9.8652E-10	9,299.68	18,599.37	0.00E+00	9.17E-06	1.83E-05
C-14	2.3062E-04	9,299.68	18,599.37	0.00E+00	2.14E+00	4.29E+00
Cl-36	1.2261E-06	9,299.68	18,599.37	0.00E+00	1.14E-02	2.28E-02
Cm-243	3.5824E-10	9,299.68	18,599.37	0.00E+00	3.33E-06	6.66E-06
Cm-244	4.1131E-09	9,299.68	18,599.37	0.00E+00	3.83E-05	7.65E-05
Co-60	5.0882E-01	9,299.68	18,599.37	0.00E+00	4.73E+03	9.46E+03
Cs-134	4.6705E-04	9,299.68	18,599.37	0.00E+00	4.34E+00	8.69E+00
Cs-135	3.0316E-05	9,299.68	18,599.37	0.00E+00	2.82E-01	5.64E-01
Cs-137	2.0516E+00	9,299.68	18,599.37	0.00E+00	1.91E+04	3.82E+04
Eu-154	2.2413E-03	9,299.68	18,599.37	0.00E+00	2.08E+01	4.17E+01
Eu-155	5.6772E-03	9,299.68	18,599.37	0.00E+00	5.28E+01	1.06E+02
Fe-55	6.6988E-02	9,299.68	18,599.37	0.00E+00	6.23E+02	1.25E+03
H-3	5.8303E-03	9,299.68	18,599.37	0.00E+00	5.42E+01	1.08E+02
I-129	7.3195E-07	9,299.68	18,599.37	0.00E+00	6.81E-03	1.36E-02
Kr-85	1.0880E-01	9,299.68	18,599.37	0.00E+00	1.01E+03	2.02E+03
Np-237	1.1481E-06	9,299.68	18,599.37	0.00E+00	1.07E-02	2.14E-02
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	6.6805E-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	4.6656E-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
Tl-208	2.5008E-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
U-234	3.6722E-07	9,299.68	18,599.37	0.00E+00	3.42E-03	6.83E-03
U-235	-2.7761E-06	9,299.68	0.00	5.14E-01	4.88E-01	5.14E-01
U-236	1.6190E-05	9,299.68	18,599.37	0.00E+00	1.51E-01	3.01E-01
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.003E+15
0.0250	4.162E+14
0.0375	3.587E+14
0.0575	3.868E+14
0.0850	2.342E+14
0.1250	1.521E+14
0.2250	2.002E+14
0.3750	8.760E+13
0.5750	1.422E+15
0.8500	1.530E+13
1.2500	7.060E+14
1.7500	3.892E+11
2.2500	3.765E+09
2.7500	2.864E+07
3.5000	1.083E+05
5.0000	6.634E+02
7.0000	7.416E+01
11.0000	8.384E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.91E+02	5.82E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	48.34531901	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		9,299.68
Bounding:		18,599.37

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET INDONESIA
SNF ID #: 672
Fuel Units & Descr: 48 - PARTICULATE
Heavy Metal Mass: BOL=3.97kg; EOL=3.97kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 1.33

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.0233E-09	75.00	149.99	0.00E+00	6.02E-07	1.20E-06
Am-241	8.8502E-05	75.00	149.99	0.00E+00	6.64E-03	1.33E-02
Am-242m	9.1098E-09	75.00	149.99	0.00E+00	6.83E-07	1.37E-06
Am-243	9.8652E-10	75.00	149.99	0.00E+00	7.40E-08	1.48E-07
C-14	2.3062E-04	75.00	149.99	0.00E+00	1.73E-02	3.46E-02
Cl-36	1.2261E-06	75.00	149.99	0.00E+00	9.20E-05	1.84E-04
Cm-243	3.5824E-10	75.00	149.99	0.00E+00	2.69E-08	5.37E-08
Cm-244	4.1131E-09	75.00	149.99	0.00E+00	3.08E-07	6.17E-07
Co-60	5.0882E-01	75.00	149.99	0.00E+00	3.82E+01	7.63E+01
Cs-134	4.6705E-04	75.00	149.99	0.00E+00	3.50E-02	7.01E-02
Cs-135	3.0316E-05	75.00	149.99	0.00E+00	2.27E-03	4.55E-03
Cs-137	2.0516E+00	75.00	149.99	0.00E+00	1.54E+02	3.08E+02
Eu-154	2.2413E-03	75.00	149.99	0.00E+00	1.68E-01	3.36E-01
Eu-155	5.6772E-03	75.00	149.99	0.00E+00	4.26E-01	8.52E-01
Fe-55	6.6988E-02	75.00	149.99	0.00E+00	5.02E+00	1.00E+01
H-3	5.8303E-03	75.00	149.99	0.00E+00	4.37E-01	8.75E-01
I-129	7.3195E-07	75.00	149.99	0.00E+00	5.49E-05	1.10E-04
Kr-85	1.0880E-01	75.00	149.99	0.00E+00	8.16E+00	1.63E+01
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.615E+13
0.0250	3.357E+12
0.0375	2.893E+12
0.0575	3.120E+12
0.0850	1.889E+12
0.1250	1.227E+12
0.2250	1.615E+12
0.3750	7.064E+11
0.5750	1.147E+13
0.8500	1.234E+11
1.2500	5.694E+12
1.7500	3.139E+09
2.2500	3.036E+07
2.7500	2.310E+05
3.5000	8.733E+02
5.0000	5.350E+00
7.0000	5.961E-01
11.0000	6.761E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.35E+00	4.69E+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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	48.34531901	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		75.00
Bounding:		149.99

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) DENMARK
SNF ID #: 298
Fuel Units & Descr: 184 - ASSEMBLY
Heavy Metal Mass: BOL=165.6kg; EOL=142.618kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%. U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 5.11

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	21,843.20	43,686.40	0.00E+00	1.86E-05	3.73E-05
Am-241	2.2753E-02	21,843.20	43,686.40	0.00E+00	4.97E+02	9.94E+02
Am-242m	8.9133E-06	21,843.20	43,686.40	0.00E+00	1.95E-01	3.89E-01
Am-243	6.4007E-06	21,843.20	43,686.40	0.00E+00	1.40E-01	2.80E-01
C-14	2.9620E-08	21,843.20	43,686.40	0.00E+00	6.47E-04	1.29E-03
Cl-36	5.9513E-35	21,843.20	43,686.40	0.00E+00	1.30E-30	2.60E-30
Cm-243	2.2087E-06	21,843.20	43,686.40	0.00E+00	4.82E-02	9.65E-02
Cm-244	1.1007E-04	21,843.20	43,686.40	0.00E+00	2.40E+00	4.81E+00
Co-60	1.6340E-05	21,843.20	43,686.40	0.00E+00	3.57E-01	7.14E-01
Cs-134	2.1353E-03	21,843.20	43,686.40	0.00E+00	4.66E+01	9.33E+01
Cs-135	4.8607E-06	21,843.20	43,686.40	0.00E+00	1.06E-01	2.12E-01
Cs-137	2.0227E+00	21,843.20	43,686.40	0.00E+00	4.42E+04	8.84E+04
Eu-154	2.0887E-02	21,843.20	43,686.40	0.00E+00	4.56E+02	9.12E+02
Eu-155	4.0867E-03	21,843.20	43,686.40	0.00E+00	8.93E+01	1.79E+02
Fe-55	1.4167E-03	21,843.20	43,686.40	0.00E+00	3.09E+01	6.19E+01
H-3	4.6653E-03	21,843.20	43,686.40	0.00E+00	1.02E+02	2.04E+02
I-129	7.1600E-07	21,843.20	43,686.40	0.00E+00	1.56E-02	3.13E-02
Kr-85	1.0240E-01	21,843.20	43,686.40	0.00E+00	2.24E+03	4.47E+03
Np-237	3.7227E-06	21,843.20	43,686.40	0.00E+00	8.13E-02	1.63E-01
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	1.6360E-14	21,843.20	43,686.40	0.00E+00	3.57E-10	7.15E-10
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.427E+15
0.0250	9.196E+14
0.0375	8.077E+14
0.0575	8.702E+14
0.0850	5.180E+14
0.1250	3.488E+14
0.2250	4.464E+14
0.3750	1.943E+14
0.5750	3.296E+15
0.8500	5.037E+13
1.2500	2.838E+13
1.7500	1.340E+12
2.2500	1.256E+08
2.7500	1.487E+07
3.5000	6.022E+05
5.0000	9.146E+04
7.0000	1.035E+04
11.0000	1.178E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.22E+02	1.84E+03
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 %:	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 673
Fuel Units & Descr: 135 - ASSEMBLY
Heavy Metal Mass: BOL=121.5kg; EOL=109.35kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	8.5333E-10	11,548.15	23,096.29	0.00E+00	9.85E-06	1.97E-05
Am-241	2.2753E-02	11,548.15	23,096.29	0.00E+00	2.63E+02	5.26E+02
Am-242m	8.9133E-06	11,548.15	23,096.29	0.00E+00	1.03E-01	2.06E-01
Am-243	6.4007E-06	11,548.15	23,096.29	0.00E+00	7.39E-02	1.48E-01
C-14	2.9620E-08	11,548.15	23,096.29	0.00E+00	3.42E-04	6.84E-04
Cl-36	5.9513E-35	11,548.15	23,096.29	0.00E+00	6.87E-31	1.37E-30
Cm-243	2.2087E-06	11,548.15	23,096.29	0.00E+00	2.55E-02	5.10E-02
Cm-244	1.1007E-04	11,548.15	23,096.29	0.00E+00	1.27E+00	2.54E+00
Co-60	1.6340E-05	11,548.15	23,096.29	0.00E+00	1.89E-01	3.77E-01
Cs-134	2.1353E-03	11,548.15	23,096.29	0.00E+00	2.47E+01	4.93E+01
Cs-135	4.8607E-06	11,548.15	23,096.29	0.00E+00	5.61E-02	1.12E-01
Cs-137	2.0227E+00	11,548.15	23,096.29	0.00E+00	2.34E+04	4.67E+04
Eu-154	2.0887E-02	11,548.15	23,096.29	0.00E+00	2.41E+02	4.82E+02
Eu-155	4.0867E-03	11,548.15	23,096.29	0.00E+00	4.72E+01	9.44E+01
Fe-55	1.4167E-03	11,548.15	23,096.29	0.00E+00	1.64E+01	3.27E+01
H-3	4.6653E-03	11,548.15	23,096.29	0.00E+00	5.39E+01	1.08E+02
I-129	7.1600E-07	11,548.15	23,096.29	0.00E+00	8.27E-03	1.65E-02
Kr-85	1.0240E-01	11,548.15	23,096.29	0.00E+00	1.18E+03	2.37E+03
Np-237	3.7227E-06	11,548.15	23,096.29	0.00E+00	4.30E-02	8.60E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.340E+15
0.0250	4.862E+14
0.0375	4.270E+14
0.0575	4.601E+14
0.0850	2.738E+14
0.1250	1.844E+14
0.2250	2.360E+14
0.3750	1.027E+14
0.5750	1.742E+15
0.8500	2.663E+13
1.2500	1.501E+13
1.7500	7.082E+11
2.2500	6.642E+07
2.7500	7.859E+06
3.5000	3.184E+05
5.0000	4.837E+04
7.0000	5.473E+03
11.0000	6.228E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.76E+02	5.52E+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 HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		11,548.15
Bounding:		23,096.29

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 674
Fuel Units & Descr: 18 - ASSEMBLY
Heavy Metal Mass: BOL=18kg; EOL=16.2kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template 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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	1,710.84	3,421.67	0.00E+00	1.46E-06	2.92E-06
Am-241	2.2753E-02	1,710.84	3,421.67	0.00E+00	3.89E+01	7.79E+01
Am-242m	8.9133E-06	1,710.84	3,421.67	0.00E+00	1.52E-02	3.05E-02
Am-243	6.4007E-06	1,710.84	3,421.67	0.00E+00	1.10E-02	2.19E-02
C-14	2.9620E-08	1,710.84	3,421.67	0.00E+00	5.07E-05	1.01E-04
Cl-36	5.9513E-35	1,710.84	3,421.67	0.00E+00	1.02E-31	2.04E-31
Cm-243	2.2087E-06	1,710.84	3,421.67	0.00E+00	3.78E-03	7.56E-03
Cm-244	1.1007E-04	1,710.84	3,421.67	0.00E+00	1.88E-01	3.77E-01
Co-60	1.6340E-05	1,710.84	3,421.67	0.00E+00	2.80E-02	5.59E-02
Cs-134	2.1353E-03	1,710.84	3,421.67	0.00E+00	3.65E+00	7.31E+00
Cs-135	4.8607E-06	1,710.84	3,421.67	0.00E+00	8.32E-03	1.66E-02
Cs-137	2.0227E+00	1,710.84	3,421.67	0.00E+00	3.46E+03	6.92E+03
Eu-154	2.0887E-02	1,710.84	3,421.67	0.00E+00	3.57E+01	7.15E+01
Eu-155	4.0867E-03	1,710.84	3,421.67	0.00E+00	6.99E+00	1.40E+01
Fe-55	1.4167E-03	1,710.84	3,421.67	0.00E+00	2.42E+00	4.85E+00
H-3	4.6653E-03	1,710.84	3,421.67	0.00E+00	7.98E+00	1.60E+01
I-129	7.1600E-07	1,710.84	3,421.67	0.00E+00	1.22E-03	2.45E-03
Kr-85	1.0240E-01	1,710.84	3,421.67	0.00E+00	1.75E+02	3.50E+02
Np-237	3.7227E-06	1,710.84	3,421.67	0.00E+00	6.37E-03	1.27E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.467E+14
0.0250	7.202E+13
0.0375	6.327E+13
0.0575	6.816E+13
0.0850	4.057E+13
0.1250	2.732E+13
0.2250	3.497E+13
0.3750	1.522E+13
0.5750	2.581E+14
0.8500	3.945E+12
1.2500	2.223E+12
1.7500	1.049E+11
2.2500	9.840E+06
2.7500	1.164E+06
3.5000	4.717E+04
5.0000	7.166E+03
7.0000	8.108E+02
11.0000	9.227E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.09E+01	8.18E+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 %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,710.84
Bounding:		3,421.67

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 675
Fuel Units & Descr: 135 - ASSEMBLY
Heavy Metal Mass: BOL=151.875kg; EOL=136.688kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	14,435.18	28,870.37	0.00E+00	1.23E-05	2.46E-05
Am-241	2.2753E-02	14,435.18	28,870.37	0.00E+00	3.28E+02	6.57E+02
Am-242m	8.9133E-06	14,435.18	28,870.37	0.00E+00	1.29E-01	2.57E-01
Am-243	6.4007E-06	14,435.18	28,870.37	0.00E+00	9.24E-02	1.85E-01
C-14	2.9620E-08	14,435.18	28,870.37	0.00E+00	4.28E-04	8.55E-04
Cl-36	5.9513E-35	14,435.18	28,870.37	0.00E+00	8.59E-31	1.72E-30
Cm-243	2.2087E-06	14,435.18	28,870.37	0.00E+00	3.19E-02	6.38E-02
Cm-244	1.1007E-04	14,435.18	28,870.37	0.00E+00	1.59E+00	3.18E+00
Co-60	1.6340E-05	14,435.18	28,870.37	0.00E+00	2.36E-01	4.72E-01
Cs-134	2.1353E-03	14,435.18	28,870.37	0.00E+00	3.08E+01	6.16E+01
Cs-135	4.8607E-06	14,435.18	28,870.37	0.00E+00	7.02E-02	1.40E-01
Cs-137	2.0227E+00	14,435.18	28,870.37	0.00E+00	2.92E+04	5.84E+04
Eu-154	2.0887E-02	14,435.18	28,870.37	0.00E+00	3.02E+02	6.03E+02
Eu-155	4.0867E-03	14,435.18	28,870.37	0.00E+00	5.90E+01	1.18E+02
Fe-55	1.4167E-03	14,435.18	28,870.37	0.00E+00	2.04E+01	4.09E+01
H-3	4.6653E-03	14,435.18	28,870.37	0.00E+00	6.73E+01	1.35E+02
I-129	7.1600E-07	14,435.18	28,870.37	0.00E+00	1.03E-02	2.07E-02
Kr-85	1.0240E-01	14,435.18	28,870.37	0.00E+00	1.48E+03	2.96E+03
Np-237	3.7227E-06	14,435.18	28,870.37	0.00E+00	5.37E-02	1.07E-01
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
Tl-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	6.71E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.925E+15
0.0250	6.077E+14
0.0375	5.338E+14
0.0575	5.751E+14
0.0850	3.423E+14
0.1250	2.305E+14
0.2250	2.950E+14
0.3750	1.284E+14
0.5750	2.178E+15
0.8500	3.329E+13
1.2500	1.876E+13
1.7500	8.853E+11
2.2500	8.303E+07
2.7500	9.824E+06
3.5000	3.980E+05
5.0000	6.047E+04
7.0000	6.841E+03
11.0000	7.785E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.45E+02	6.90E+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 HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		14,435.18	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		28,870.37	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX LEU) AUSTRALIA
SNF ID #: 299
Fuel Units & Descr: 289 - ASSEMBLY
Heavy Metal Mass: BOL=289kg; EOL=260.1kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	27,468.45	54,936.90	0.00E+00	2.34E-05	4.69E-05
Am-241	2.2753E-02	27,468.45	54,936.90	0.00E+00	6.25E+02	1.25E+03
Am-242m	8.9133E-06	27,468.45	54,936.90	0.00E+00	2.45E-01	4.90E-01
Am-243	6.4007E-06	27,468.45	54,936.90	0.00E+00	1.76E-01	3.52E-01
C-14	2.9620E-08	27,468.45	54,936.90	0.00E+00	8.14E-04	1.63E-03
Cl-36	5.9513E-35	27,468.45	54,936.90	0.00E+00	1.63E-30	3.27E-30
Cm-243	2.2087E-06	27,468.45	54,936.90	0.00E+00	6.07E-02	1.21E-01
Cm-244	1.1007E-04	27,468.45	54,936.90	0.00E+00	3.02E+00	6.05E+00
Co-60	1.6340E-05	27,468.45	54,936.90	0.00E+00	4.49E-01	8.98E-01
Cs-134	2.1353E-03	27,468.45	54,936.90	0.00E+00	5.87E+01	1.17E+02
Cs-135	4.8607E-06	27,468.45	54,936.90	0.00E+00	1.34E-01	2.67E-01
Cs-137	2.0227E+00	27,468.45	54,936.90	0.00E+00	5.56E+04	1.11E+05
Eu-154	2.0887E-02	27,468.45	54,936.90	0.00E+00	5.74E+02	1.15E+03
Eu-155	4.0867E-03	27,468.45	54,936.90	0.00E+00	1.12E+02	2.25E+02
Fe-55	1.4167E-03	27,468.45	54,936.90	0.00E+00	3.89E+01	7.78E+01
H-3	4.6653E-03	27,468.45	54,936.90	0.00E+00	1.28E+02	2.56E+02
I-129	7.1600E-07	27,468.45	54,936.90	0.00E+00	1.97E-02	3.93E-02
Kr-85	1.0240E-01	27,468.45	54,936.90	0.00E+00	2.81E+03	5.63E+03
Np-237	3.7227E-06	27,468.45	54,936.90	0.00E+00	1.02E-01	2.05E-01
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	1.0607E-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
Tl-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	4.6500E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.566E+15
0.0250	1.156E+15
0.0375	1.016E+15
0.0575	1.094E+15
0.0850	6.514E+14
0.1250	4.386E+14
0.2250	5.614E+14
0.3750	2.444E+14
0.5750	4.144E+15
0.8500	6.335E+13
1.2500	3.569E+13
1.7500	1.685E+12
2.2500	1.580E+08
2.7500	1.869E+07
3.5000	7.574E+05
5.0000	1.151E+05
7.0000	1.302E+04
11.0000	1.481E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.57E+02	1.31E+03
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 %:	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)[2]

	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) AUSTRALIA
SNF ID #: 300
Fuel Units & Descr: 266 - ASSEMBLY
Heavy Metal Mass: BOL=38.251kg; EOL=22.025kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	14,945.82	29,891.64	0.00E+00	4.69E-06	9.37E-06
Am-241	8.0194E-03	14,945.82	29,891.64	0.00E+00	1.20E+02	2.40E+02
Am-242m	1.3694E-06	14,945.82	29,891.64	0.00E+00	2.05E-02	4.09E-02
Am-243	3.7096E-05	14,945.82	29,891.64	0.00E+00	5.54E-01	1.11E+00
C-14	2.6464E-06	14,945.82	29,891.64	0.00E+00	3.96E-04	7.91E-04
Cl-36	4.4441E-31	14,945.82	29,891.64	0.00E+00	6.64E-27	1.33E-26
Cm-243	5.7029E-06	14,945.82	29,891.64	0.00E+00	8.52E-02	1.70E-01
Cm-244	4.6555E-03	14,945.82	29,891.64	0.00E+00	6.96E+01	1.39E+02
Co-60	4.8663E-05	14,945.82	29,891.64	0.00E+00	7.27E-01	1.45E+00
Cs-134	1.0638E-02	14,945.82	29,891.64	0.00E+00	1.59E+02	3.18E+02
Cs-135	4.2564E-06	14,945.82	29,891.64	0.00E+00	6.36E-02	1.27E-01
Cs-137	2.0358E+00	14,945.82	29,891.64	0.00E+00	3.04E+04	6.09E+04
Eu-154	5.1956E-02	14,945.82	29,891.64	0.00E+00	7.77E+02	1.55E+03
Eu-155	1.4295E-02	14,945.82	29,891.64	0.00E+00	2.14E+02	4.27E+02
Fe-55	1.3560E-03	14,945.82	29,891.64	0.00E+00	2.03E+01	4.05E+01
H-3	4.6258E-03	14,945.82	29,891.64	0.00E+00	6.91E+01	1.38E+02
I-129	6.6403E-07	14,945.82	29,891.64	0.00E+00	9.92E-03	1.98E-02
Kr-85	1.0808E-01	14,945.82	29,891.64	0.00E+00	1.62E+03	3.23E+03
Np-237	3.1537E-05	14,945.82	29,891.64	0.00E+00	4.71E-01	9.43E-01
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	1.9064E+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-06	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
Tl-208	4.8827E-06	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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.160E+15
0.0250	6.514E+14
0.0375	5.787E+14
0.0575	6.128E+14
0.0850	3.709E+14
0.1250	2.627E+14
0.2250	3.192E+14
0.3750	1.382E+14
0.5750	2.287E+15
0.8500	5.989E+13
1.2500	3.840E+13
1.7500	1.480E+12
2.2500	9.461E+07
2.7500	5.536E+07
3.5000	2.339E+06
5.0000	8.993E+05
7.0000	1.032E+05
11.0000	1.183E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.32E+02	8.65E+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 HM Constituents:	U	U
BOL Enrichment %:	80.00000311	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		14,945.82	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		29,891.64	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) AUSTRALIA
SNF ID #: 684
Fuel Units & Descr: 169 - ASSEMBLY
Heavy Metal Mass: BOL=47.878kg; EOL=32.651kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template 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 Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	14,025.54	28,051.09	0.00E+00	4.40E-06	8.80E-06
Am-241	8.0194E-03	14,025.54	28,051.09	0.00E+00	1.12E+02	2.25E+02
Am-242m	1.3694E-06	14,025.54	28,051.09	0.00E+00	1.92E-02	3.84E-02
Am-243	3.7096E-05	14,025.54	28,051.09	0.00E+00	5.20E-01	1.04E+00
C-14	2.6464E-08	14,025.54	28,051.09	0.00E+00	3.71E-04	7.42E-04
Cl-36	4.4441E-31	14,025.54	28,051.09	0.00E+00	6.23E-27	1.25E-26
Cm-243	5.7029E-06	14,025.54	28,051.09	0.00E+00	8.00E-02	1.60E-01
Cm-244	4.6555E-03	14,025.54	28,051.09	0.00E+00	6.53E+01	1.31E+02
Co-60	4.8663E-05	14,025.54	28,051.09	0.00E+00	6.83E-01	1.37E+00
Cs-134	1.0638E-02	14,025.54	28,051.09	0.00E+00	1.49E+02	2.98E+02
Cs-135	4.2564E-06	14,025.54	28,051.09	0.00E+00	5.97E-02	1.19E-01
Cs-137	2.0358E+00	14,025.54	28,051.09	0.00E+00	2.86E+04	5.71E+04
Eu-154	5.1956E-02	14,025.54	28,051.09	0.00E+00	7.29E+02	1.46E+03
Eu-155	1.4295E-02	14,025.54	28,051.09	0.00E+00	2.00E+02	4.01E+02
Fe-55	1.3560E-03	14,025.54	28,051.09	0.00E+00	1.90E+01	3.80E+01
H-3	4.6258E-03	14,025.54	28,051.09	0.00E+00	6.49E+01	1.30E+02
I-129	6.6403E-07	14,025.54	28,051.09	0.00E+00	9.31E-03	1.86E-02
Kr-85	1.0808E-01	14,025.54	28,051.09	0.00E+00	1.52E+03	3.03E+03
Np-237	3.1537E-05	14,025.54	28,051.09	0.00E+00	4.42E-01	8.85E-01
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	1.9064E+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	2.0705E-14	14,025.54	28,051.09	0.00E+00	2.90E-10	5.81E-10
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.966E+15
0.0250	6.113E+14
0.0375	5.431E+14
0.0575	5.750E+14
0.0850	3.481E+14
0.1250	2.465E+14
0.2250	2.996E+14
0.3750	1.297E+14
0.5750	2.146E+15
0.8500	5.620E+13
1.2500	3.603E+13
1.7500	1.388E+12
2.2500	8.879E+07
2.7500	5.195E+07
3.5000	2.195E+06
5.0000	8.440E+05
7.0000	9.688E+04
11.0000	1.110E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.06E+02	8.11E+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 HM Constituents:	U	U
BOL Enrichment %:	60.00000706	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		14,025.54	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		28,051.09	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.67	
Bounding:	1.34	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	279.55	559.11	0.00E+00	8.77E-08	1.75E-07
Am-241	8.0194E-03	279.55	559.11	0.00E+00	2.24E+00	4.48E+00
Am-242m	1.3694E-06	279.55	559.11	0.00E+00	3.83E-04	7.66E-04
Am-243	3.7096E-05	279.55	559.11	0.00E+00	1.04E-02	2.07E-02
C-14	2.6464E-08	279.55	559.11	0.00E+00	7.40E-06	1.48E-05
Cl-36	4.4441E-31	279.55	559.11	0.00E+00	1.24E-28	2.48E-28
Cm-243	5.7029E-06	279.55	559.11	0.00E+00	1.59E-03	3.19E-03
Cm-244	4.6555E-03	279.55	559.11	0.00E+00	1.30E+00	2.60E+00
Co-60	4.8663E-05	279.55	559.11	0.00E+00	1.36E-02	2.72E-02
Cs-134	1.0638E-02	279.55	559.11	0.00E+00	2.97E+00	5.95E+00
Cs-135	4.2564E-06	279.55	559.11	0.00E+00	1.19E-03	2.38E-03
Cs-137	2.0358E+00	279.55	559.11	0.00E+00	5.69E+02	1.14E+03
Eu-154	5.1956E-02	279.55	559.11	0.00E+00	1.45E+01	2.90E+01
Eu-155	1.4295E-02	279.55	559.11	0.00E+00	4.00E+00	7.99E+00
Fe-55	1.3560E-03	279.55	559.11	0.00E+00	3.79E-01	7.58E-01
H-3	4.6258E-03	279.55	559.11	0.00E+00	1.29E+00	2.59E+00
I-129	6.6403E-07	279.55	559.11	0.00E+00	1.86E-04	3.71E-04
Kr-85	1.0808E-01	279.55	559.11	0.00E+00	3.02E+01	6.04E+01
Np-237	3.1537E-05	279.55	559.11	0.00E+00	8.82E-03	1.76E-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-06	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	3.8056E-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-06	279.55	559.11	0.00E+00	2.95E-06	5.90E-06
Th-232	2.0705E-14	279.55	559.11	0.00E+00	5.79E-12	1.16E-11
Tl-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-06	2.11E-06
U-234	5.2047E-05	279.55	559.11	0.00E+00	1.46E-02	2.91E-02
U-235	-2.8661E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.911E+13
0.0250	1.218E+13
0.0375	1.082E+13
0.0575	1.146E+13
0.0850	6.937E+12
0.1250	4.913E+12
0.2250	5.971E+12
0.3750	2.584E+12
0.5750	4.278E+13
0.8500	1.120E+12
1.2500	7.182E+11
1.7500	2.767E+10
2.2500	1.770E+08
2.7500	1.036E+08
3.5000	4.376E+04
5.0000	1.682E+04
7.0000	1.931E+03
11.0000	2.213E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.09E+00	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) DENMARK
SNF ID #: 678
Fuel Units & Descr: 5 - ASSEMBLY
Heavy Metal Mass: BOL=0.79kg; EOL=0.423kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	338.51	677.01	0.00E+00	1.06E-07	2.12E-07
Am-241	8.0194E-03	338.51	677.01	0.00E+00	2.71E+00	5.43E+00
Am-242m	1.3694E-06	338.51	677.01	0.00E+00	4.64E-04	9.27E-04
Am-243	3.7096E-05	338.51	677.01	0.00E+00	1.26E-02	2.51E-02
C-14	2.6464E-08	338.51	677.01	0.00E+00	8.96E-06	1.79E-05
Cl-36	4.4441E-31	338.51	677.01	0.00E+00	1.50E-28	3.01E-28
Cm-243	5.7029E-06	338.51	677.01	0.00E+00	1.93E-03	3.86E-03
Cm-244	4.6555E-03	338.51	677.01	0.00E+00	1.58E+00	3.15E+00
Co-60	4.8663E-05	338.51	677.01	0.00E+00	1.65E-02	3.29E-02
Cs-134	1.0638E-02	338.51	677.01	0.00E+00	3.60E+00	7.20E+00
Cs-135	4.2564E-06	338.51	677.01	0.00E+00	1.44E-03	2.88E-03
Cs-137	2.0358E+00	338.51	677.01	0.00E+00	6.89E+02	1.38E+03
Eu-154	5.1956E-02	338.51	677.01	0.00E+00	1.76E+01	3.52E+01
Eu-155	1.4295E-02	338.51	677.01	0.00E+00	4.84E+00	9.68E+00
Fe-55	1.3560E-03	338.51	677.01	0.00E+00	4.59E-01	9.18E-01
H-3	4.6258E-03	338.51	677.01	0.00E+00	1.57E+00	3.13E+00
I-129	6.6403E-07	338.51	677.01	0.00E+00	2.25E-04	4.50E-04
Kr-85	1.0808E-01	338.51	677.01	0.00E+00	3.66E+01	7.32E+01
Np-237	3.1537E-05	338.51	677.01	0.00E+00	1.07E-02	2.14E-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
Tl-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	6.18E-04	1.59E-03
U-236	1.6701E-05	338.51	677.01	0.00E+00	5.65E-03	1.13E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.158E+13
0.0250	1.475E+13
0.0375	1.311E+13
0.0575	1.388E+13
0.0850	8.400E+12
0.1250	5.950E+12
0.2250	7.230E+12
0.3750	3.129E+12
0.5750	5.180E+13
0.8500	1.356E+12
1.2500	8.696E+11
1.7500	3.351E+10
2.2500	2.143E+06
2.7500	1.254E+06
3.5000	6.298E+04
5.0000	2.037E+04
7.0000	2.338E+03
11.0000	2.679E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.79E+00	1.95E+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 %:	93.00000949	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		338.51	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		677.01	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 683
Fuel Units & Descr: 105 - ASSEMBLY
Heavy Metal Mass: BOL=19.688kg; EOL=13.388kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	5,802.95	11,605.90	0.00E+00	1.82E-06	3.64E-06
Am-241	8.0194E-03	5,802.95	11,605.90	0.00E+00	4.65E+01	9.31E+01
Am-242m	1.3694E-06	5,802.95	11,605.90	0.00E+00	7.95E-03	1.59E-02
Am-243	3.7096E-05	5,802.95	11,605.90	0.00E+00	2.15E-01	4.31E-01
C-14	2.6464E-08	5,802.95	11,605.90	0.00E+00	1.54E-04	3.07E-04
Cl-36	4.4441E-31	5,802.95	11,605.90	0.00E+00	2.58E-27	5.16E-27
Cm-243	5.7029E-06	5,802.95	11,605.90	0.00E+00	3.31E-02	6.62E-02
Cm-244	4.6555E-03	5,802.95	11,605.90	0.00E+00	2.70E+01	5.40E+01
Co-60	4.8663E-05	5,802.95	11,605.90	0.00E+00	2.82E-01	5.65E-01
Cs-134	1.0638E-02	5,802.95	11,605.90	0.00E+00	6.17E+01	1.23E+02
Cs-135	4.2564E-06	5,802.95	11,605.90	0.00E+00	2.47E-02	4.94E-02
Cs-137	2.0358E+00	5,802.95	11,605.90	0.00E+00	1.18E+04	2.36E+04
Eu-154	5.1956E-02	5,802.95	11,605.90	0.00E+00	3.01E+02	6.03E+02
Eu-155	1.4295E-02	5,802.95	11,605.90	0.00E+00	8.30E+01	1.66E+02
Fe-55	1.3560E-03	5,802.95	11,605.90	0.00E+00	7.87E+00	1.57E+01
H-3	4.6258E-03	5,802.95	11,605.90	0.00E+00	2.68E+01	5.37E+01
I-129	6.6403E-07	5,802.95	11,605.90	0.00E+00	3.85E-03	7.71E-03
Kr-85	1.0808E-01	5,802.95	11,605.90	0.00E+00	6.27E+02	1.25E+03
Np-237	3.1537E-05	5,802.95	11,605.90	0.00E+00	1.83E-01	3.66E-01
Pa-231	9.7023E-10	5,802.95	11,605.90	0.00E+00	5.63E-06	1.13E-05
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	6.9502E-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-06	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-06	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
Tl-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	-2.8661E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.227E+15
0.0250	2.529E+14
0.0375	2.247E+14
0.0575	2.379E+14
0.0850	1.440E+14
0.1250	1.020E+14
0.2250	1.240E+14
0.3750	5.364E+13
0.5750	8.879E+14
0.8500	2.325E+13
1.2500	1.491E+13
1.7500	5.745E+11
2.2500	3.674E+07
2.7500	2.149E+07
3.5000	9.083E+05
5.0000	3.492E+05
7.0000	4.008E+04
11.0000	4.593E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E+02	3.36E+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 HM Constituents:	U	U
BOL Enrichment %:	80	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		5,802.95	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		11,605.90	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 685
Fuel Units & Descr: 130 - ASSEMBLY
Heavy Metal Mass: BOL=27.625kg; EOL=18.785kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.1355E-10	8,142.55	16,285.10	0.00E+00	2.55E-06	5.11E-06
Am-241	8.0194E-03	8,142.55	16,285.10	0.00E+00	6.53E+01	1.31E+02
Am-242m	1.3694E-06	8,142.55	16,285.10	0.00E+00	1.12E-02	2.23E-02
Am-243	3.7096E-05	8,142.55	16,285.10	0.00E+00	3.02E-01	6.04E-01
C-14	2.6464E-08	8,142.55	16,285.10	0.00E+00	2.15E-04	4.31E-04
Cl-36	4.4441E-31	8,142.55	16,285.10	0.00E+00	3.62E-27	7.24E-27
Cm-243	5.7029E-06	8,142.55	16,285.10	0.00E+00	4.64E-02	9.29E-02
Cm-244	4.6555E-03	8,142.55	16,285.10	0.00E+00	3.79E+01	7.58E+01
Co-60	4.8663E-05	8,142.55	16,285.10	0.00E+00	3.96E-01	7.92E-01
Cs-134	1.0638E-02	8,142.55	16,285.10	0.00E+00	8.66E+01	1.73E+02
Cs-135	4.2564E-06	8,142.55	16,285.10	0.00E+00	3.47E-02	6.93E-02
Cs-137	2.0358E+00	8,142.55	16,285.10	0.00E+00	1.66E+04	3.32E+04
Eu-154	5.1956E-02	8,142.55	16,285.10	0.00E+00	4.23E+02	8.46E+02
Eu-155	1.4295E-02	8,142.55	16,285.10	0.00E+00	1.16E+02	2.33E+02
Fe-55	1.3560E-03	8,142.55	16,285.10	0.00E+00	1.10E+01	2.21E+01
H-3	4.6258E-03	8,142.55	16,285.10	0.00E+00	3.77E+01	7.53E+01
I-129	6.6403E-07	8,142.55	16,285.10	0.00E+00	5.41E-03	1.08E-02
Kr-85	1.0808E-01	8,142.55	16,285.10	0.00E+00	8.80E+02	1.76E+03
Np-237	3.1537E-05	8,142.55	16,285.10	0.00E+00	2.57E-01	5.14E-01
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	3.8056E-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
Tl-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	3.7679E-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-90	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.722E+15
0.0250	3.549E+14
0.0375	3.153E+14
0.0575	3.338E+14
0.0850	2.021E+14
0.1250	1.431E+14
0.2250	1.739E+14
0.3750	7.527E+13
0.5750	1.246E+15
0.8500	3.263E+13
1.2500	2.092E+13
1.7500	8.061E+11
2.2500	5.155E+07
2.7500	3.016E+07
3.5000	1.274E+06
5.0000	4.900E+05
7.0000	5.624E+04
11.0000	6.445E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.35E+02	4.71E+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 HM Constituents:	U	U
BOL Enrichment %:	60	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		8,142.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		16,285.10	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

[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: GCRE (1B SERIES)
SNF ID #: 745
Fuel Units & Descr: 69 - 19 ROD ASSEMBLY
Heavy Metal Mass: BOL=60.541kg; EOL=59.864kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1960
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 65 years

Estimated Canister usage: 18"x10'
2.88

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	4.5940E-08	638.77	1,277.54	0.00E+00	2.93E-05	5.87E-05
Am-241	1.1471E-04	638.77	1,277.54	0.00E+00	7.33E-02	1.47E-01
Am-242m	7.4210E-09	638.77	1,277.54	0.00E+00	4.74E-06	9.48E-06
Am-243	9.8236E-10	638.77	1,277.54	0.00E+00	6.28E-07	1.26E-06
C-14	2.2928E-04	638.77	1,277.54	0.00E+00	1.46E-01	2.93E-01
Cl-36	1.2260E-06	638.77	1,277.54	0.00E+00	7.83E-04	1.57E-03
Cm-243	1.2000E-10	638.77	1,277.54	0.00E+00	7.67E-08	1.53E-07
Cm-244	7.3577E-10	638.77	1,277.54	0.00E+00	4.70E-07	9.40E-07
Co-60	1.3732E-03	638.77	1,277.54	0.00E+00	8.77E-01	1.75E+00
Cs-134	1.2709E-10	638.77	1,277.54	0.00E+00	8.12E-08	1.62E-07
Cs-135	3.0316E-05	638.77	1,277.54	0.00E+00	1.94E-02	3.87E-02
Cs-137	7.2579E-01	638.77	1,277.54	0.00E+00	4.64E+02	9.27E+02
Eu-154	5.9750E-05	638.77	1,277.54	0.00E+00	3.82E-02	7.63E-02
Eu-155	1.0577E-05	638.77	1,277.54	0.00E+00	6.76E-03	1.35E-02
Fe-55	4.1631E-07	638.77	1,277.54	0.00E+00	2.66E-04	5.32E-04
H-3	4.6722E-04	638.77	1,277.54	0.00E+00	2.98E-01	5.97E-01
I-129	7.3195E-07	638.77	1,277.54	0.00E+00	4.68E-04	9.35E-04
Kr-85	5.9418E-03	638.77	1,277.54	0.00E+00	3.80E+00	7.59E+00
Np-237	1.1499E-06	638.77	1,277.54	0.00E+00	7.35E-04	1.47E-03
Pa-231	7.0899E-08	638.77	1,277.54	0.00E+00	4.53E-05	9.06E-05
Pb-210	2.2363E-12	638.77	1,277.54	0.00E+00	1.43E-09	2.86E-09
Pm-147	4.2296E-07	638.77	1,277.54	0.00E+00	2.70E-04	5.40E-04
Pu-238	2.3295E-04	638.77	1,277.54	0.00E+00	1.49E-01	2.98E-01
Pu-239	6.6722E-04	638.77	1,277.54	0.00E+00	4.26E-01	8.52E-01
Pu-240	8.6556E-05	638.77	1,277.54	0.00E+00	5.53E-02	1.11E-01
Pu-241	1.6889E-04	638.77	1,277.54	0.00E+00	1.08E-01	2.16E-01
Pu-242	1.9717E-09	638.77	1,277.54	0.00E+00	1.26E-06	2.52E-06
Ra-226	4.5740E-12	638.77	1,277.54	0.00E+00	2.92E-09	5.84E-09
Ra-228	8.3511E-12	638.77	1,277.54	0.00E+00	5.33E-09	1.07E-08
Ru-106	2.0516E-19	638.77	1,277.54	0.00E+00	1.31E-16	2.62E-16
Se-79	1.3220E-05	638.77	1,277.54	0.00E+00	8.44E-03	1.69E-02
Sn-126	1.1489E-05	638.77	1,277.54	0.00E+00	7.34E-03	1.47E-02
Sr-90	6.6872E-01	638.77	1,277.54	0.00E+00	4.27E+02	8.54E+02
Tc-99	4.6639E-04	638.77	1,277.54	0.00E+00	2.98E-01	5.96E-01
Th-229	2.3727E-11	638.77	1,277.54	0.00E+00	1.52E-08	3.03E-08
Th-230	2.7354E-10	638.77	1,277.54	0.00E+00	1.75E-07	3.49E-07
Th-232	8.3594E-12	638.77	1,277.54	0.00E+00	5.34E-09	1.07E-08
Tl-208	1.6228E-08	638.77	1,277.54	0.00E+00	1.04E-05	2.07E-05
U-232	4.3960E-08	638.77	1,277.54	0.00E+00	2.81E-05	5.62E-05
U-233	3.3344E-09	638.77	1,277.54	0.00E+00	2.13E-06	4.26E-06
U-234	4.0749E-07	638.77	1,277.54	0.00E+00	2.60E-04	5.21E-04
U-235	-2.7761E-06	638.77	0.00	1.21E-01	1.19E-01	1.21E-01
U-236	1.6190E-05	638.77	1,277.54	0.00E+00	1.03E-02	2.07E-02
U-238	-2.8547E-09	638.77	0.00	1.59E-03	1.58E-03	1.59E-03
Y-90	6.6889E-01	638.77	1,277.54	0.00E+00	4.27E+02	8.55E+02
Other Radionuclides					5.80E+02	1.16E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.663E+13
0.0250	9.688E+12
0.0375	8.419E+12
0.0575	9.035E+12
0.0850	5.457E+12
0.1250	3.539E+12
0.2250	4.705E+12
0.3750	2.051E+12
0.5750	3.451E+13
0.8500	3.351E+11
1.2500	2.426E+11
1.7500	8.621E+09
2.2500	1.630E+08
2.7500	7.302E+05
3.5000	8.581E+01
5.0000	3.554E+01
7.0000	3.940E+00
11.0000	4.432E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.20E+00	1.04E+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:	HASTELLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	92.20234775	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		638.77
Bounding:		1,277.54

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:	0.23	
Bounding:	0.45	

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: GCRE (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

[1]Fuel decay start date: 1960
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	46.19	92.39	0.00E+00	2.12E-06	4.24E-06
Am-241	1.1471E-04	46.19	92.39	0.00E+00	5.30E-03	1.06E-02
Am-242m	7.4210E-09	46.19	92.39	0.00E+00	3.43E-07	6.86E-07
Am-243	9.8236E-10	46.19	92.39	0.00E+00	4.54E-08	9.08E-08
C-14	2.2928E-04	46.19	92.39	0.00E+00	1.06E-02	2.12E-02
Cl-36	1.2260E-06	46.19	92.39	0.00E+00	5.66E-05	1.13E-04
Cm-243	1.2000E-10	46.19	92.39	0.00E+00	5.54E-09	1.11E-08
Cm-244	7.3577E-10	46.19	92.39	0.00E+00	3.40E-08	6.80E-08
Co-60	1.3732E-03	46.19	92.39	0.00E+00	6.34E-02	1.27E-01
Cs-134	1.2709E-10	46.19	92.39	0.00E+00	5.87E-09	1.17E-08
Cs-135	3.0316E-05	46.19	92.39	0.00E+00	1.40E-03	2.80E-03
Cs-137	7.2579E-01	46.19	92.39	0.00E+00	3.35E+01	6.71E+01
Eu-154	5.9750E-05	46.19	92.39	0.00E+00	2.76E-03	5.52E-03
Eu-155	1.0577E-05	46.19	92.39	0.00E+00	4.89E-04	9.77E-04
Fe-55	4.1631E-07	46.19	92.39	0.00E+00	1.92E-05	3.85E-05
H-3	4.6722E-04	46.19	92.39	0.00E+00	2.16E-02	4.32E-02
I-129	7.3195E-07	46.19	92.39	0.00E+00	3.38E-05	6.76E-05
Kr-85	5.9418E-03	46.19	92.39	0.00E+00	2.74E-01	5.49E-01
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-05	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
Tl-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	6.6889E-01	46.19	92.39	0.00E+00	3.09E+01	6.18E+01
Other Radionuclides					4.20E+01	8.39E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.372E+12
0.0250	7.006E+11
0.0375	6.069E+11
0.0575	6.534E+11
0.0850	3.946E+11
0.1250	2.559E+11
0.2250	3.401E+11
0.3750	1.483E+11
0.5750	2.495E+12
0.8500	2.424E+10
1.2500	1.754E+10
1.7500	6.234E+08
2.2500	1.179E+05
2.7500	5.280E+04
3.5000	5.494E+00
5.0000	2.270E+00
7.0000	2.510E-01
11.0000	2.819E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.76E-01	7.82E-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:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.671	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		46.19	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		92.39	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: 1.00

[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: GENTR
SNF ID #: 97
Fuel Units & Descr: 16 - STACKED DISKS
Heavy Metal Mass: BOL=3.992kg; EOL=3.984kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116589
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.44

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	7.58	15.15	0.00E+00	1.10E-09	2.20E-09
Am-241	1.1190E-03	7.58	15.15	0.00E+00	8.48E-03	1.70E-02
Am-242m	4.5425E-07	7.58	15.15	0.00E+00	3.44E-06	6.88E-06
Am-243	1.4921E-06	7.58	15.15	0.00E+00	1.13E-05	2.26E-05
C-14	5.7244E-09	7.58	15.15	0.00E+00	4.34E-08	8.67E-08
Cl-36	1.3124E-32	7.58	15.15	0.00E+00	9.94E-32	1.99E-31
Cm-243	2.3676E-07	7.58	15.15	0.00E+00	1.79E-06	3.59E-06
Cm-244	5.2042E-05	7.58	15.15	0.00E+00	3.94E-04	7.89E-04
Co-60	3.8208E-05	7.58	15.15	0.00E+00	2.89E-04	5.79E-04
Cs-134	4.8693E-01	7.58	15.15	0.00E+00	3.69E+00	7.38E+00
Cs-135	3.4477E-06	7.58	15.15	0.00E+00	2.61E-05	5.22E-05
Cs-137	2.8731E+00	7.58	15.15	0.00E+00	2.18E+01	4.35E+01
Eu-154	8.2053E-02	7.58	15.15	0.00E+00	6.22E-01	1.24E+00
Eu-155	3.9134E-02	7.58	15.15	0.00E+00	2.96E-01	5.93E-01
Fe-55	6.7429E-03	7.58	15.15	0.00E+00	5.11E-02	1.02E-01
H-3	1.0599E-02	7.58	15.15	0.00E+00	8.03E-02	1.61E-01
I-129	7.5300E-07	7.58	15.15	0.00E+00	5.70E-06	1.14E-05
Kr-85	2.8595E-01	7.58	15.15	0.00E+00	2.17E+00	4.33E+00
Np-237	9.5479E-06	7.58	15.15	0.00E+00	7.23E-05	1.45E-04
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	3.86E+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
Tl-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	1.9564E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.923E+12
0.0250	6.298E+11
0.0375	5.812E+11
0.0575	5.714E+11
0.0850	3.643E+11
0.1250	3.155E+11
0.2250	3.089E+11
0.3750	1.495E+11
0.5750	2.053E+12
0.8500	2.875E+11
1.2500	5.349E+10
1.7500	2.243E+09
2.2500	4.705E+09
2.7500	2.707E+07
3.5000	3.002E+08
5.0000	9.270E+00
7.0000	1.034E+00
11.0000	1.165E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.84E-01	7.68E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

[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: 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

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	3,825.20	7,650.40	0.00E+00	7.68E-06	1.54E-05
Am-241	2.5251E-03	3,825.20	7,650.40	0.00E+00	9.66E+00	1.93E+01
Am-242m	3.9624E-07	3,825.20	7,650.40	0.00E+00	1.52E-03	3.03E-03
Am-243	1.4880E-06	3,825.20	7,650.40	0.00E+00	5.69E-03	1.14E-02
C-14	5.7053E-09	3,825.20	7,650.40	0.00E+00	2.18E-05	4.36E-05
Cl-36	1.3124E-32	3,825.20	7,650.40	0.00E+00	5.02E-29	1.00E-28
Cm-243	1.1419E-07	3,825.20	7,650.40	0.00E+00	4.37E-04	8.74E-04
Cm-244	1.6522E-05	3,825.20	7,650.40	0.00E+00	6.32E-02	1.26E-01
Co-60	7.4047E-07	3,825.20	7,650.40	0.00E+00	2.83E-03	5.66E-03
Cs-134	2.0455E-05	3,825.20	7,650.40	0.00E+00	7.82E-02	1.56E-01
Cs-135	3.4477E-06	3,825.20	7,650.40	0.00E+00	1.32E-02	2.64E-02
Cs-137	1.4365E+00	3,825.20	7,650.40	0.00E+00	5.50E+03	1.10E+04
Eu-154	7.3230E-03	3,825.20	7,650.40	0.00E+00	2.80E+01	5.60E+01
Eu-155	5.9259E-04	3,825.20	7,650.40	0.00E+00	2.27E+00	4.53E+00
Fe-55	2.2791E-06	3,825.20	7,650.40	0.00E+00	8.72E-03	1.74E-02
H-3	1.9698E-03	3,825.20	7,650.40	0.00E+00	7.53E+00	1.51E+01
I-129	7.5300E-07	3,825.20	7,650.40	0.00E+00	2.88E-03	5.76E-03
Kr-85	4.1176E-02	3,825.20	7,650.40	0.00E+00	1.58E+02	3.15E+02
Np-237	9.5752E-06	3,825.20	7,650.40	0.00E+00	3.66E-02	7.33E-02
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	8.3497E-08	3,825.20	7,650.40	0.00E+00	3.19E-04	6.39E-04
Th-232	3.8371E-14	3,825.20	7,650.40	0.00E+00	1.47E-10	2.94E-10
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.635E+14
0.0250	1.170E+14
0.0375	1.017E+14
0.0575	1.095E+14
0.0850	6.596E+13
0.1250	4.357E+13
0.2250	5.694E+13
0.3750	2.477E+13
0.5750	4.094E+14
0.8500	5.001E+12
1.2500	2.419E+12
1.7500	1.361E+11
2.2500	1.138E+07
2.7500	1.086E+07
3.5000	6.295E+03
5.0000	2.572E+03
7.0000	2.815E+02
11.0000	3.139E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.40E+01	1.28E+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 %:	91.93720219	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		3,825.20	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		7,650.40	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.65	
Bounding:	1.30	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GRR (UALX HEU) GREECE
SNF ID #: 1069
Fuel Units & Descr: 46 - MTR TYPE
Heavy Metal Mass: BOL=7.99kg; EOL=6.27kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1,629.25	3,258.50	0.00E+00	3.27E-06	6.54E-06
Am-241	2.5251E-03	1,629.25	3,258.50	0.00E+00	4.11E+00	8.23E+00
Am-242m	3.9624E-07	1,629.25	3,258.50	0.00E+00	6.46E-04	1.29E-03
Am-243	1.4880E-06	1,629.25	3,258.50	0.00E+00	2.42E-03	4.85E-03
C-14	5.7053E-09	1,629.25	3,258.50	0.00E+00	9.30E-06	1.86E-05
Cl-36	1.3124E-32	1,629.25	3,258.50	0.00E+00	2.14E-29	4.28E-29
Cm-243	1.1419E-07	1,629.25	3,258.50	0.00E+00	1.86E-04	3.72E-04
Cm-244	1.6522E-05	1,629.25	3,258.50	0.00E+00	2.69E-02	5.38E-02
Co-60	7.4047E-07	1,629.25	3,258.50	0.00E+00	1.21E-03	2.41E-03
Cs-134	2.0455E-05	1,629.25	3,258.50	0.00E+00	3.33E-02	6.67E-02
Cs-135	3.4477E-06	1,629.25	3,258.50	0.00E+00	5.62E-03	1.12E-02
Cs-137	1.4365E+00	1,629.25	3,258.50	0.00E+00	2.34E+03	4.68E+03
Eu-154	7.3230E-03	1,629.25	3,258.50	0.00E+00	1.19E+01	2.39E+01
Eu-155	5.9259E-04	1,629.25	3,258.50	0.00E+00	9.65E-01	1.93E+00
Fe-55	2.2791E-06	1,629.25	3,258.50	0.00E+00	3.71E-03	7.43E-03
H-3	1.9698E-03	1,629.25	3,258.50	0.00E+00	3.21E+00	6.42E+00
I-129	7.5300E-07	1,629.25	3,258.50	0.00E+00	1.23E-03	2.45E-03
Kr-85	4.1176E-02	1,629.25	3,258.50	0.00E+00	6.71E+01	1.34E+02
Np-237	9.5752E-06	1,629.25	3,258.50	0.00E+00	1.56E-02	3.12E-02
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
Se-79	1.2930E-05	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
Tl-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-06	1.18E-05
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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.400E+14
0.0250	4.983E+13
0.0375	4.332E+13
0.0575	4.662E+13
0.0850	2.809E+13
0.1250	1.858E+13
0.2250	2.425E+13
0.3750	1.055E+13
0.5750	1.744E+14
0.8500	2.130E+12
1.2500	1.030E+12
1.7500	5.798E+10
2.2500	4.848E+06
2.7500	4.627E+06
3.5000	2.681E+03
5.0000	1.096E+03
7.0000	1.199E+02
11.0000	1.337E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.73E+01	5.45E+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 %:	91.93720219	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,629.25	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,258.50	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.65	
Bounding:	1.30	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GTRR
SNF ID #: 87
Fuel Units & Descr: 25 - ASSEMBLY
Heavy Metal Mass: BOL=5.05kg; EOL=4.47kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 25 years

Estimated Canister usage:

18"x10'
0.69

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	5.4520E-10	534.24	1,068.48	0.00E+00	2.91E-07	5.83E-07
Am-241	9.2284E-03	534.24	1,068.48	0.00E+00	4.93E+00	9.86E+00
Am-242m	1.3390E-06	534.24	1,068.48	0.00E+00	7.15E-04	1.43E-03
Am-243	3.7084E-05	534.24	1,068.48	0.00E+00	1.98E-02	3.96E-02
C-14	2.6452E-08	534.24	1,068.48	0.00E+00	1.41E-05	2.83E-05
Cl-36	4.4441E-31	534.24	1,068.48	0.00E+00	2.37E-28	4.75E-28
Cm-243	5.0498E-06	534.24	1,068.48	0.00E+00	2.70E-03	5.40E-03
Cm-244	3.8451E-03	534.24	1,068.48	0.00E+00	2.05E+00	4.11E+00
Co-60	2.5225E-05	534.24	1,068.48	0.00E+00	1.35E-02	2.70E-02
Cs-134	1.9830E-03	534.24	1,068.48	0.00E+00	1.06E+00	2.12E+00
Cs-135	4.2564E-06	534.24	1,068.48	0.00E+00	2.27E-03	4.55E-03
Cs-137	1.8141E+00	534.24	1,068.48	0.00E+00	9.69E+02	1.94E+03
Eu-154	3.4733E-02	534.24	1,068.48	0.00E+00	1.86E+01	3.71E+01
Eu-155	7.1081E-03	534.24	1,068.48	0.00E+00	3.80E+00	7.59E+00
Fe-55	3.5790E-04	534.24	1,068.48	0.00E+00	1.91E-01	3.82E-01
H-3	3.4945E-03	534.24	1,068.48	0.00E+00	1.87E+00	3.73E+00
I-129	6.6403E-07	534.24	1,068.48	0.00E+00	3.55E-04	7.10E-04
Kr-85	7.8250E-02	534.24	1,068.48	0.00E+00	4.18E+01	8.36E+01
Np-237	3.1567E-05	534.24	1,068.48	0.00E+00	1.69E-02	3.37E-02
Pa-231	1.3372E-09	534.24	1,068.48	0.00E+00	7.14E-07	1.43E-06
Pb-210	3.0644E-11	534.24	1,068.48	0.00E+00	1.64E-08	3.27E-08
Pm-147	6.5188E-03	534.24	1,068.48	0.00E+00	3.48E+00	6.97E+00
Pu-238	1.4769E-01	534.24	1,068.48	0.00E+00	7.89E+01	1.58E+02
Pu-239	6.9502E-04	534.24	1,068.48	0.00E+00	3.71E-01	7.43E-01
Pu-240	3.7928E-04	534.24	1,068.48	0.00E+00	2.03E-01	4.05E-01
Pu-241	1.0565E-01	534.24	1,068.48	0.00E+00	5.64E+01	1.13E+02
Pu-242	3.0911E-06	534.24	1,068.48	0.00E+00	1.65E-03	3.30E-03
Ra-226	1.1081E-10	534.24	1,068.48	0.00E+00	5.92E-08	1.18E-07
Ra-228	2.1185E-14	534.24	1,068.48	0.00E+00	1.13E-11	2.26E-11
Ru-106	2.3621E-07	534.24	1,068.48	0.00E+00	1.26E-04	2.52E-04
Se-79	1.2339E-05	534.24	1,068.48	0.00E+00	6.59E-03	1.32E-02
Sn-126	1.0194E-05	534.24	1,068.48	0.00E+00	5.45E-03	1.09E-02
Sr-90	1.6932E+00	534.24	1,068.48	0.00E+00	9.05E+02	1.81E+03
Tc-99	3.8056E-04	534.24	1,068.48	0.00E+00	2.03E-01	4.07E-01
Th-229	9.1252E-12	534.24	1,068.48	0.00E+00	4.88E-09	9.75E-09
Th-230	1.5407E-08	534.24	1,068.48	0.00E+00	8.23E-06	1.65E-05
Th-232	2.8937E-14	534.24	1,068.48	0.00E+00	1.55E-11	3.09E-11
Tl-208	4.7272E-08	534.24	1,068.48	0.00E+00	2.53E-05	5.05E-05
U-232	1.2855E-07	534.24	1,068.48	0.00E+00	6.87E-05	1.37E-04
U-233	5.1470E-09	534.24	1,068.48	0.00E+00	2.75E-06	5.50E-06
U-234	5.6069E-05	534.24	1,068.48	0.00E+00	3.00E-02	5.99E-02
U-235	-2.8661E-06	534.24	0.00	1.02E-02	8.63E-03	1.02E-02
U-236	1.6701E-05	534.24	1,068.48	0.00E+00	8.92E-03	1.78E-02
U-238	-9.4194E-09	534.24	0.00	1.18E-04	1.13E-04	1.18E-04
Y-90	1.6932E+00	534.24	1,068.48	0.00E+00	9.05E+02	1.81E+03
Other Radionuclides					9.27E+02	1.85E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.002E+14
0.0250	2.062E+13
0.0375	1.820E+13
0.0575	1.942E+13
0.0850	1.169E+13
0.1250	8.110E+12
0.2250	1.009E+13
0.3750	4.367E+12
0.5750	7.240E+13
0.8500	1.426E+12
1.2500	9.625E+11
1.7500	3.984E+10
2.2500	2.147E+06
2.7500	1.846E+06
3.5000	6.337E+04
5.0000	2.686E+04
7.0000	3.081E+03
11.0000	3.529E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+01	2.77E+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 %:	93.06930693	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		534.24	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,068.48	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.24	
Bounding:	0.48	

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: H. B. ROBINSON
SNF ID #: 99
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.547kg; EOL=0.52kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: (Worst Case)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	25.85	51.70	0.00E+00	6.51E-05	1.30E-04
Am-241	8.6432E+00	25.85	51.70	0.00E+00	2.23E+02	4.47E+02
Am-242m	1.5728E-02	25.85	51.70	0.00E+00	4.07E-01	8.13E-01
Am-243	1.6288E-02	25.85	51.70	0.00E+00	4.21E-01	8.42E-01
C-14	1.2068E-01	25.85	51.70	0.00E+00	3.12E+00	6.24E+00
Cl-36	2.2849E-03	25.85	51.70	0.00E+00	5.91E-02	1.18E-01
Cm-243	6.0144E-04	25.85	51.70	0.00E+00	1.55E-02	3.11E-02
Cm-244	9.4880E-02	25.85	51.70	0.00E+00	2.45E+00	4.91E+00
Co-60	3.9052E+00	25.85	51.70	0.00E+00	1.01E+02	2.02E+02
Cs-134	2.2139E-06	25.85	51.70	0.00E+00	5.72E-05	1.14E-04
Cs-135	4.3976E-04	25.85	51.70	0.00E+00	1.14E-02	2.27E-02
Cs-137	1.4887E+01	25.85	51.70	0.00E+00	3.85E+02	7.70E+02
Eu-154	3.7342E-01	25.85	51.70	0.00E+00	9.65E+00	1.93E+01
Eu-155	8.4893E-03	25.85	51.70	0.00E+00	2.19E-01	4.39E-01
Fe-55	5.3750E-03	25.85	51.70	0.00E+00	1.39E-01	2.78E-01
H-3	1.0472E-01	25.85	51.70	0.00E+00	2.71E+00	5.41E+00
I-129	1.0618E-05	25.85	51.70	0.00E+00	2.74E-04	5.49E-04
Kr-85	2.2717E-01	25.85	51.70	0.00E+00	5.87E+00	1.17E+01
Np-237	1.6400E-04	25.85	51.70	0.00E+00	4.24E-03	8.48E-03
Pa-231	2.8688E-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
Se-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.428E+13
0.0250	8.654E+12
0.0375	7.317E+12
0.0575	1.382E+13
0.0850	4.633E+12
0.1250	3.278E+12
0.2250	4.009E+12
0.3750	1.735E+12
0.5750	2.872E+13
0.8500	6.290E+11
1.2500	1.542E+13
1.7500	1.853E+10
2.2500	8.014E+07
2.7500	1.379E+08
3.5000	8.338E+04
5.0000	3.523E+04
7.0000	4.010E+03
11.0000	4.573E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.55E+01	3.06E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:	2.897	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:		25.85
Bounding:	16.42	51.70

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:	1.41	
Bounding:	2.82	3.15

Estimated EOL HM/Given EOL HM: 31.56

[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: HFBR
SNF ID #: 706
Fuel Units & Descr: 1050 - 18 CURVED PLATES
Heavy Metal Mass: BOL=394.8kg; EOL=282.24kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 35 years

Estimated Canister usage: 16"x10' 29.17

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.5869E-10	103,679.35	207,358.71	0.00E+00	9.94E-05	1.99E-04
Am-241	1.0109E-02	103,679.35	207,358.71	0.00E+00	1.05E+03	2.10E+03
Am-242m	1.2789E-06	103,679.35	207,358.71	0.00E+00	1.33E-01	2.65E-01
Am-243	3.7047E-05	103,679.35	207,358.71	0.00E+00	3.84E+00	7.68E+00
C-14	2.6416E-08	103,679.35	207,358.71	0.00E+00	2.74E-03	5.48E-03
Cl-36	4.4441E-31	103,679.35	207,358.71	0.00E+00	4.61E-26	9.22E-26
Cm-243	3.9605E-06	103,679.35	207,358.71	0.00E+00	4.11E-01	8.21E-01
Cm-244	2.6227E-03	103,679.35	207,358.71	0.00E+00	2.72E+02	5.44E+02
Co-60	6.7740E-06	103,679.35	207,358.71	0.00E+00	7.02E-01	1.40E+00
Cs-134	6.8894E-05	103,679.35	207,358.71	0.00E+00	7.14E+00	1.43E+01
Cs-135	4.2564E-06	103,679.35	207,358.71	0.00E+00	4.41E-01	8.83E-01
Cs-137	1.4399E+00	103,679.35	207,358.71	0.00E+00	1.49E+05	2.99E+05
Eu-154	1.5522E-02	103,679.35	207,358.71	0.00E+00	1.61E+03	3.22E+03
Eu-155	1.7588E-03	103,679.35	207,358.71	0.00E+00	1.82E+02	3.65E+02
Fe-55	2.4933E-05	103,679.35	207,358.71	0.00E+00	2.59E+00	5.17E+00
H-3	1.9945E-03	103,679.35	207,358.71	0.00E+00	2.07E+02	4.14E+02
I-129	6.6403E-07	103,679.35	207,358.71	0.00E+00	6.88E-02	1.38E-01
Kr-85	4.1002E-02	103,679.35	207,358.71	0.00E+00	4.25E+03	8.50E+03
Np-237	3.1610E-05	103,679.35	207,358.71	0.00E+00	3.28E+00	6.55E+00
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	3.8056E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.532E+16
0.0250	3.147E+15
0.0375	2.758E+15
0.0575	2.967E+15
0.0850	1.776E+15
0.1250	1.198E+15
0.2250	1.534E+15
0.3750	6.660E+14
0.5750	1.112E+16
0.8500	1.648E+14
1.2500	9.844E+13
1.7500	4.657E+12
2.2500	3.224E+08
2.7500	3.241E+08
3.5000	6.616E+06
5.0000	3.661E+06
7.0000	4.192E+05
11.0000	4.797E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.19E+03	4.37E+03
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 %:	93.08510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		103,679.35	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		207,358.71	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.60	
Bounding:	1.20	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (INNER)
SNF ID #: 103
Fuel Units & Design: 442 - 171 CURVED PLATES
Heavy Metal Mass: BOL=1234.506kg; EOL=623.667kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: $18^{*}x10^{4}$ 147.33

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	389,072.50	778,145.01	0.00E+00	7.81E-04	1.56E-03
Am-241	2.5251E-03	389,072.50	778,145.01	0.00E+00	9.82E+02	1.96E+03
Am-242m	3.9624E-07	389,072.50	778,145.01	0.00E+00	1.54E-01	3.08E-01
Am-243	1.4880E-06	389,072.50	778,145.01	0.00E+00	5.79E-01	1.16E+00
C-14	5.7053E-09	389,072.50	778,145.01	0.00E+00	2.22E-03	4.44E-03
Cl-36	1.3124E-32	389,072.50	778,145.01	0.00E+00	5.11E-27	1.02E-26
Cm-243	1.1419E-07	389,072.50	778,145.01	0.00E+00	4.44E-02	8.89E-02
Cm-244	1.6522E-05	389,072.50	778,145.01	0.00E+00	6.43E+00	1.29E+01
Co-60	7.4047E-07	389,072.50	778,145.01	0.00E+00	2.88E-01	5.76E-01
Cs-134	2.0455E-05	389,072.50	778,145.01	0.00E+00	7.96E+00	1.59E+01
Cs-135	3.4477E-06	389,072.50	778,145.01	0.00E+00	1.34E+00	2.68E+00
Cs-137	1.4365E+00	389,072.50	778,145.01	0.00E+00	5.59E+05	1.12E+06
Eu-154	7.3230E-03	389,072.50	778,145.01	0.00E+00	2.85E+03	5.70E+03
Eu-155	5.9259E-04	389,072.50	778,145.01	0.00E+00	2.31E+02	4.61E+02
Fe-55	2.2791E-06	389,072.50	778,145.01	0.00E+00	8.87E-01	1.77E+00
H-3	1.9698E-03	389,072.50	778,145.01	0.00E+00	7.66E+02	1.53E+03
I-129	7.5300E-07	389,072.50	778,145.01	0.00E+00	2.93E-01	5.86E-01
Kr-85	4.1176E-02	389,072.50	778,145.01	0.00E+00	1.60E+04	3.20E+04
Np-237	9.5752E-06	389,072.50	778,145.01	0.00E+00	3.73E+00	7.45E+00
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
Tl-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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.731E+16
0.0250	1.190E+16
0.0375	1.034E+16
0.0575	1.113E+16
0.0850	6.709E+15
0.1250	4.431E+15
0.2250	5.791E+15
0.3750	2.520E+15
0.5750	4.164E+16
0.8500	5.086E+14
1.2500	2.460E+14
1.7500	1.385E+13
2.2500	1.158E+09
2.7500	1.105E+09
3.5000	6.402E+05
5.0000	2.616E+05
7.0000	2.862E+04
11.0000	3.192E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.51E+03	1.30E+04
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 %:	92.954	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	283,936.38	389,072.50	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		778,145.01	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	1.37
Bounding:	2.00	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (INNER)
SNF ID #: 1083
Fuel Units & Descr: 54 - 171 CURVED PLATES
Heavy Metal Mass: BOL=148.446kg; EOL=115.285kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	34,142.58	68,285.16	0.00E+00	6.85E-05	1.37E-04
Am-241	2.5251E-03	34,142.58	68,285.16	0.00E+00	8.62E+01	1.72E+02
Am-242m	3.9624E-07	34,142.58	68,285.16	0.00E+00	1.35E-02	2.71E-02
Am-243	1.4880E-06	34,142.58	68,285.16	0.00E+00	5.08E-02	1.02E-01
C-14	5.7053E-09	34,142.58	68,285.16	0.00E+00	1.95E-04	3.90E-04
Cl-36	1.3124E-32	34,142.58	68,285.16	0.00E+00	4.48E-28	8.96E-28
Cm-243	1.1419E-07	34,142.58	68,285.16	0.00E+00	3.90E-03	7.80E-03
Cm-244	1.6522E-05	34,142.58	68,285.16	0.00E+00	5.64E-01	1.13E+00
Co-60	7.4047E-07	34,142.58	68,285.16	0.00E+00	2.53E-02	5.06E-02
Cs-134	2.0455E-05	34,142.58	68,285.16	0.00E+00	6.98E-01	1.40E+00
Cs-135	3.4477E-06	34,142.58	68,285.16	0.00E+00	1.18E-01	2.35E-01
Cs-137	1.4365E+00	34,142.58	68,285.16	0.00E+00	4.90E+04	9.81E+04
Eu-154	7.3230E-03	34,142.58	68,285.16	0.00E+00	2.50E+02	5.00E+02
Eu-155	5.9259E-04	34,142.58	68,285.16	0.00E+00	2.02E+01	4.05E+01
Fe-55	2.2791E-06	34,142.58	68,285.16	0.00E+00	7.78E-02	1.56E-01
H-3	1.9698E-03	34,142.58	68,285.16	0.00E+00	6.73E+01	1.35E+02
I-129	7.5300E-07	34,142.58	68,285.16	0.00E+00	2.57E-02	5.14E-02
Kr-85	4.1176E-02	34,142.58	68,285.16	0.00E+00	1.41E+03	2.81E+03
Np-237	9.5752E-06	34,142.58	68,285.16	0.00E+00	3.27E-01	6.54E-01
Pa-231	3.9379E-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	3.8371E-14	34,142.58	68,285.16	0.00E+00	1.31E-09	2.62E-09
Tl-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
U-233	3.6275E-09	34,142.58	68,285.16	0.00E+00	1.24E-04	2.48E-04
U-234	1.8562E-04	34,142.58	68,285.16	0.00E+00	6.34E+00	1.27E+01
U-235	-2.7235E-06	34,142.58	0.00	2.99E-01	2.06E-01	2.99E-01
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.029E+15
0.0250	1.044E+15
0.0375	9.077E+14
0.0575	9.771E+14
0.0850	5.887E+14
0.1250	3.889E+14
0.2250	5.082E+14
0.3750	2.211E+14
0.5750	3.654E+15
0.8500	4.464E+13
1.2500	2.159E+13
1.7500	1.215E+12
2.2500	1.016E+08
2.7500	9.697E+07
3.5000	5.618E+04
5.0000	2.296E+04
7.0000	2.512E+03
11.0000	2.801E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.71E+02	1.14E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.141	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	34,142.58	31,404.49	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		68,285.16	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (OUTER)
SNF ID #: 707
Fuel Units & Descr: 54 - 369 CURVED PLATES
Heavy Metal Mass: BOL=388.687kg; EOL=322.364kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	89,397.92	178,795.84	0.00E+00	1.79E-04	3.59E-04
Am-241	2.5251E-03	89,397.92	178,795.84	0.00E+00	2.26E+02	4.51E+02
Am-242m	3.9624E-07	89,397.92	178,795.84	0.00E+00	3.54E-02	7.08E-02
Am-243	1.4880E-06	89,397.92	178,795.84	0.00E+00	1.33E-01	2.66E-01
C-14	5.7053E-09	89,397.92	178,795.84	0.00E+00	5.10E-04	1.02E-03
Cl-36	1.3124E-32	89,397.92	178,795.84	0.00E+00	1.17E-27	2.35E-27
Cm-243	1.1419E-07	89,397.92	178,795.84	0.00E+00	1.02E-02	2.04E-02
Cm-244	1.6522E-05	89,397.92	178,795.84	0.00E+00	1.48E+00	2.95E+00
Co-60	7.4047E-07	89,397.92	178,795.84	0.00E+00	6.62E-02	1.32E-01
Cs-134	2.0455E-05	89,397.92	178,795.84	0.00E+00	1.83E+00	3.66E+00
Cs-135	3.4477E-06	89,397.92	178,795.84	0.00E+00	3.08E-01	6.16E-01
Cs-137	1.4365E+00	89,397.92	178,795.84	0.00E+00	1.28E+05	2.57E+05
Eu-154	7.3230E-03	89,397.92	178,795.84	0.00E+00	6.55E+02	1.31E+03
Eu-155	5.9259E-04	89,397.92	178,795.84	0.00E+00	5.30E+01	1.06E+02
Fe-55	2.2791E-06	89,397.92	178,795.84	0.00E+00	2.04E-01	4.08E-01
H-3	1.9698E-03	89,397.92	178,795.84	0.00E+00	1.76E+02	3.52E+02
I-129	7.5300E-07	89,397.92	178,795.84	0.00E+00	6.73E-02	1.35E-01
Kr-85	4.1176E-02	89,397.92	178,795.84	0.00E+00	3.68E+03	7.36E+03
Np-237	9.5752E-06	89,397.92	178,795.84	0.00E+00	8.56E-01	1.71E+00
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-06	2.22E-06
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.317E+16
0.0250	2.734E+15
0.0375	2.377E+15
0.0575	2.558E+15
0.0850	1.541E+15
0.1250	1.018E+15
0.2250	1.331E+15
0.3750	5.789E+14
0.5750	9.568E+15
0.8500	1.169E+14
1.2500	5.653E+13
1.7500	3.181E+12
2.2500	2.660E+08
2.7500	2.539E+08
3.5000	1.471E+05
5.0000	6.011E+04
7.0000	6.578E+03
11.0000	7.334E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.50E+03	2.99E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.141	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
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

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	0.70
Bounding:	1.46	

Estimated EOL HM/Given EOL HM: 0.93

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (OUTER)
SNF ID #: 1084
Fuel Units & Descr: 442 - 369 CURVED PLATES
Heavy Metal Mass: BOL=3232.39kg; EOL=2303.174kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage:
24"x10'
147.33

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	879,986.15	1,759,972.29	0.00E+00	1.77E-03	3.53E-03
Am-241	2.5251E-03	879,986.15	1,759,972.29	0.00E+00	2.22E+03	4.44E+03
Am-242m	3.9624E-07	879,986.15	1,759,972.29	0.00E+00	3.49E-01	6.97E-01
Am-243	1.4880E-06	879,986.15	1,759,972.29	0.00E+00	1.31E+00	2.62E+00
C-14	5.7053E-09	879,986.15	1,759,972.29	0.00E+00	5.02E-03	1.00E-02
Cl-36	1.3124E-32	879,986.15	1,759,972.29	0.00E+00	1.15E-26	2.31E-26
Cm-243	1.1419E-07	879,986.15	1,759,972.29	0.00E+00	1.00E-01	2.01E-01
Cm-244	1.6522E-05	879,986.15	1,759,972.29	0.00E+00	1.45E+01	2.91E+01
Co-60	7.4047E-07	879,986.15	1,759,972.29	0.00E+00	6.52E-01	1.30E+00
Cs-134	2.0455E-05	879,986.15	1,759,972.29	0.00E+00	1.80E+01	3.60E+01
Cs-135	3.4477E-06	879,986.15	1,759,972.29	0.00E+00	3.03E+00	6.07E+00
Cs-137	1.4365E+00	879,986.15	1,759,972.29	0.00E+00	1.26E+06	2.53E+06
Eu-154	7.3230E-03	879,986.15	1,759,972.29	0.00E+00	6.44E+03	1.29E+04
Eu-155	5.9259E-04	879,986.15	1,759,972.29	0.00E+00	5.21E+02	1.04E+03
Fe-55	2.2791E-06	879,986.15	1,759,972.29	0.00E+00	2.01E+00	4.01E+00
H-3	1.9698E-03	879,986.15	1,759,972.29	0.00E+00	1.73E+03	3.47E+03
I-129	7.5300E-07	879,986.15	1,759,972.29	0.00E+00	6.63E-01	1.33E+00
Kr-85	4.1176E-02	879,986.15	1,759,972.29	0.00E+00	3.62E+04	7.25E+04
Np-237	9.5752E-06	879,986.15	1,759,972.29	0.00E+00	8.43E+00	1.69E+01
Pa-231	3.9379E-09	879,986.15	1,759,972.29	0.00E+00	3.47E-03	6.93E-03
Pb-210	3.3115E-10	879,986.15	1,759,972.29	0.00E+00	2.91E-04	5.83E-04
Pm-147	9.2402E-04	879,986.15	1,759,972.29	0.00E+00	8.13E+02	1.63E+03
Pu-238	1.6217E-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	1.6242E-02	879,986.15	1,759,972.29	0.00E+00	1.43E+04	2.86E+04
Pu-242	3.6329E-07	879,986.15	1,759,972.29	0.00E+00	3.20E-01	6.39E-01
Ra-226	9.0114E-10	879,986.15	1,759,972.29	0.00E+00	7.93E-04	1.59E-03
Ra-228	3.1019E-14	879,986.15	1,759,972.29	0.00E+00	2.73E-08	5.46E-08
Ru-106	2.1225E-10	879,986.15	1,759,972.29	0.00E+00	1.87E-04	3.74E-04
Se-79	1.2930E-05	879,986.15	1,759,972.29	0.00E+00	1.14E+01	2.28E+01
Sn-126	1.1571E-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	3.38E-08	6.75E-08
Tl-208	4.0414E-08	879,986.15	1,759,972.29	0.00E+00	3.56E-02	7.11E-02
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	1.8562E-04	879,986.15	1,759,972.29	0.00E+00	1.63E+02	3.27E+02
U-235	-2.7235E-06	879,986.15	0.00	6.49E+00	4.10E+00	6.49E+00
U-236	1.5493E-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	0.00	7.65E-02	7.28E-02	7.65E-02
Y-90	1.3475E+00	879,986.15	1,759,972.29	0.00E+00	1.19E+06	2.37E+06
Other Radionuclides					1.20E+06	2.41E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.296E+17
0.0250	2.692E+16
0.0375	2.340E+16
0.0575	2.518E+16
0.0850	1.517E+16
0.1250	1.002E+16
0.2250	1.310E+16
0.3750	5.699E+15
0.5750	9.418E+16
0.8500	1.150E+15
1.2500	5.564E+14
1.7500	3.132E+13
2.2500	2.618E+09
2.7500	2.499E+09
3.5000	1.448E+06
5.0000	5.917E+05
7.0000	6.475E+04
11.0000	7.219E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.47E+04	2.95E+04
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 %:	92.954	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	743,449.75	879,986.15	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,759,972.29	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.87	1.18
Bounding:	1.73	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	5.4520E-10	10,655.32	21,310.64	0.00E+00	5.81E-06	1.16E-05
Am-241	9.2284E-03	10,655.32	21,310.64	0.00E+00	9.83E+01	1.97E+02
Am-242m	1.3390E-06	10,655.32	21,310.64	0.00E+00	1.43E-02	2.85E-02
Am-243	3.7084E-05	10,655.32	21,310.64	0.00E+00	3.95E-01	7.90E-01
C-14	2.6452E-08	10,655.32	21,310.64	0.00E+00	2.82E-04	5.64E-04
Cl-36	4.4441E-31	10,655.32	21,310.64	0.00E+00	4.74E-27	9.47E-27
Cm-243	5.0498E-06	10,655.32	21,310.64	0.00E+00	5.38E-02	1.08E-01
Cm-244	3.8451E-03	10,655.32	21,310.64	0.00E+00	4.10E+01	8.19E+01
Co-60	2.5225E-05	10,655.32	21,310.64	0.00E+00	2.69E-01	5.38E-01
Cs-134	1.9830E-03	10,655.32	21,310.64	0.00E+00	2.11E+01	4.23E+01
Cs-135	4.2564E-06	10,655.32	21,310.64	0.00E+00	4.54E-02	9.07E-02
Cs-137	1.8141E+00	10,655.32	21,310.64	0.00E+00	1.93E+04	3.87E+04
Eu-154	3.4733E-02	10,655.32	21,310.64	0.00E+00	3.70E+02	7.40E+02
Eu-155	7.1081E-03	10,655.32	21,310.64	0.00E+00	7.57E+01	1.51E+02
Fe-55	3.5790E-04	10,655.32	21,310.64	0.00E+00	3.81E+00	7.63E+00
H-3	3.4945E-03	10,655.32	21,310.64	0.00E+00	3.72E+01	7.45E+01
I-129	6.6403E-07	10,655.32	21,310.64	0.00E+00	7.08E-03	1.42E-02
Kr-85	7.8250E-02	10,655.32	21,310.64	0.00E+00	8.34E+02	1.67E+03
Np-237	3.1567E-05	10,655.32	21,310.64	0.00E+00	3.36E-01	6.73E-01
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-06	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
Tl-208	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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.998E+15
0.0250	4.112E+14
0.0375	3.631E+14
0.0575	3.872E+14
0.0850	2.331E+14
0.1250	1.617E+14
0.2250	2.012E+14
0.3750	8.710E+13
0.5750	1.444E+15
0.8500	2.844E+13
1.2500	1.920E+13
1.7500	7.945E+11
2.2500	4.283E+07
2.7500	3.682E+07
3.5000	1.264E+06
5.0000	5.358E+05
7.0000	6.146E+04
11.0000	7.039E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.76E+02	8.53E+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 HM Constituents:	U	U
BOL Enrichment %:	79.82555621	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		10,655.32	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		21,310.64	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

[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: HOR (NETHERLANDS)
SNF ID #: 713
Fuel Units & Descr: 33 - ASSEMBLY
Heavy Metal Mass: BOL=6.55kg; EOL=4.01kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1968
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	2,406.38	4,812.75	0.00E+00	4.83E-06	9.66E-06
Am-241	2.5251E-03	2,406.38	4,812.75	0.00E+00	6.08E+00	1.22E+01
Am-242m	3.9624E-07	2,406.38	4,812.75	0.00E+00	9.54E-04	1.91E-03
Am-243	1.4880E-06	2,406.38	4,812.75	0.00E+00	3.58E-03	7.16E-03
C-14	5.7053E-09	2,406.38	4,812.75	0.00E+00	1.37E-05	2.75E-05
Cl-36	1.3124E-32	2,406.38	4,812.75	0.00E+00	3.16E-29	6.32E-29
Cm-243	1.1419E-07	2,406.38	4,812.75	0.00E+00	2.75E-04	5.50E-04
Cm-244	1.6522E-05	2,406.38	4,812.75	0.00E+00	3.98E-02	7.95E-02
Co-60	7.4047E-07	2,406.38	4,812.75	0.00E+00	1.78E-03	3.56E-03
Cs-134	2.0455E-05	2,406.38	4,812.75	0.00E+00	4.92E-02	9.84E-02
Cs-135	3.4477E-06	2,406.38	4,812.75	0.00E+00	8.30E-03	1.66E-02
Cs-137	1.4365E+00	2,406.38	4,812.75	0.00E+00	3.46E+03	6.91E+03
Eu-154	7.3230E-03	2,406.38	4,812.75	0.00E+00	1.76E+01	3.52E+01
Eu-155	5.9259E-04	2,406.38	4,812.75	0.00E+00	1.43E+00	2.85E+00
Fe-55	2.2791E-06	2,406.38	4,812.75	0.00E+00	5.48E-03	1.10E-02
H-3	1.9698E-03	2,406.38	4,812.75	0.00E+00	4.74E+00	9.48E+00
I-129	7.5300E-07	2,406.38	4,812.75	0.00E+00	1.81E-03	3.62E-03
Kr-85	4.1176E-02	2,406.38	4,812.75	0.00E+00	9.91E+01	1.98E+02
Np-237	9.5752E-06	2,406.38	4,812.75	0.00E+00	2.30E-02	4.61E-02
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	3.8371E-14	2,406.38	4,812.75	0.00E+00	9.23E-11	1.85E-10
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.545E+14
0.0250	7.360E+13
0.0375	6.398E+13
0.0575	6.886E+13
0.0850	4.149E+13
0.1250	2.741E+13
0.2250	3.582E+13
0.3750	1.558E+13
0.5750	2.575E+14
0.8500	3.146E+12
1.2500	1.522E+12
1.7500	8.564E+10
2.2500	7.160E+06
2.7500	6.834E+06
3.5000	3.959E+03
5.0000	1.618E+03
7.0000	1.770E+02
11.0000	1.974E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.83E+01	8.05E+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 %:	93.13062871	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		2,406.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,812.75	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

[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: HTRE (ANP)
SNF ID #: 105
Fuel Units & Descr: 13 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=4.55kg; EOL=4.039kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 65 years

Estimated Canister usage: $18^{*}x10^{6}$ 0.36

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	482.62	965.24	0.00E+00	2.22E-05	4.43E-05
Am-241	1.1471E-04	482.62	965.24	0.00E+00	5.54E-02	1.11E-01
Am-242m	7.4210E-09	482.62	965.24	0.00E+00	3.58E-06	7.16E-06
Am-243	9.8236E-10	482.62	965.24	0.00E+00	4.74E-07	9.48E-07
C-14	2.2928E-04	482.62	965.24	0.00E+00	1.11E-01	2.21E-01
Cl-36	1.2260E-06	482.62	965.24	0.00E+00	5.92E-04	1.18E-03
Cm-243	1.2000E-10	482.62	965.24	0.00E+00	5.79E-08	1.16E-07
Cm-244	7.3577E-10	482.62	965.24	0.00E+00	3.55E-07	7.10E-07
Co-60	1.3732E-03	482.62	965.24	0.00E+00	6.63E-01	1.33E+00
Cs-134	1.2709E-10	482.62	965.24	0.00E+00	6.13E-08	1.23E-07
Cs-135	3.0316E-05	482.62	965.24	0.00E+00	1.46E-02	2.93E-02
Cs-137	7.2579E-01	482.62	965.24	0.00E+00	3.50E+02	7.01E+02
Eu-154	5.9750E-05	482.62	965.24	0.00E+00	2.88E-02	5.77E-02
Eu-155	1.0577E-05	482.62	965.24	0.00E+00	5.10E-03	1.02E-02
Fe-55	4.1631E-07	482.62	965.24	0.00E+00	2.01E-04	4.02E-04
H-3	4.6722E-04	482.62	965.24	0.00E+00	2.25E-01	4.51E-01
I-129	7.3195E-07	482.62	965.24	0.00E+00	3.53E-04	7.07E-04
Kr-85	5.9418E-03	482.62	965.24	0.00E+00	2.87E+00	5.74E+00
Np-237	1.1499E-06	482.62	965.24	0.00E+00	5.55E-04	1.11E-03
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
Sn-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
Tl-208	1.6228E-08	482.62	965.24	0.00E+00	7.83E-06	1.57E-05
U-232	4.3960E-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.523E+13
0.0250	7.320E+12
0.0375	6.361E+12
0.0575	6.826E+12
0.0850	4.123E+12
0.1250	2.673E+12
0.2250	3.553E+12
0.3750	1.550E+12
0.5750	2.607E+13
0.8500	2.532E+11
1.2500	1.833E+11
1.7500	6.513E+09
2.2500	1.232E+08
2.7500	5.517E+06
3.5000	5.624E+01
5.0000	2.323E+01
7.0000	2.568E+00
11.0000	2.884E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.93E+00	7.86E+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:	NICHROME	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		482.62
Bounding:		965.24

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:	2.27	
Bounding:	4.55	

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: HWCTR 3EMT-2 (UMO)
SNF ID #: 118
Fuel Units & Descr: 7 - TUBE
Heavy Metal Mass: BOL= ; EOL=8.108kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	7,772.05	7,772.05	0.00E+00	6.06E-05	6.06E-05
Am-241	2.3560E-02	7,772.05	7,772.05	0.00E+00	1.83E+02	1.83E+02
Am-242m	3.0880E-06	7,772.05	7,772.05	0.00E+00	2.40E-02	2.40E-02
Am-243	2.0520E-06	7,772.05	7,772.05	0.00E+00	1.59E-02	1.59E-02
C-14	1.1222E-03	7,772.05	7,772.05	0.00E+00	8.72E+00	8.72E+00
Cl-36	8.3760E-11	7,772.05	7,772.05	0.00E+00	6.51E-07	6.51E-07
Cm-243	2.4260E-07	7,772.05	7,772.05	0.00E+00	1.89E-03	1.89E-03
Cm-244	3.3140E-06	7,772.05	7,772.05	0.00E+00	2.58E-02	2.58E-02
Co-60	1.2454E-03	7,772.05	7,772.05	0.00E+00	9.68E+00	9.68E+00
Cs-134	3.3040E-10	7,772.05	7,772.05	0.00E+00	2.57E-06	2.57E-06
Cs-135	7.9140E-06	7,772.05	7,772.05	0.00E+00	6.15E-02	6.15E-02
Cs-137	7.1580E-01	7,772.05	7,772.05	0.00E+00	5.56E+03	5.56E+03
Eu-154	6.0500E-04	7,772.05	7,772.05	0.00E+00	4.70E+00	4.70E+00
Eu-155	9.4860E-06	7,772.05	7,772.05	0.00E+00	7.37E-02	7.37E-02
Fe-55	1.9322E-08	7,772.05	7,772.05	0.00E+00	1.50E-04	1.50E-04
H-3	4.4180E-03	7,772.05	7,772.05	0.00E+00	3.43E+01	3.43E+01
I-129	7.5020E-07	7,772.05	7,772.05	0.00E+00	5.83E-03	5.83E-03
Kr-85	5.4940E-03	7,772.05	7,772.05	0.00E+00	4.27E+01	4.27E+01
Np-237	5.8040E-06	7,772.05	7,772.05	0.00E+00	4.51E-02	4.51E-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-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.660E+14
0.0250	5.494E+13
0.0375	4.837E+13
0.0575	5.357E+13
0.0850	3.082E+13
0.1250	2.003E+13
0.2250	2.653E+13
0.3750	1.155E+13
0.5750	2.066E+14
0.8500	1.974E+12
1.2500	1.426E+12
1.7500	5.100E+10
2.2500	9.178E+06
2.7500	9.536E+06
3.5000	3.886E+04
5.0000	1.631E+04
7.0000	1.834E+03
11.0000	2.080E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.38E+01	7.38E+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:	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:		7,772.05
Bounding:		7,772.05

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR DRIVER (U-ZR) HEU
SNF ID #: 117
Fuel Units & Descr: 76 - TUBE
Heavy Metal Mass: BOL= ; EOL=36.13kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated Canister usage: 18"x15" 3.45

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	34,632.91	34,632.91	0.00E+00	2.70E-04	2.70E-04
Am-241	2.3560E-02	34,632.91	34,632.91	0.00E+00	8.16E+02	8.16E+02
Am-242m	3.0880E-06	34,632.91	34,632.91	0.00E+00	1.07E-01	1.07E-01
Am-243	2.0520E-06	34,632.91	34,632.91	0.00E+00	7.11E-02	7.11E-02
C-14	1.1222E-03	34,632.91	34,632.91	0.00E+00	3.89E+01	3.89E+01
Cl-36	8.3760E-11	34,632.91	34,632.91	0.00E+00	2.90E-06	2.90E-06
Cm-243	2.4260E-07	34,632.91	34,632.91	0.00E+00	8.40E-03	8.40E-03
Cm-244	3.3140E-06	34,632.91	34,632.91	0.00E+00	1.15E-01	1.15E-01
Co-60	1.2454E-03	34,632.91	34,632.91	0.00E+00	4.31E+01	4.31E+01
Cs-134	3.3040E-10	34,632.91	34,632.91	0.00E+00	1.14E-05	1.14E-05
Cs-135	7.9140E-06	34,632.91	34,632.91	0.00E+00	2.74E-01	2.74E-01
Cs-137	7.1580E-01	34,632.91	34,632.91	0.00E+00	2.48E+04	2.48E+04
Eu-154	6.0500E-04	34,632.91	34,632.91	0.00E+00	2.10E+01	2.10E+01
Eu-155	9.4860E-06	34,632.91	34,632.91	0.00E+00	3.29E-01	3.29E-01
Fe-55	1.9322E-08	34,632.91	34,632.91	0.00E+00	6.69E-04	6.69E-04
H-3	4.4180E-03	34,632.91	34,632.91	0.00E+00	1.53E+02	1.53E+02
I-129	7.5020E-07	34,632.91	34,632.91	0.00E+00	2.60E-02	2.60E-02
Kr-85	5.4940E-03	34,632.91	34,632.91	0.00E+00	1.90E+02	1.90E+02
Np-237	5.8040E-06	34,632.91	34,632.91	0.00E+00	2.01E-01	2.01E-01
Pa-231	1.1096E-08	34,632.91	34,632.91	0.00E+00	3.84E-04	3.84E-04
Pb-210	1.4712E-06	34,632.91	34,632.91	0.00E+00	5.10E-04	5.10E-04
Pm-147	3.5920E-07	34,632.91	34,632.91	0.00E+00	1.24E-02	1.24E-02
Pu-238	5.0700E-03	34,632.91	34,632.91	0.00E+00	1.76E+02	1.76E+02
Pu-239	1.8728E-02	34,632.91	34,632.91	0.00E+00	6.49E+02	6.49E+02
Pu-240	8.3280E-03	34,632.91	34,632.91	0.00E+00	2.88E+02	2.88E+02
Pu-241	3.4460E-02	34,632.91	34,632.91	0.00E+00	1.19E+03	1.19E+03
Pu-242	2.0380E-06	34,632.91	34,632.91	0.00E+00	7.06E-02	7.06E-02
Ra-226	2.9640E-08	34,632.91	34,632.91	0.00E+00	1.03E-03	1.03E-03
Ra-228	1.1922E-09	34,632.91	34,632.91	0.00E+00	4.13E-05	4.13E-05
Ru-106	3.5780E-19	34,632.91	34,632.91	0.00E+00	1.24E-14	1.24E-14
Se-79	1.2520E-05	34,632.91	34,632.91	0.00E+00	4.34E-01	4.34E-01
Sn-126	1.2050E-05	34,632.91	34,632.91	0.00E+00	4.17E-01	4.17E-01
Sr-90	6.1880E-01	34,632.91	34,632.91	0.00E+00	2.14E+04	2.14E+04
Tc-99	4.4120E-04	34,632.91	34,632.91	0.00E+00	1.53E+01	1.53E+01
Th-229	6.9280E-09	34,632.91	34,632.91	0.00E+00	2.40E-04	2.40E-04
Th-230	1.7084E-06	34,632.91	34,632.91	0.00E+00	5.92E-02	5.92E-02
Th-232	1.1926E-09	34,632.91	34,632.91	0.00E+00	4.13E-05	4.13E-05
Tl-208	3.4740E-08	34,632.91	34,632.91	0.00E+00	1.20E-03	1.20E-03
U-232	9.2940E-08	34,632.91	34,632.91	0.00E+00	3.22E-03	3.22E-03
U-233	9.1680E-07	34,632.91	34,632.91	0.00E+00	3.18E-02	3.18E-02
U-234	2.3440E-03	34,632.91	34,632.91	0.00E+00	8.12E+01	8.12E+01
U-235	-2.3296E-06	34,632.91	0.00	7.81E-03	0.00E+00	7.81E-03
U-236	2.6620E-05	34,632.91	34,632.91	0.00E+00	9.22E-01	9.22E-01
U-238	-1.3291E-07	34,632.91	0.00	2.28E-02	1.82E-02	2.28E-02
Y-90	6.1900E-01	34,632.91	34,632.91	0.00E+00	2.14E+04	2.14E+04
Other Radionuclides					2.37E+04	2.37E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.185E+15
0.0250	2.448E+14
0.0375	2.155E+14
0.0575	2.387E+14
0.0850	1.373E+14
0.1250	8.926E+13
0.2250	1.182E+14
0.3750	5.148E+13
0.5750	9.208E+14
0.8500	8.796E+12
1.2500	6.356E+12
1.7500	2.273E+11
2.2500	4.090E+07
2.7500	4.249E+07
3.5000	1.732E+06
5.0000	7.267E+04
7.0000	8.171E+03
11.0000	9.270E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.29E+02	3.29E+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:	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:		34,632.91
Bounding:		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 twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR ETWO (U METAL) LEU
SNF ID #: 867
Fuel Units & Descr: 6 - TUBE
Heavy Metal Mass: BOL= ; EOL=45.456kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated Canister usage: 18"x15' 0.27

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	7.7980E-09	43,572.00	43,572.00	0.00E+00	3.40E-04	3.40E-04
Am-241	2.3560E-02	43,572.00	43,572.00	0.00E+00	1.03E+03	1.03E+03
Am-242m	3.0880E-06	43,572.00	43,572.00	0.00E+00	1.35E-01	1.35E-01
Am-243	2.0520E-06	43,572.00	43,572.00	0.00E+00	8.94E-02	8.94E-02
C-14	1.1222E-03	43,572.00	43,572.00	0.00E+00	4.89E+01	4.89E+01
Cl-36	8.3760E-11	43,572.00	43,572.00	0.00E+00	3.65E-06	3.65E-06
Cm-243	2.4260E-07	43,572.00	43,572.00	0.00E+00	1.06E-02	1.06E-02
Cm-244	3.3140E-06	43,572.00	43,572.00	0.00E+00	1.44E-01	1.44E-01
Co-60	1.2454E-03	43,572.00	43,572.00	0.00E+00	5.43E+01	5.43E+01
Cs-134	3.3040E-10	43,572.00	43,572.00	0.00E+00	1.44E-05	1.44E-05
Cs-135	7.9140E-06	43,572.00	43,572.00	0.00E+00	3.45E-01	3.45E-01
Cs-137	7.1580E-01	43,572.00	43,572.00	0.00E+00	3.12E+04	3.12E+04
Eu-154	6.0500E-04	43,572.00	43,572.00	0.00E+00	2.64E+01	2.64E+01
Eu-155	9.4860E-06	43,572.00	43,572.00	0.00E+00	4.13E-01	4.13E-01
Fe-55	1.9322E-08	43,572.00	43,572.00	0.00E+00	8.42E-04	8.42E-04
H-3	4.4180E-03	43,572.00	43,572.00	0.00E+00	1.93E+02	1.93E+02
I-129	7.5020E-07	43,572.00	43,572.00	0.00E+00	3.27E-02	3.27E-02
Kr-85	5.4940E-03	43,572.00	43,572.00	0.00E+00	2.39E+02	2.39E+02
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	8.3280E-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	6.9280E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.491E+15
0.0250	3.080E+14
0.0375	2.712E+14
0.0575	3.003E+14
0.0850	1.728E+14
0.1250	1.123E+14
0.2250	1.487E+14
0.3750	6.477E+13
0.5750	1.159E+15
0.8500	1.107E+13
1.2500	7.997E+12
1.7500	2.859E+11
2.2500	5.145E+07
2.7500	5.346E+07
3.5000	2.179E+05
5.0000	9.143E+04
7.0000	1.028E+04
11.0000	1.166E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.14E+02	4.14E+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:	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:	32.63	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IMT (U METAL-SST) DU
SNF ID #: 113
Fuel Units & Descr: 82 - TUBE
Heavy Metal Mass: BOL= ; EOL=92.775kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
[2]Template 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: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.2380E-09	88,573.24	88,573.24	0.00E+00	8.18E-04	8.18E-04
Am-241	2.2020E-01	88,573.24	88,573.24	0.00E+00	1.95E+04	1.95E+04
Am-242m	8.9860E-05	88,573.24	88,573.24	0.00E+00	7.96E+00	7.96E+00
Am-243	5.2240E-05	88,573.24	88,573.24	0.00E+00	4.63E+00	4.63E+00
C-14	2.2080E-02	88,573.24	88,573.24	0.00E+00	1.96E+03	1.96E+03
Cl-36	4.1880E-04	88,573.24	88,573.24	0.00E+00	3.71E+01	3.71E+01
Cm-243	8.0820E-06	88,573.24	88,573.24	0.00E+00	7.16E-01	7.16E-01
Cm-244	2.3260E-04	88,573.24	88,573.24	0.00E+00	2.06E+01	2.06E+01
Co-60	9.9520E-02	88,573.24	88,573.24	0.00E+00	8.81E+03	8.81E+03
Cs-134	7.2160E-10	88,573.24	88,573.24	0.00E+00	6.39E-05	6.39E-05
Cs-135	3.7460E-06	88,573.24	88,573.24	0.00E+00	3.32E-01	3.32E-01
Cs-137	7.2140E-01	88,573.24	88,573.24	0.00E+00	6.39E+04	6.39E+04
Eu-154	8.2120E-04	88,573.24	88,573.24	0.00E+00	7.27E+01	7.27E+01
Eu-155	1.2284E-05	88,573.24	88,573.24	0.00E+00	1.09E+00	1.09E+00
Fe-55	1.8062E-05	88,573.24	88,573.24	0.00E+00	1.60E+00	1.60E+00
H-3	8.2700E-03	88,573.24	88,573.24	0.00E+00	7.33E+02	7.33E+02
I-129	9.1660E-07	88,573.24	88,573.24	0.00E+00	8.12E-02	8.12E-02
Kr-85	4.6540E-03	88,573.24	88,573.24	0.00E+00	4.12E+02	4.12E+02
Np-237	2.1800E-05	88,573.24	88,573.24	0.00E+00	1.93E+00	1.93E+00
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-08	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.835E+15
0.0250	5.483E+14
0.0375	4.892E+14
0.0575	7.546E+14
0.0850	2.925E+14
0.1250	1.900E+14
0.2250	2.497E+14
0.3750	1.084E+14
0.5750	2.360E+15
0.8500	2.002E+13
1.2500	6.595E+14
1.7500	4.938E+11
2.2500	3.511E+09
2.7500	3.689E+08
3.5000	1.862E+08
5.0000	7.734E+05
7.0000	8.611E+04
11.0000	9.708E+03

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

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	SST	SST
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:		88,573.24
Bounding:		88,573.24

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:	32.70	
Bounding:	32.70	

Estimated EOL HM/Given EOL HM: 2.26

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IRO (UO2) LEU
SNF ID #: 976
Fuel Units & Descr: 2 - TUBE
Heavy Metal Mass: BOL= ; EOL=5.407kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	7.7980E-09	5,183.09	5,183.09	0.00E+00	4.04E-05	4.04E-05
Am-241	2.3560E-02	5,183.09	5,183.09	0.00E+00	1.22E+02	1.22E+02
Am-242m	3.0880E-06	5,183.09	5,183.09	0.00E+00	1.60E-02	1.60E-02
Am-243	2.0520E-06	5,183.09	5,183.09	0.00E+00	1.06E-02	1.06E-02
C-14	1.1222E-03	5,183.09	5,183.09	0.00E+00	5.82E+00	5.82E+00
Cl-36	8.3760E-11	5,183.09	5,183.09	0.00E+00	4.34E-07	4.34E-07
Cm-243	2.4260E-07	5,183.09	5,183.09	0.00E+00	1.26E-03	1.26E-03
Cm-244	3.3140E-06	5,183.09	5,183.09	0.00E+00	1.72E-02	1.72E-02
Co-60	1.2454E-03	5,183.09	5,183.09	0.00E+00	6.46E+00	6.46E+00
Cs-134	3.3040E-10	5,183.09	5,183.09	0.00E+00	1.71E-06	1.71E-06
Cs-135	7.9140E-06	5,183.09	5,183.09	0.00E+00	4.10E-02	4.10E-02
Cs-137	7.1580E-01	5,183.09	5,183.09	0.00E+00	3.71E+03	3.71E+03
Eu-154	6.0500E-04	5,183.09	5,183.09	0.00E+00	3.14E+00	3.14E+00
Eu-155	9.4860E-06	5,183.09	5,183.09	0.00E+00	4.92E-02	4.92E-02
Fe-55	1.9322E-08	5,183.09	5,183.09	0.00E+00	1.00E-04	1.00E-04
H-3	4.4180E-03	5,183.09	5,183.09	0.00E+00	2.29E+01	2.29E+01
I-129	7.5020E-07	5,183.09	5,183.09	0.00E+00	3.89E-03	3.89E-03
Kr-85	5.4940E-03	5,183.09	5,183.09	0.00E+00	2.85E+01	2.85E+01
Np-237	5.8040E-06	5,183.09	5,183.09	0.00E+00	3.01E-02	3.01E-02
Pa-231	1.1096E-08	5,183.09	5,183.09	0.00E+00	5.75E-05	5.75E-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	8.85E-03	8.85E-03
Th-232	1.1926E-09	5,183.09	5,183.09	0.00E+00	6.18E-06	6.18E-06
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.774E+14
0.0250	3.664E+13
0.0375	3.226E+13
0.0575	3.572E+13
0.0850	2.055E+13
0.1250	1.336E+13
0.2250	1.769E+13
0.3750	7.705E+12
0.5750	1.378E+14
0.8500	1.316E+12
1.2500	9.513E+11
1.7500	3.401E+10
2.2500	6.121E+06
2.7500	6.360E+06
3.5000	2.592E+04
5.0000	1.068E+04
7.0000	1.223E+03
11.0000	1.387E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.92E+01	4.92E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT 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:		5,183.09
Bounding:		5,183.09

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IS (U-ZR) LEU
SNF ID #: 977
Fuel Units & Descr: 3 - TUBE
Heavy Metal Mass: BOL= ; EOL=15.776kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	15,122.23	15,122.23	0.00E+00	1.18E-04	1.18E-04
Am-241	2.3560E-02	15,122.23	15,122.23	0.00E+00	3.56E+02	3.56E+02
Am-242m	3.0880E-06	15,122.23	15,122.23	0.00E+00	4.67E-02	4.67E-02
Am-243	2.0520E-06	15,122.23	15,122.23	0.00E+00	3.10E-02	3.10E-02
C-14	1.1222E-03	15,122.23	15,122.23	0.00E+00	1.70E+01	1.70E+01
Cl-36	8.3760E-11	15,122.23	15,122.23	0.00E+00	1.27E-06	1.27E-06
Cm-243	2.4260E-07	15,122.23	15,122.23	0.00E+00	3.67E-03	3.67E-03
Cm-244	3.3140E-06	15,122.23	15,122.23	0.00E+00	5.01E-02	5.01E-02
Co-60	1.2454E-03	15,122.23	15,122.23	0.00E+00	1.88E+01	1.88E+01
Cs-134	3.3040E-10	15,122.23	15,122.23	0.00E+00	5.00E-06	5.00E-06
Cs-135	7.9140E-06	15,122.23	15,122.23	0.00E+00	1.20E-01	1.20E-01
Cs-137	7.1580E-01	15,122.23	15,122.23	0.00E+00	1.08E+04	1.08E+04
Eu-154	6.0500E-04	15,122.23	15,122.23	0.00E+00	9.15E+00	9.15E+00
Eu-155	9.4860E-06	15,122.23	15,122.23	0.00E+00	1.43E-01	1.43E-01
Fe-55	1.9322E-08	15,122.23	15,122.23	0.00E+00	2.92E-04	2.92E-04
H-3	4.4180E-03	15,122.23	15,122.23	0.00E+00	6.68E+01	6.68E+01
I-129	7.5020E-07	15,122.23	15,122.23	0.00E+00	1.13E-02	1.13E-02
Kr-85	5.4940E-03	15,122.23	15,122.23	0.00E+00	8.31E+01	8.31E+01
Np-237	5.8040E-06	15,122.23	15,122.23	0.00E+00	8.78E-02	8.78E-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-05	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.176E+14
0.0250	1.069E+14
0.0375	9.411E+13
0.0575	1.042E+14
0.0850	5.996E+13
0.1250	3.897E+13
0.2250	5.162E+13
0.3750	2.248E+13
0.5750	4.021E+14
0.8500	3.841E+12
1.2500	2.775E+12
1.7500	9.923E+10
2.2500	1.786E+07
2.7500	1.856E+07
3.5000	7.562E+04
5.0000	3.173E+04
7.0000	3.568E+03
11.0000	4.048E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.44E+02	1.44E+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:	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:		15,122.23
Bounding:		15,122.23

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR OT (UO2) LEU
SNF ID #: 283
Fuel Units & Descr: 8 - TUBE
Heavy Metal Mass: BOL= ; EOL=139.532kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1963
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.2581E-09	209.63	209.63	0.00E+00	2.64E-07	2.64E-07
Am-241	1.4761E-01	209.63	209.63	0.00E+00	3.09E+01	3.09E+01
Am-242m	2.5032E-04	209.63	209.63	0.00E+00	5.25E-02	5.25E-02
Am-243	6.2367E-04	209.63	209.63	0.00E+00	1.31E-01	1.31E-01
C-14	4.7739E-05	209.63	209.63	0.00E+00	1.00E-02	1.00E-02
Cl-36	8.0297E-07	209.63	209.63	0.00E+00	1.68E-04	1.68E-04
Cm-243	1.2099E-04	209.63	209.63	0.00E+00	2.54E-02	2.54E-02
Cm-244	1.5560E-02	209.63	209.63	0.00E+00	3.26E+00	3.26E+00
Co-60	4.9580E-05	209.63	209.63	0.00E+00	1.04E-02	1.04E-02
Cs-134	1.7022E-09	209.63	209.63	0.00E+00	3.57E-07	3.57E-07
Cs-135	1.4433E-05	209.63	209.63	0.00E+00	3.03E-03	3.03E-03
Cs-137	6.9929E-01	209.63	209.63	0.00E+00	1.47E+02	1.47E+02
Eu-154	1.8023E-03	209.63	209.63	0.00E+00	3.78E-01	3.78E-01
Eu-155	2.6793E-05	209.63	209.63	0.00E+00	5.62E-03	5.62E-03
Fe-55	1.4580E-08	209.63	209.63	0.00E+00	3.06E-06	3.06E-06
H-3	3.8566E-03	209.63	209.63	0.00E+00	8.08E-01	8.08E-01
I-129	9.8288E-07	209.63	209.63	0.00E+00	2.06E-04	2.06E-04
Kr-85	4.0617E-03	209.63	209.63	0.00E+00	8.51E-01	8.51E-01
Np-237	1.2645E-05	209.63	209.63	0.00E+00	2.65E-03	2.65E-03
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	5.3085E-12	209.63	209.63	0.00E+00	1.11E-09	1.11E-09
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.676E+12
0.0250	1.127E+12
0.0375	1.054E+12
0.0575	1.446E+12
0.0850	6.169E+11
0.1250	4.024E+11
0.2250	5.248E+11
0.3750	2.271E+11
0.5750	5.405E+12
0.8500	4.333E+10
1.2500	2.026E+10
1.7500	1.165E+09
2.2500	2.057E+05
2.7500	1.021E+06
3.5000	5.090E+04
5.0000	2.174E+04
7.0000	2.503E+03
11.0000	2.872E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.08E+00	3.08E+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:	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	Basis for burnup used in estimate:
Nominal:		209.63	Nominal burnup set equal to bounding burnup
Bounding:		209.63	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR RMT & SMT (U METAL) LEU
SNF ID #: 790
Fuel Units & Descr: 10 - TUBE
Heavy Metal Mass: BOL= ; EOL=63.746kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	61,103.94	61,103.94	0.00E+00	4.76E-04	4.76E-04
Am-241	2.3560E-02	61,103.94	61,103.94	0.00E+00	1.44E+03	1.44E+03
Am-242m	3.0880E-06	61,103.94	61,103.94	0.00E+00	1.89E-01	1.89E-01
Am-243	2.0520E-06	61,103.94	61,103.94	0.00E+00	1.25E-01	1.25E-01
C-14	1.1222E-03	61,103.94	61,103.94	0.00E+00	6.86E+01	6.86E+01
Cl-36	8.3760E-11	61,103.94	61,103.94	0.00E+00	5.12E-06	5.12E-06
Cm-243	2.4260E-07	61,103.94	61,103.94	0.00E+00	1.48E-02	1.48E-02
Cm-244	3.3140E-06	61,103.94	61,103.94	0.00E+00	2.02E-01	2.02E-01
Co-60	1.2454E-03	61,103.94	61,103.94	0.00E+00	7.61E+01	7.61E+01
Cs-134	3.3040E-10	61,103.94	61,103.94	0.00E+00	2.02E-05	2.02E-05
Cs-135	7.9140E-06	61,103.94	61,103.94	0.00E+00	4.84E-01	4.84E-01
Cs-137	7.1580E-01	61,103.94	61,103.94	0.00E+00	4.37E+04	4.37E+04
Eu-154	6.0500E-04	61,103.94	61,103.94	0.00E+00	3.70E+01	3.70E+01
Eu-155	9.4860E-06	61,103.94	61,103.94	0.00E+00	5.80E-01	5.80E-01
Fe-55	1.9322E-06	61,103.94	61,103.94	0.00E+00	1.18E-03	1.18E-03
H-3	4.4180E-03	61,103.94	61,103.94	0.00E+00	2.70E+02	2.70E+02
I-129	7.5020E-07	61,103.94	61,103.94	0.00E+00	4.58E-02	4.58E-02
Kr-85	5.4940E-03	61,103.94	61,103.94	0.00E+00	3.36E+02	3.36E+02
Np-237	5.8040E-06	61,103.94	61,103.94	0.00E+00	3.55E-01	3.55E-01
Pa-231	1.1096E-06	61,103.94	61,103.94	0.00E+00	6.78E-04	6.78E-04
Pb-210	1.4712E-06	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	3.4460E-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-06	61,103.94	61,103.94	0.00E+00	1.04E-01	1.04E-01
Th-232	1.1926E-09	61,103.94	61,103.94	0.00E+00	7.29E-05	7.29E-05
Tl-208	3.4740E-06	61,103.94	61,103.94	0.00E+00	2.12E-03	2.12E-03
U-232	9.2940E-06	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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.091E+15
0.0250	4.319E+14
0.0375	3.803E+14
0.0575	4.212E+14
0.0850	2.423E+14
0.1250	1.575E+14
0.2250	2.086E+14
0.3750	9.083E+13
0.5750	1.625E+15
0.8500	1.552E+13
1.2500	1.121E+13
1.7500	4.010E+11
2.2500	7.216E+07
2.7500	7.498E+07
3.5000	3.055E+05
5.0000	1.282E+05
7.0000	1.442E+04
11.0000	1.636E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.80E+02	5.80E+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:	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:		61,103.94
Bounding:		61,103.94

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SOT (UO2) LEU
SNF ID #: 120
Fuel Units & Descr: 96 - TUBE
Heavy Metal Mass: BOL= ; EOL=249.725kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	239,374.53	239,374.53	0.00E+00	1.87E-03	1.87E-03
Am-241	2.3560E-02	239,374.53	239,374.53	0.00E+00	5.64E+03	5.64E+03
Am-242m	3.0880E-06	239,374.53	239,374.53	0.00E+00	7.39E-01	7.39E-01
Am-243	2.0520E-06	239,374.53	239,374.53	0.00E+00	4.91E-01	4.91E-01
C-14	1.1222E-03	239,374.53	239,374.53	0.00E+00	2.69E+02	2.69E+02
Cl-36	8.3760E-11	239,374.53	239,374.53	0.00E+00	2.01E-05	2.01E-05
Cm-243	2.4260E-07	239,374.53	239,374.53	0.00E+00	5.81E-02	5.81E-02
Cm-244	3.3140E-06	239,374.53	239,374.53	0.00E+00	7.93E-01	7.93E-01
Co-60	1.2454E-03	239,374.53	239,374.53	0.00E+00	2.98E+02	2.98E+02
Cs-134	3.3040E-10	239,374.53	239,374.53	0.00E+00	7.91E-05	7.91E-05
Cs-135	7.9140E-06	239,374.53	239,374.53	0.00E+00	1.89E+00	1.89E+00
Cs-137	7.1580E-01	239,374.53	239,374.53	0.00E+00	1.71E+05	1.71E+05
Eu-154	6.0500E-04	239,374.53	239,374.53	0.00E+00	1.45E+02	1.45E+02
Eu-155	9.4860E-06	239,374.53	239,374.53	0.00E+00	2.27E+00	2.27E+00
Fe-55	1.9322E-08	239,374.53	239,374.53	0.00E+00	4.63E-03	4.63E-03
H-3	4.4180E-03	239,374.53	239,374.53	0.00E+00	1.06E+03	1.06E+03
I-129	7.5020E-07	239,374.53	239,374.53	0.00E+00	1.80E-01	1.80E-01
Kr-85	5.4940E-03	239,374.53	239,374.53	0.00E+00	1.32E+03	1.32E+03
Np-237	5.8040E-06	239,374.53	239,374.53	0.00E+00	1.39E+00	1.39E+00
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	1.1922E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.193E+15
0.0250	1.692E+15
0.0375	1.490E+15
0.0575	1.650E+15
0.0850	9.492E+14
0.1250	6.169E+14
0.2250	8.170E+14
0.3750	3.558E+14
0.5750	6.365E+15
0.8500	6.080E+13
1.2500	4.393E+13
1.7500	1.571E+12
2.2500	2.827E+08
2.7500	2.937E+08
3.5000	1.197E+06
5.0000	5.023E+05
7.0000	5.648E+04
11.0000	6.407E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.27E+03	2.27E+03
Total	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 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:		239,374.53
Bounding:		239,374.53

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPR (U-ZR) LEU
SNF ID #: 783
Fuel Units & Descr: 56 - TUBE
Heavy Metal Mass: BOL= ; EOL=437.679kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	419,538.84	419,538.84	0.00E+00	3.27E-03	3.27E-03
Am-241	2.3560E-02	419,538.84	419,538.84	0.00E+00	9.88E+03	9.88E+03
Am-242m	3.0880E-06	419,538.84	419,538.84	0.00E+00	1.30E+00	1.30E+00
Am-243	2.0520E-06	419,538.84	419,538.84	0.00E+00	8.61E-01	8.61E-01
C-14	1.1222E-03	419,538.84	419,538.84	0.00E+00	4.71E+02	4.71E+02
Cl-36	8.3760E-11	419,538.84	419,538.84	0.00E+00	3.51E-05	3.51E-05
Cm-243	2.4260E-07	419,538.84	419,538.84	0.00E+00	1.02E-01	1.02E-01
Cm-244	3.3140E-06	419,538.84	419,538.84	0.00E+00	1.39E+00	1.39E+00
Co-60	1.2454E-03	419,538.84	419,538.84	0.00E+00	5.22E+02	5.22E+02
Cs-134	3.3040E-10	419,538.84	419,538.84	0.00E+00	1.39E-04	1.39E-04
Cs-135	7.9140E-06	419,538.84	419,538.84	0.00E+00	3.32E+00	3.32E+00
Cs-137	7.1580E-01	419,538.84	419,538.84	0.00E+00	3.00E+05	3.00E+05
Eu-154	6.0500E-04	419,538.84	419,538.84	0.00E+00	2.54E+02	2.54E+02
Eu-155	9.4860E-06	419,538.84	419,538.84	0.00E+00	3.98E+00	3.98E+00
Fe-55	1.9322E-08	419,538.84	419,538.84	0.00E+00	8.11E-03	8.11E-03
H-3	4.4180E-03	419,538.84	419,538.84	0.00E+00	1.85E+03	1.85E+03
I-129	7.5020E-07	419,538.84	419,538.84	0.00E+00	3.15E-01	3.15E-01
Kr-85	5.4940E-03	419,538.84	419,538.84	0.00E+00	2.30E+03	2.30E+03
Np-237	5.8040E-06	419,538.84	419,538.84	0.00E+00	2.44E+00	2.44E+00
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	6.17E-03	6.17E-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	3.4460E-02	419,538.84	419,538.84	0.00E+00	1.45E+04	1.45E+04
Pu-242	2.0380E-06	419,538.84	419,538.84	0.00E+00	8.55E-01	8.55E-01
Ra-226	2.9640E-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
Tc-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-06	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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.436E+16
0.0250	2.965E+15
0.0375	2.611E+15
0.0575	2.892E+15
0.0850	1.664E+15
0.1250	1.081E+15
0.2250	1.432E+15
0.3750	6.237E+14
0.5750	1.115E+16
0.8500	1.066E+14
1.2500	7.700E+13
1.7500	2.753E+12
2.2500	4.954E+08
2.7500	5.148E+08
3.5000	2.098E+08
5.0000	8.803E+05
7.0000	9.898E+04
11.0000	1.123E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.96E+03	3.96E+03
Total	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 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:		419,538.84
Bounding:		419,538.84

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (U02) ALUM LEU
SNF ID #: 115
Fuel Units & Descr: 3 - TUBE
Heavy Metal Mass: BOL= ; EOL=6.499kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated Canister usage: 16"x10'
0.08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	5.3460E-09	6,176.98	6,176.98	0.00E+00	3.30E-05	3.30E-05
Am-241	2.9433E-02	6,176.98	6,176.98	0.00E+00	1.82E+02	1.82E+02
Am-242m	7.2600E-06	6,176.98	6,176.98	0.00E+00	4.48E-02	4.48E-02
Am-243	6.3740E-06	6,176.98	6,176.98	0.00E+00	3.94E-02	3.94E-02
C-14	2.9460E-08	6,176.98	6,176.98	0.00E+00	1.82E-04	1.82E-04
Cl-36	5.9507E-35	6,176.98	6,176.98	0.00E+00	3.68E-31	3.68E-31
Cm-243	7.3933E-07	6,176.98	6,176.98	0.00E+00	4.57E-03	4.57E-03
Cm-244	1.9660E-05	6,176.98	6,176.98	0.00E+00	1.21E-01	1.21E-01
Co-60	4.3927E-08	6,176.98	6,176.98	0.00E+00	2.71E-04	2.71E-04
Cs-134	5.7507E-10	6,176.98	6,176.98	0.00E+00	3.55E-06	3.55E-06
Cs-135	4.8607E-06	6,176.98	6,176.98	0.00E+00	3.00E-02	3.00E-02
Cs-137	7.1533E-01	6,176.98	6,176.98	0.00E+00	4.42E+03	4.42E+03
Eu-154	5.5553E-04	6,176.98	6,176.98	0.00E+00	3.43E+00	3.43E+00
Eu-155	7.5800E-06	6,176.98	6,176.98	0.00E+00	4.68E-02	4.68E-02
Fe-55	8.7333E-09	6,176.98	6,176.98	0.00E+00	5.39E-05	5.39E-05
H-3	3.7313E-04	6,176.98	6,176.98	0.00E+00	2.30E+00	2.30E+00
I-129	7.1600E-07	6,176.98	6,176.98	0.00E+00	4.42E-03	4.42E-03
Kr-85	5.5793E-03	6,176.98	6,176.98	0.00E+00	3.45E+01	3.45E+01
Np-237	4.2207E-06	6,176.98	6,176.98	0.00E+00	2.61E-02	2.61E-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	3.1780E-07	6,176.98	6,176.98	0.00E+00	1.96E-03	1.96E-03
Pu-238	3.8753E-03	6,176.98	6,176.98	0.00E+00	2.39E+01	2.39E+01
Pu-239	1.0300E-02	6,176.98	6,176.98	0.00E+00	6.36E+01	6.36E+01
Pu-240	5.3920E-03	6,176.98	6,176.98	0.00E+00	3.33E+01	3.33E+01
Pu-241	4.3067E-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
Ra-226	5.8127E-12	6,176.98	6,176.98	0.00E+00	3.59E-08	3.59E-08
Ra-228	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
Se-79	1.2533E-05	6,176.98	6,176.98	0.00E+00	7.74E-02	7.74E-02
Sn-126	1.1393E-05	6,176.98	6,176.98	0.00E+00	7.04E-02	7.04E-02
Sr-90	6.3033E-01	6,176.98	6,176.98	0.00E+00	3.89E+03	3.89E+03
Tc-99	4.3527E-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	2.89E-06	2.89E-06
Th-232	5.1647E-14	6,176.98	6,176.98	0.00E+00	3.19E-10	3.19E-10
Tl-208	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	1.3927E-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	-2.5335E-06	6,176.98	0.00	4.21E-03	0.00E+00	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-08	6,176.98	0.00	3.67E-03	3.58E-03	3.67E-03
Y-90	6.3053E-01	6,176.98	6,176.98	0.00E+00	3.89E+03	3.89E+03
Other Radionuclides					4.21E+03	4.21E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.149E+14
0.0250	4.444E+13
0.0375	3.892E+13
0.0575	4.378E+13
0.0850	2.493E+13
0.1250	1.620E+13
0.2250	2.147E+13
0.3750	9.351E+12
0.5750	1.642E+14
0.8500	1.575E+12
1.2500	5.673E+11
1.7500	4.106E+10
2.2500	4.340E+06
2.7500	1.108E+06
3.5000	2.271E+04
5.0000	9.495E+03
7.0000	1.064E+03
11.0000	1.204E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.73E+01	8.73E+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 %:		10 to 20

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:		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 twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.85	
Bounding:	10.85	

Estimated EOL HM/Given EOL HM: 2.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (U02) SST LEU
SNF ID #: 978
Fuel Units & Descr: 5 - TUBE
Heavy Metal Mass: BOL= ; EOL=89.362kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	9.2380E-09	85,315.00	85,315.00	0.00E+00	7.88E-04	7.88E-04
Am-241	2.2020E-01	85,315.00	85,315.00	0.00E+00	1.88E+04	1.88E+04
Am-242m	8.9860E-05	85,315.00	85,315.00	0.00E+00	7.67E+00	7.67E+00
Am-243	5.2240E-05	85,315.00	85,315.00	0.00E+00	4.46E+00	4.46E+00
C-14	2.2080E-02	85,315.00	85,315.00	0.00E+00	1.88E+03	1.88E+03
Cl-36	4.1880E-04	85,315.00	85,315.00	0.00E+00	3.57E+01	3.57E+01
Cm-243	8.0820E-06	85,315.00	85,315.00	0.00E+00	6.90E-01	6.90E-01
Cm-244	2.3260E-04	85,315.00	85,315.00	0.00E+00	1.98E+01	1.98E+01
Co-60	9.9520E-02	85,315.00	85,315.00	0.00E+00	8.49E+03	8.49E+03
Cs-134	7.2160E-10	85,315.00	85,315.00	0.00E+00	6.16E-05	6.16E-05
Cs-135	3.7460E-06	85,315.00	85,315.00	0.00E+00	3.20E-01	3.20E-01
Cs-137	7.2140E-01	85,315.00	85,315.00	0.00E+00	6.15E+04	6.15E+04
Eu-154	8.2120E-04	85,315.00	85,315.00	0.00E+00	7.01E+01	7.01E+01
Eu-155	1.2284E-05	85,315.00	85,315.00	0.00E+00	1.05E+00	1.05E+00
Fe-55	1.8062E-05	85,315.00	85,315.00	0.00E+00	1.54E+00	1.54E+00
H-3	8.2700E-03	85,315.00	85,315.00	0.00E+00	7.06E+02	7.06E+02
I-129	9.1660E-07	85,315.00	85,315.00	0.00E+00	7.82E-02	7.82E-02
Kr-85	4.6540E-03	85,315.00	85,315.00	0.00E+00	3.97E+02	3.97E+02
Np-237	2.1800E-05	85,315.00	85,315.00	0.00E+00	1.86E+00	1.86E+00
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	4.3360E-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-06	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.731E+15
0.0250	5.281E+14
0.0375	4.712E+14
0.0575	7.268E+14
0.0850	2.818E+14
0.1250	1.830E+14
0.2250	2.405E+14
0.3750	1.044E+14
0.5750	2.274E+15
0.8500	1.928E+13
1.2500	6.352E+14
1.7500	4.757E+11
2.2500	3.381E+09
2.7500	3.553E+08
3.5000	1.794E+08
5.0000	7.450E+05
7.0000	8.295E+04
11.0000	9.351E+03

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

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	SST	SST
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:		85,315.00
Bounding:		85,315.00

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:	32.70	
Bounding:	32.70	

Estimated EOL HM/Given EOL HM: 2.26

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (UO2) ZR LEU
SNF ID #: 772
Fuel Units & Descr: 48 - TUBE
Heavy Metal Mass: BOL= ; EOL=180.922kg
ROC Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	173,423.00	173,423.00	0.00E+00	1.35E-03	1.35E-03
Am-241	2.3560E-02	173,423.00	173,423.00	0.00E+00	4.09E+03	4.09E+03
Am-242m	3.0880E-06	173,423.00	173,423.00	0.00E+00	5.36E-01	5.36E-01
Am-243	2.0520E-06	173,423.00	173,423.00	0.00E+00	3.56E-01	3.56E-01
C-14	1.1222E-03	173,423.00	173,423.00	0.00E+00	1.95E+02	1.95E+02
Cl-36	8.3760E-11	173,423.00	173,423.00	0.00E+00	1.45E-05	1.45E-05
Cm-243	2.4260E-07	173,423.00	173,423.00	0.00E+00	4.21E-02	4.21E-02
Cm-244	3.3140E-06	173,423.00	173,423.00	0.00E+00	5.75E-01	5.75E-01
Co-60	1.2454E-03	173,423.00	173,423.00	0.00E+00	2.16E+02	2.16E+02
Cs-134	3.3040E-10	173,423.00	173,423.00	0.00E+00	5.73E-05	5.73E-05
Cs-135	7.9140E-06	173,423.00	173,423.00	0.00E+00	1.37E+00	1.37E+00
Cs-137	7.1580E-01	173,423.00	173,423.00	0.00E+00	1.24E+05	1.24E+05
Eu-154	6.0500E-04	173,423.00	173,423.00	0.00E+00	1.05E+02	1.05E+02
Eu-155	9.4860E-06	173,423.00	173,423.00	0.00E+00	1.65E+00	1.65E+00
Fe-55	1.9322E-08	173,423.00	173,423.00	0.00E+00	3.35E-03	3.35E-03
H-3	4.4180E-03	173,423.00	173,423.00	0.00E+00	7.66E+02	7.66E+02
I-129	7.5020E-07	173,423.00	173,423.00	0.00E+00	1.30E-01	1.30E-01
Kr-85	5.4940E-03	173,423.00	173,423.00	0.00E+00	9.53E+02	9.53E+02
Np-237	5.8040E-06	173,423.00	173,423.00	0.00E+00	1.01E+00	1.01E+00
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-05	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.936E+15
0.0250	1.226E+15
0.0375	1.079E+15
0.0575	1.195E+15
0.0850	6.877E+14
0.1250	4.470E+14
0.2250	5.919E+14
0.3750	2.578E+14
0.5750	4.611E+15
0.8500	4.405E+13
1.2500	3.183E+13
1.7500	1.138E+12
2.2500	2.048E+08
2.7500	2.128E+08
3.5000	8.672E+05
5.0000	3.639E+05
7.0000	4.092E+04
11.0000	4.642E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+03	1.85E+03
Total	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 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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TFEN (U-ZR) LEU
SNF ID #: 880
Fuel Units & Descr: 11 - TUBE
Heavy Metal Mass: BOL= ; EOL=162.082kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	155,363.95	155,363.95	0.00E+00	1.21E-03	1.21E-03
Am-241	2.3560E-02	155,363.95	155,363.95	0.00E+00	3.66E+03	3.66E+03
Am-242m	3.0880E-06	155,363.95	155,363.95	0.00E+00	4.80E-01	4.80E-01
Am-243	2.0520E-06	155,363.95	155,363.95	0.00E+00	3.19E-01	3.19E-01
C-14	1.1222E-03	155,363.95	155,363.95	0.00E+00	1.74E+02	1.74E+02
Cl-36	8.3760E-11	155,363.95	155,363.95	0.00E+00	1.30E-05	1.30E-05
Cm-243	2.4260E-07	155,363.95	155,363.95	0.00E+00	3.77E-02	3.77E-02
Cm-244	3.3140E-06	155,363.95	155,363.95	0.00E+00	5.15E-01	5.15E-01
Co-60	1.2454E-03	155,363.95	155,363.95	0.00E+00	1.93E+02	1.93E+02
Cs-134	3.3040E-10	155,363.95	155,363.95	0.00E+00	5.13E-05	5.13E-05
Cs-135	7.9140E-06	155,363.95	155,363.95	0.00E+00	1.23E+00	1.23E+00
Cs-137	7.1580E-01	155,363.95	155,363.95	0.00E+00	1.11E+05	1.11E+05
Eu-154	6.0500E-04	155,363.95	155,363.95	0.00E+00	9.40E+01	9.40E+01
Eu-155	9.4860E-06	155,363.95	155,363.95	0.00E+00	1.47E+00	1.47E+00
Fe-55	1.9322E-08	155,363.95	155,363.95	0.00E+00	3.00E-03	3.00E-03
H-3	4.4180E-03	155,363.95	155,363.95	0.00E+00	6.86E+02	6.86E+02
I-129	7.5020E-07	155,363.95	155,363.95	0.00E+00	1.17E-01	1.17E-01
Kr-85	5.4940E-03	155,363.95	155,363.95	0.00E+00	8.54E+02	8.54E+02
Np-237	5.8040E-06	155,363.95	155,363.95	0.00E+00	9.02E-01	9.02E-01
Pa-231	1.1096E-08	155,363.95	155,363.95	0.00E+00	1.72E-03	1.72E-03
Pb-210	1.4712E-08	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
Th-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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.318E+15
0.0250	1.098E+15
0.0375	9.669E+14
0.0575	1.071E+15
0.0850	6.160E+14
0.1250	4.004E+14
0.2250	5.303E+14
0.3750	2.310E+14
0.5750	4.131E+15
0.8500	3.946E+13
1.2500	2.851E+13
1.7500	1.019E+12
2.2500	1.835E+08
2.7500	1.906E+08
3.5000	7.769E+05
5.0000	3.260E+05
7.0000	3.665E+04
11.0000	4.159E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.47E+03	1.47E+03
Total	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 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:		155,363.95
Bounding:		155,363.95

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TMT-1-2 & 1-3 (U/TH)
SNF ID #: 112
Fuel Units & Descr: 2 - TUBE
Heavy Metal Mass: BOL= ; EOL=77.91kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.6528E-06	273.69	547.39	0.00E+00	7.26E-04	1.45E-03
Am-241	8.6432E+00	273.69	547.39	0.00E+00	2.37E+03	4.73E+03
Am-242m	1.4688E-02	273.69	547.39	0.00E+00	4.02E+00	8.04E+00
Am-243	1.6272E-02	273.69	547.39	0.00E+00	4.45E+00	8.91E+00
C-14	1.2046E-01	273.69	547.39	0.00E+00	3.30E+01	6.59E+01
Cl-36	2.2849E-03	273.69	547.39	0.00E+00	6.25E-01	1.25E+00
Cm-243	4.1760E-04	273.69	547.39	0.00E+00	1.14E-01	2.29E-01
Cm-244	5.3440E-02	273.69	547.39	0.00E+00	1.46E+01	2.93E+01
Co-60	5.4296E-01	273.69	547.39	0.00E+00	1.49E+02	2.97E+02
Cs-134	1.4346E-08	273.69	547.39	0.00E+00	3.93E-06	7.85E-06
Cs-135	4.3976E-04	273.69	547.39	0.00E+00	1.20E-01	2.41E-01
Cs-137	1.0528E+01	273.69	547.39	0.00E+00	2.88E+03	5.76E+03
Eu-154	1.1156E-01	273.69	547.39	0.00E+00	3.05E+01	6.11E+01
Eu-155	1.0445E-03	273.69	547.39	0.00E+00	2.86E-01	5.72E-01
Fe-55	9.8542E-05	273.69	547.39	0.00E+00	2.70E-02	5.39E-02
H-3	4.5119E-02	273.69	547.39	0.00E+00	1.23E+01	2.47E+01
I-129	1.0618E-05	273.69	547.39	0.00E+00	2.91E-03	5.81E-03
Kr-85	8.6191E-02	273.69	547.39	0.00E+00	2.36E+01	4.72E+01
Np-237	2.0592E-04	273.69	547.39	0.00E+00	5.64E-02	1.13E-01
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	2.9200E-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	2.65E+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
Tl-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	2.66E+03	5.31E+03
Other Radionuclides					1.19E+04	2.37E+04

Gamma Sources: Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.426E+14
0.0250	6.503E+13
0.0375	5.347E+13
0.0575	1.215E+14
0.0850	3.424E+13
0.1250	2.301E+13
0.2250	2.944E+13
0.3750	1.281E+13
0.5750	2.147E+14
0.8500	3.212E+12
1.2500	2.391E+13
1.7500	8.930E+10
2.2500	1.237E+08
2.7500	1.262E+09
3.5000	6.505E+05
5.0000	2.731E+05
7.0000	3.086E+04
11.0000	3.505E+03

Thermal Power: Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.45E+02	2.90E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Th 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:		273.69
Bounding:		547.39

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=78.198kg

Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	
Bounding:	0.21	

Estimated EOL HM/Given EOL HM: 2.74

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TWNT (U METAL) LEU
SNF ID #: 791
Fuel Units & Descr: 15 - TUBE
Heavy Metal Mass: BOL= ; EOL=321.82kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2030
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
[2]Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 65 years

Estimated Canister usage: 18"x15' 0.68

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	7.7980E-09	308,482.10	308,482.10	0.00E+00	2.41E-03	2.41E-03
Am-241	2.3560E-02	308,482.10	308,482.10	0.00E+00	7.27E+03	7.27E+03
Am-242m	3.0880E-06	308,482.10	308,482.10	0.00E+00	9.53E-01	9.53E-01
Am-243	2.0520E-06	308,482.10	308,482.10	0.00E+00	6.33E-01	6.33E-01
C-14	1.1222E-03	308,482.10	308,482.10	0.00E+00	3.46E+02	3.46E+02
Cl-36	8.3760E-11	308,482.10	308,482.10	0.00E+00	2.58E-05	2.58E-05
Cm-243	2.4260E-07	308,482.10	308,482.10	0.00E+00	7.48E-02	7.48E-02
Cm-244	3.3140E-06	308,482.10	308,482.10	0.00E+00	1.02E+00	1.02E+00
Co-60	1.2454E-03	308,482.10	308,482.10	0.00E+00	3.84E+02	3.84E+02
Cs-134	3.3040E-10	308,482.10	308,482.10	0.00E+00	1.02E-04	1.02E-04
Cs-135	7.9140E-06	308,482.10	308,482.10	0.00E+00	2.44E+00	2.44E+00
Cs-137	7.1580E-01	308,482.10	308,482.10	0.00E+00	2.21E+05	2.21E+05
Eu-154	6.0500E-04	308,482.10	308,482.10	0.00E+00	1.87E+02	1.87E+02
Eu-155	9.4860E-06	308,482.10	308,482.10	0.00E+00	2.93E+00	2.93E+00
Fe-55	1.9322E-08	308,482.10	308,482.10	0.00E+00	5.96E-03	5.96E-03
H-3	4.4180E-03	308,482.10	308,482.10	0.00E+00	1.36E+03	1.36E+03
I-129	7.5020E-07	308,482.10	308,482.10	0.00E+00	2.31E-01	2.31E-01
Kr-85	5.4940E-03	308,482.10	308,482.10	0.00E+00	1.69E+03	1.69E+03
Np-237	5.8040E-06	308,482.10	308,482.10	0.00E+00	1.79E+00	1.79E+00
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	6.1880E-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
Tl-206	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	6.96E-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	6.1900E-01	308,482.10	308,482.10	0.00E+00	1.91E+05	1.91E+05
Other Radionuclides					2.11E+05	2.11E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.056E+16
0.0250	2.180E+15
0.0375	1.920E+15
0.0575	2.126E+15
0.0850	1.223E+15
0.1250	7.950E+14
0.2250	1.053E+15
0.3750	4.586E+14
0.5750	8.202E+15
0.8500	7.835E+13
1.2500	5.662E+13
1.7500	2.024E+12
2.2500	3.643E+08
2.7500	3.785E+08
3.5000	1.543E+08
5.0000	6.473E+05
7.0000	7.278E+04
11.0000	8.257E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.93E+03	2.93E+03
Total	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 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:		308,482.10
Bounding:		308,482.10

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IAN-R1 (COLUMBIA)
SNF ID #: 596
Fuel Units & Descr: 16 - MTR TYPE
Heavy Metal Mass: BOL=2.536kg; EOL=2.426kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	104.55	209.10	0.00E+00	2.10E-07	4.20E-07
Am-241	2.5251E-03	104.55	209.10	0.00E+00	2.64E-01	5.28E-01
Am-242m	3.9624E-07	104.55	209.10	0.00E+00	4.14E-05	8.29E-05
Am-243	1.4880E-06	104.55	209.10	0.00E+00	1.56E-04	3.11E-04
C-14	5.7053E-09	104.55	209.10	0.00E+00	5.96E-07	1.19E-06
Cl-36	1.3124E-32	104.55	209.10	0.00E+00	1.37E-30	2.74E-30
Cm-243	1.1419E-07	104.55	209.10	0.00E+00	1.19E-05	2.39E-05
Cm-244	1.6522E-05	104.55	209.10	0.00E+00	1.73E-03	3.45E-03
Co-60	7.4047E-07	104.55	209.10	0.00E+00	7.74E-05	1.55E-04
Cs-134	2.0455E-05	104.55	209.10	0.00E+00	2.14E-03	4.28E-03
Cs-135	3.4477E-06	104.55	209.10	0.00E+00	3.60E-04	7.21E-04
Cs-137	1.4365E+00	104.55	209.10	0.00E+00	1.50E+02	3.00E+02
Eu-154	7.3230E-03	104.55	209.10	0.00E+00	7.66E-01	1.53E+00
Eu-155	5.9259E-04	104.55	209.10	0.00E+00	6.20E-02	1.24E-01
Fe-55	2.2791E-06	104.55	209.10	0.00E+00	2.38E-04	4.77E-04
H-3	1.9698E-03	104.55	209.10	0.00E+00	2.06E-01	4.12E-01
I-129	7.5300E-07	104.55	209.10	0.00E+00	7.87E-05	1.57E-04
Kr-85	4.1176E-02	104.55	209.10	0.00E+00	4.31E+00	8.61E+00
Np-237	9.5752E-06	104.55	209.10	0.00E+00	1.00E-03	2.00E-03
Pa-231	3.9379E-09	104.55	209.10	0.00E+00	4.12E-07	8.23E-07
Pb-210	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	1.6217E-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
Ra-226	9.0114E-10	104.55	209.10	0.00E+00	9.42E-08	1.88E-07
Ra-228	3.1019E-14	104.55	209.10	0.00E+00	3.24E-12	6.49E-12
Ru-106	2.1225E-10	104.55	209.10	0.00E+00	2.22E-08	4.44E-08
Se-79	1.2930E-05	104.55	209.10	0.00E+00	1.35E-03	2.70E-03
Sn-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
Tc-99	4.2239E-04	104.55	209.10	0.00E+00	4.42E-02	8.83E-02
Th-229	1.2407E-11	104.55	209.10	0.00E+00	1.30E-09	2.59E-09
Th-230	8.3497E-08	104.55	209.10	0.00E+00	8.73E-06	1.75E-05
Th-232	3.8371E-14	104.55	209.10	0.00E+00	4.01E-12	8.02E-12
Tl-208	4.0414E-08	104.55	209.10	0.00E+00	4.23E-06	8.45E-06
U-232	1.0948E-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	-2.7235E-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	-4.2851E-09	104.55	0.00	5.79E-05	5.75E-05	5.79E-05
Y-90	1.3475E+00	104.55	209.10	0.00E+00	1.41E+02	2.82E+02
Other Radionuclides					1.43E+02	2.86E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.540E+13
0.0250	3.198E+12
0.0375	2.780E+12
0.0575	2.992E+12
0.0850	1.803E+12
0.1250	1.191E+12
0.2250	1.556E+12
0.3750	6.771E+11
0.5750	1.119E+13
0.8500	1.367E+11
1.2500	6.611E+10
1.7500	3.721E+09
2.2500	3.111E+05
2.7500	2.969E+05
3.5000	1.724E+02
5.0000	7.047E+01
7.0000	7.712E+00
11.0000	8.599E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+00	3.50E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.20235261	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	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 HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IAN-R1 (COLUMBIA)
SNF ID #: 803
Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=0.685kg; EOL=0.685kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
0.21

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.1465E-09	12.97	25.95	0.00E+00	1.49E-08	2.98E-08
Am-241	2.3056E-03	12.97	25.95	0.00E+00	2.99E-02	5.98E-02
Am-242m	4.1476E-07	12.97	25.95	0.00E+00	5.38E-06	1.08E-05
Am-243	1.4894E-06	12.97	25.95	0.00E+00	1.93E-05	3.86E-05
C-14	5.7108E-09	12.97	25.95	0.00E+00	7.41E-08	1.48E-07
Cl-36	1.3124E-32	12.97	25.95	0.00E+00	1.70E-31	3.41E-31
Cm-243	1.4562E-07	12.97	25.95	0.00E+00	1.89E-06	3.78E-06
Cm-244	2.4221E-05	12.97	25.95	0.00E+00	3.14E-04	6.28E-04
Co-60	2.7560E-06	12.97	25.95	0.00E+00	3.58E-05	7.15E-05
Cs-134	5.8851E-04	12.97	25.95	0.00E+00	7.64E-03	1.53E-02
Cs-135	3.4477E-06	12.97	25.95	0.00E+00	4.47E-05	8.95E-05
Cs-137	1.8099E+00	12.97	25.95	0.00E+00	2.35E+01	4.70E+01
Eu-154	1.6386E-02	12.97	25.95	0.00E+00	2.13E-01	4.25E-01
Eu-155	2.3957E-03	12.97	25.95	0.00E+00	3.11E-02	6.22E-02
Fe-55	3.2707E-05	12.97	25.95	0.00E+00	4.24E-04	8.49E-04
H-3	3.4504E-03	12.97	25.95	0.00E+00	4.48E-02	8.95E-02
I-129	7.5300E-07	12.97	25.95	0.00E+00	9.77E-06	1.95E-05
Kr-85	7.8540E-02	12.97	25.95	0.00E+00	1.02E+00	2.04E+00
Np-237	9.5615E-06	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
Tl-208	4.4336E-06	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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.428E+12
0.0250	5.044E+11
0.0375	4.393E+11
0.0575	4.717E+11
0.0850	2.846E+11
0.1250	1.907E+11
0.2250	2.458E+11
0.3750	1.068E+11
0.5750	1.751E+12
0.8500	2.524E+10
1.2500	1.403E+10
1.7500	6.934E+08
2.2500	4.942E+04
2.7500	4.047E+04
3.5000	3.066E+01
5.0000	1.032E+01
7.0000	1.136E+00
11.0000	1.271E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.74E-01	5.49E-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 %:	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 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:	0.08	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (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

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	3,143.73	6,287.45	0.00E+00	3.60E-06	7.21E-06
Am-241	2.3056E-03	3,143.73	6,287.45	0.00E+00	7.25E+00	1.45E+01
Am-242m	4.1476E-07	3,143.73	6,287.45	0.00E+00	1.30E-03	2.61E-03
Am-243	1.4894E-06	3,143.73	6,287.45	0.00E+00	4.68E-03	9.36E-03
C-14	5.7108E-09	3,143.73	6,287.45	0.00E+00	1.80E-05	3.59E-05
Cl-36	1.3124E-32	3,143.73	6,287.45	0.00E+00	4.13E-29	8.25E-29
Cm-243	1.4562E-07	3,143.73	6,287.45	0.00E+00	4.58E-04	9.16E-04
Cm-244	2.4221E-05	3,143.73	6,287.45	0.00E+00	7.61E-02	1.52E-01
Co-60	2.7560E-06	3,143.73	6,287.45	0.00E+00	8.66E-03	1.73E-02
Cs-134	5.8851E-04	3,143.73	6,287.45	0.00E+00	1.85E+00	3.70E+00
Cs-135	3.4477E-06	3,143.73	6,287.45	0.00E+00	1.08E-02	2.17E-02
Cs-137	1.8099E+00	3,143.73	6,287.45	0.00E+00	5.69E+03	1.14E+04
Eu-154	1.6386E-02	3,143.73	6,287.45	0.00E+00	5.15E+01	1.03E+02
Eu-155	2.3957E-03	3,143.73	6,287.45	0.00E+00	7.53E+00	1.51E+01
Fe-55	3.2707E-05	3,143.73	6,287.45	0.00E+00	1.03E-01	2.06E-01
H-3	3.4504E-03	3,143.73	6,287.45	0.00E+00	1.08E+01	2.17E+01
I-129	7.5300E-07	3,143.73	6,287.45	0.00E+00	2.37E-03	4.73E-03
Kr-85	7.8540E-02	3,143.73	6,287.45	0.00E+00	2.47E+02	4.94E+02
Np-237	9.5615E-06	3,143.73	6,287.45	0.00E+00	3.01E-02	6.01E-02
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	3.64E-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-06	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
Tl-208	4.4336E-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.883E+14
0.0250	1.222E+14
0.0375	1.064E+14
0.0575	1.143E+14
0.0850	6.897E+13
0.1250	4.619E+13
0.2250	5.954E+13
0.3750	2.589E+13
0.5750	4.244E+14
0.8500	6.115E+12
1.2500	3.401E+12
1.7500	1.680E+11
2.2500	1.197E+07
2.7500	9.805E+06
3.5000	7.399E+03
5.0000	2.489E+03
7.0000	2.738E+02
11.0000	3.063E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.85E+01	1.33E+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 %:	93.10655847	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		3,143.73	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		6,287.45	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.20	
Bounding:	2.41	

Estimated EOL HM/Given EOL HM: 1.04

[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: 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

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	1,726.23	3,452.45	0.00E+00	1.98E-06	3.96E-06
Am-241	2.3056E-03	1,726.23	3,452.45	0.00E+00	3.98E+00	7.96E+00
Am-242m	4.1476E-07	1,726.23	3,452.45	0.00E+00	7.16E-04	1.43E-03
Am-243	1.4894E-06	1,726.23	3,452.45	0.00E+00	2.57E-03	5.14E-03
C-14	5.7108E-09	1,726.23	3,452.45	0.00E+00	9.86E-06	1.97E-05
Cl-36	1.3124E-32	1,726.23	3,452.45	0.00E+00	2.27E-29	4.53E-29
Cm-243	1.4562E-07	1,726.23	3,452.45	0.00E+00	2.51E-04	5.03E-04
Cm-244	2.4221E-05	1,726.23	3,452.45	0.00E+00	4.18E-02	8.36E-02
Co-60	2.7560E-06	1,726.23	3,452.45	0.00E+00	4.76E-03	9.51E-03
Cs-134	5.8851E-04	1,726.23	3,452.45	0.00E+00	1.02E+00	2.03E+00
Cs-135	3.4477E-06	1,726.23	3,452.45	0.00E+00	5.95E-03	1.19E-02
Cs-137	1.8099E+00	1,726.23	3,452.45	0.00E+00	3.12E+03	6.25E+03
Eu-154	1.6386E-02	1,726.23	3,452.45	0.00E+00	2.83E+01	5.66E+01
Eu-155	2.3957E-03	1,726.23	3,452.45	0.00E+00	4.14E+00	8.27E+00
Fe-55	3.2707E-05	1,726.23	3,452.45	0.00E+00	5.65E-02	1.13E-01
H-3	3.4504E-03	1,726.23	3,452.45	0.00E+00	5.96E+00	1.19E+01
I-129	7.5300E-07	1,726.23	3,452.45	0.00E+00	1.30E-03	2.60E-03
Kr-85	7.8540E-02	1,726.23	3,452.45	0.00E+00	1.36E+02	2.71E+02
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
Tl-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-06	1.04E-05
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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.231E+14
0.0250	6.711E+13
0.0375	5.845E+13
0.0575	6.276E+13
0.0850	3.787E+13
0.1250	2.537E+13
0.2250	3.270E+13
0.3750	1.421E+13
0.5750	2.330E+14
0.8500	3.358E+12
1.2500	1.867E+12
1.7500	9.226E+10
2.2500	6.576E+06
2.7500	5.384E+06
3.5000	4.154E+03
5.0000	1.406E+03
7.0000	1.549E+02
11.0000	1.734E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.65E+01	7.30E+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 %:	19.66156126	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:		1,726.23
Bounding:		3,452.45

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	
Bounding:	0.17	

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: IEA-R1 (UALX LEU) BRAZIL
SNF ID #: 1076
Fuel Units & Descr: 39 - ASSEMBLY
Heavy Metal Mass: BOL=29.507kg; EOL=28.661kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	801.46	1,602.93	0.00E+00	9.19E-07	1.84E-06
Am-241	2.3056E-03	801.46	1,602.93	0.00E+00	1.85E+00	3.70E+00
Am-242m	4.1476E-07	801.46	1,602.93	0.00E+00	3.32E-04	6.65E-04
Am-243	1.4894E-06	801.46	1,602.93	0.00E+00	1.19E-03	2.39E-03
C-14	5.7108E-09	801.46	1,602.93	0.00E+00	4.58E-06	9.15E-06
Cl-36	1.3124E-32	801.46	1,602.93	0.00E+00	1.05E-29	2.10E-29
Cm-243	1.4562E-07	801.46	1,602.93	0.00E+00	1.17E-04	2.33E-04
Cm-244	2.4221E-05	801.46	1,602.93	0.00E+00	1.94E-02	3.88E-02
Co-60	2.7560E-06	801.46	1,602.93	0.00E+00	2.21E-03	4.42E-03
Cs-134	5.8851E-04	801.46	1,602.93	0.00E+00	4.72E-01	9.43E-01
Cs-135	3.4477E-06	801.46	1,602.93	0.00E+00	2.76E-03	5.53E-03
Cs-137	1.8099E+00	801.46	1,602.93	0.00E+00	1.45E+03	2.90E+03
Eu-154	1.6386E-02	801.46	1,602.93	0.00E+00	1.31E+01	2.63E+01
Eu-155	2.3957E-03	801.46	1,602.93	0.00E+00	1.92E+00	3.84E+00
Fe-55	3.2707E-05	801.46	1,602.93	0.00E+00	2.62E-02	5.24E-02
H-3	3.4504E-03	801.46	1,602.93	0.00E+00	2.77E+00	5.53E+00
I-129	7.5300E-07	801.46	1,602.93	0.00E+00	6.03E-04	1.21E-03
Kr-85	7.8540E-02	801.46	1,602.93	0.00E+00	6.29E+01	1.26E+02
Np-237	9.5615E-06	801.46	1,602.93	0.00E+00	7.66E-03	1.53E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.500E+14
0.0250	3.116E+13
0.0375	2.714E+13
0.0575	2.914E+13
0.0850	1.758E+13
0.1250	1.178E+13
0.2250	1.518E+13
0.3750	6.599E+12
0.5750	1.082E+14
0.8500	1.559E+12
1.2500	8.670E+11
1.7500	4.283E+10
2.2500	3.053E+06
2.7500	2.500E+06
3.5000	1.929E+03
5.0000	6.527E+02
7.0000	7.191E+01
11.0000	8.050E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.70E+01	3.39E+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 %:	19.66156126	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:		801.46
Bounding:		1,602.93

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	
Bounding:	0.17	

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: 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

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	4.17	8.33	0.00E+00	4.78E-09	9.55E-09
Am-241	2.3056E-03	4.17	8.33	0.00E+00	9.61E-03	1.92E-02
Am-242m	4.1476E-07	4.17	8.33	0.00E+00	1.73E-06	3.46E-06
Am-243	1.4894E-06	4.17	8.33	0.00E+00	6.21E-06	1.24E-05
C-14	5.7108E-09	4.17	8.33	0.00E+00	2.38E-08	4.76E-08
Cl-36	1.3124E-32	4.17	8.33	0.00E+00	5.47E-32	1.09E-31
Cm-243	1.4562E-07	4.17	8.33	0.00E+00	6.07E-07	1.21E-06
Cm-244	2.4221E-05	4.17	8.33	0.00E+00	1.01E-04	2.02E-04
Co-60	2.7560E-06	4.17	8.33	0.00E+00	1.15E-05	2.30E-05
Cs-134	5.8851E-04	4.17	8.33	0.00E+00	2.45E-03	4.90E-03
Cs-135	3.4477E-06	4.17	8.33	0.00E+00	1.44E-05	2.87E-05
Cs-137	1.8099E+00	4.17	8.33	0.00E+00	7.54E+00	1.51E+01
Eu-154	1.6386E-02	4.17	8.33	0.00E+00	6.83E-02	1.37E-01
Eu-155	2.3957E-03	4.17	8.33	0.00E+00	9.98E-03	2.00E-02
Fe-55	3.2707E-05	4.17	8.33	0.00E+00	1.36E-04	2.73E-04
H-3	3.4504E-03	4.17	8.33	0.00E+00	1.44E-02	2.88E-02
I-129	7.5300E-07	4.17	8.33	0.00E+00	3.14E-06	6.28E-06
Kr-85	7.8540E-02	4.17	8.33	0.00E+00	3.27E-01	6.55E-01
Np-237	9.5615E-06	4.17	8.33	0.00E+00	3.98E-05	7.97E-05
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-08	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.800E+11
0.0250	1.620E+11
0.0375	1.411E+11
0.0575	1.515E+11
0.0850	9.143E+10
0.1250	6.127E+10
0.2250	7.906E+10
0.3750	3.431E+10
0.5750	5.625E+11
0.8500	8.106E+09
1.2500	4.508E+09
1.7500	2.227E+08
2.2500	1.587E+04
2.7500	1.300E+04
3.5000	1.046E+01
5.0000	3.572E+00
7.0000	3.938E-01
11.0000	4.410E-02

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.30961127	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4.17
Bounding:		8.33

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:	0.00	
Bounding:	0.01	

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: IOWA STATE UNIVERSITY (U3Si2 LEU)
SNF ID #: 953
Fuel Units & Descr: 24 - 24 FLAT PLATES
Heavy Metal Mass: BOL=19.205kg; EOL=19.195kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	9.09	18.18	0.00E+00	1.04E-08	2.08E-08
Am-241	2.3056E-03	9.09	18.18	0.00E+00	2.10E-02	4.19E-02
Am-242m	4.1476E-07	9.09	18.18	0.00E+00	3.77E-06	7.54E-06
Am-243	1.4894E-06	9.09	18.18	0.00E+00	1.35E-05	2.71E-05
C-14	5.7108E-09	9.09	18.18	0.00E+00	5.19E-08	1.04E-07
Cl-36	1.3124E-32	9.09	18.18	0.00E+00	1.19E-31	2.39E-31
Cm-243	1.4562E-07	9.09	18.18	0.00E+00	1.32E-06	2.65E-06
Cm-244	2.4221E-05	9.09	18.18	0.00E+00	2.20E-04	4.40E-04
Co-60	2.7560E-06	9.09	18.18	0.00E+00	2.51E-05	5.01E-05
Cs-134	5.8851E-04	9.09	18.18	0.00E+00	5.35E-03	1.07E-02
Cs-135	3.4477E-06	9.09	18.18	0.00E+00	3.13E-05	6.27E-05
Cs-137	1.8099E+00	9.09	18.18	0.00E+00	1.65E+01	3.29E+01
Eu-154	1.6386E-02	9.09	18.18	0.00E+00	1.49E-01	2.98E-01
Eu-155	2.3957E-03	9.09	18.18	0.00E+00	2.18E-02	4.36E-02
Fe-55	3.2707E-05	9.09	18.18	0.00E+00	2.97E-04	5.95E-04
H-3	3.4504E-03	9.09	18.18	0.00E+00	3.14E-02	6.27E-02
I-129	7.5300E-07	9.09	18.18	0.00E+00	6.85E-06	1.37E-05
Kr-85	7.8540E-02	9.09	18.18	0.00E+00	7.14E-01	1.43E+00
Np-237	9.5615E-06	9.09	18.18	0.00E+00	8.69E-05	1.74E-04
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	4.2810E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.702E+12
0.0250	3.535E+11
0.0375	3.078E+11
0.0575	3.305E+11
0.0850	1.995E+11
0.1250	1.336E+11
0.2250	1.724E+11
0.3750	7.486E+10
0.5750	1.227E+12
0.8500	1.768E+10
1.2500	9.835E+09
1.7500	4.859E+08
2.2500	3.468E+04
2.7500	2.839E+04
3.5000	4.926E+01
5.0000	1.917E+01
7.0000	2.170E+00
11.0000	2.470E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E-01	3.85E-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 %:	19.76527712	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	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
Nominal:	0.00	473.39
Bounding:	0.00	

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: 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

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	206.92	413.85	0.00E+00	4.15E-07	8.31E-07
Am-241	2.5251E-03	206.92	413.85	0.00E+00	5.22E-01	1.04E+00
Am-242m	3.9624E-07	206.92	413.85	0.00E+00	8.20E-05	1.64E-04
Am-243	1.4880E-06	206.92	413.85	0.00E+00	3.08E-04	6.16E-04
C-14	5.7053E-09	206.92	413.85	0.00E+00	1.18E-06	2.36E-06
Cl-36	1.3124E-32	206.92	413.85	0.00E+00	2.72E-30	5.43E-30
Cm-243	1.1419E-07	206.92	413.85	0.00E+00	2.36E-05	4.73E-05
Cm-244	1.6522E-05	206.92	413.85	0.00E+00	3.42E-03	6.84E-03
Co-60	7.4047E-07	206.92	413.85	0.00E+00	1.53E-04	3.06E-04
Cs-134	2.0455E-05	206.92	413.85	0.00E+00	4.23E-03	8.47E-03
Cs-135	3.4477E-06	206.92	413.85	0.00E+00	7.13E-04	1.43E-03
Cs-137	1.4365E+00	206.92	413.85	0.00E+00	2.97E+02	5.95E+02
Eu-154	7.3230E-03	206.92	413.85	0.00E+00	1.52E+00	3.03E+00
Eu-155	5.9259E-04	206.92	413.85	0.00E+00	1.23E-01	2.45E-01
Fe-55	2.2791E-06	206.92	413.85	0.00E+00	4.72E-04	9.43E-04
H-3	1.9698E-03	206.92	413.85	0.00E+00	4.08E-01	8.15E-01
I-129	7.5300E-07	206.92	413.85	0.00E+00	1.56E-04	3.12E-04
Kr-85	4.1176E-02	206.92	413.85	0.00E+00	8.52E+00	1.70E+01
Np-237	9.5752E-06	206.92	413.85	0.00E+00	1.98E-03	3.96E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.048E+13
0.0250	6.329E+12
0.0375	5.501E+12
0.0575	5.922E+12
0.0850	3.568E+12
0.1250	2.357E+12
0.2250	3.080E+12
0.3750	1.340E+12
0.5750	2.215E+13
0.8500	2.705E+11
1.2500	1.308E+11
1.7500	7.364E+09
2.2500	8.157E+05
2.7500	5.877E+05
3.5000	3.422E+02
5.0000	1.398E+02
7.0000	1.531E+01
11.0000	1.707E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.46E+00	6.93E+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 %:	77.58892697	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		206.92
Bounding:		413.85

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:	0.16	
Bounding:	0.33	

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: 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

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	182.40	364.79	0.00E+00	3.66E-07	7.32E-07
Am-241	2.5251E-03	182.40	364.79	0.00E+00	4.61E-01	9.21E-01
Am-242m	3.9624E-07	182.40	364.79	0.00E+00	7.23E-05	1.45E-04
Am-243	1.4880E-06	182.40	364.79	0.00E+00	2.71E-04	5.43E-04
C-14	5.7053E-09	182.40	364.79	0.00E+00	1.04E-06	2.08E-06
Cl-36	1.3124E-32	182.40	364.79	0.00E+00	2.39E-30	4.79E-30
Cm-243	1.1419E-07	182.40	364.79	0.00E+00	2.08E-05	4.17E-05
Cm-244	1.6522E-05	182.40	364.79	0.00E+00	3.01E-03	6.03E-03
Co-60	7.4047E-07	182.40	364.79	0.00E+00	1.35E-04	2.70E-04
Cs-134	2.0455E-05	182.40	364.79	0.00E+00	3.73E-03	7.46E-03
Cs-135	3.4477E-06	182.40	364.79	0.00E+00	6.29E-04	1.26E-03
Cs-137	1.4365E+00	182.40	364.79	0.00E+00	2.62E+02	5.24E+02
Eu-154	7.3230E-03	182.40	364.79	0.00E+00	1.34E+00	2.67E+00
Eu-155	5.9259E-04	182.40	364.79	0.00E+00	1.08E-01	2.16E-01
Fe-55	2.2791E-06	182.40	364.79	0.00E+00	4.16E-04	8.31E-04
H-3	1.9698E-03	182.40	364.79	0.00E+00	3.59E-01	7.19E-01
I-129	7.5300E-07	182.40	364.79	0.00E+00	1.37E-04	2.75E-04
Kr-85	4.1176E-02	182.40	364.79	0.00E+00	7.51E+00	1.50E+01
Np-237	9.5752E-06	182.40	364.79	0.00E+00	1.75E-03	3.49E-03
Pa-231	3.9379E-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
Tl-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	6.62E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.687E+13
0.0250	5.579E+12
0.0375	4.849E+12
0.0575	5.220E+12
0.0850	3.145E+12
0.1250	2.077E+12
0.2250	2.715E+12
0.3750	1.181E+12
0.5750	1.952E+13
0.8500	2.384E+11
1.2500	1.153E+11
1.7500	6.491E+09
2.2500	5.427E+05
2.7500	5.180E+05
3.5000	3.185E+02
5.0000	1.305E+02
7.0000	1.433E+01
11.0000	1.601E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.85E+00	8.11E+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 %:	19.22438767	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:		182.40
Bounding:		364.79

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:	0.09	

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: JMTR
SNF ID #: 507
Fuel Units & Descr: 574 - ASSEMBLY
Heavy Metal Mass: BOL=1176.7kg; EOL=1106.098kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1983
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	66,861.47	133,722.93	0.00E+00	1.34E-04	2.68E-04
Am-241	2.5251E-03	66,861.47	133,722.93	0.00E+00	1.69E+02	3.38E+02
Am-242m	3.9624E-07	66,861.47	133,722.93	0.00E+00	2.65E-02	5.30E-02
Am-243	1.4880E-06	66,861.47	133,722.93	0.00E+00	9.95E-02	1.99E-01
C-14	5.7053E-09	66,861.47	133,722.93	0.00E+00	3.81E-04	7.63E-04
Cl-36	1.3124E-32	66,861.47	133,722.93	0.00E+00	8.77E-28	1.75E-27
Cm-243	1.1419E-07	66,861.47	133,722.93	0.00E+00	7.63E-03	1.53E-02
Cm-244	1.6522E-05	66,861.47	133,722.93	0.00E+00	1.10E+00	2.21E+00
Co-60	7.4047E-07	66,861.47	133,722.93	0.00E+00	4.95E-02	9.90E-02
Cs-134	2.0455E-05	66,861.47	133,722.93	0.00E+00	1.37E+00	2.74E+00
Cs-135	3.4477E-06	66,861.47	133,722.93	0.00E+00	2.31E-01	4.61E-01
Cs-137	1.4365E+00	66,861.47	133,722.93	0.00E+00	9.60E+04	1.92E+05
Eu-154	7.3230E-03	66,861.47	133,722.93	0.00E+00	4.90E+02	9.79E+02
Eu-155	5.9259E-04	66,861.47	133,722.93	0.00E+00	3.96E+01	7.92E+01
Fe-55	2.2791E-06	66,861.47	133,722.93	0.00E+00	1.52E-01	3.05E-01
H-3	1.9698E-03	66,861.47	133,722.93	0.00E+00	1.32E+02	2.63E+02
I-129	7.5300E-07	66,861.47	133,722.93	0.00E+00	5.03E-02	1.01E-01
Kr-85	4.1176E-02	66,861.47	133,722.93	0.00E+00	2.75E+03	5.51E+03
Np-237	9.5752E-06	66,861.47	133,722.93	0.00E+00	6.40E-01	1.28E+00
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.849E+15
0.0250	2.045E+15
0.0375	1.778E+15
0.0575	1.913E+15
0.0850	1.153E+15
0.1250	7.615E+14
0.2250	9.953E+14
0.3750	4.330E+14
0.5750	7.156E+15
0.8500	8.741E+13
1.2500	4.228E+13
1.7500	2.379E+12
2.2500	1.989E+08
2.7500	1.899E+08
3.5000	1.117E+05
5.0000	4.567E+04
7.0000	5.001E+03
11.0000	5.579E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+03	2.24E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000029	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:		66,861.47
Bounding:		133,722.93

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 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: 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

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	24,345.03	48,690.06	0.00E+00	4.89E-05	9.77E-05
Am-241	2.5251E-03	24,345.03	48,690.06	0.00E+00	6.15E+01	1.23E+02
Am-242m	3.9624E-07	24,345.03	48,690.06	0.00E+00	9.65E-03	1.93E-02
Am-243	1.4880E-06	24,345.03	48,690.06	0.00E+00	3.62E-02	7.25E-02
C-14	5.7053E-09	24,345.03	48,690.06	0.00E+00	1.39E-04	2.78E-04
Cl-36	1.3124E-32	24,345.03	48,690.06	0.00E+00	3.19E-28	6.39E-28
Cm-243	1.1419E-07	24,345.03	48,690.06	0.00E+00	2.78E-03	5.56E-03
Cm-244	1.6522E-05	24,345.03	48,690.06	0.00E+00	4.02E-01	8.04E-01
Co-60	7.4047E-07	24,345.03	48,690.06	0.00E+00	1.80E-02	3.61E-02
Cs-134	2.0455E-05	24,345.03	48,690.06	0.00E+00	4.98E-01	9.96E-01
Cs-135	3.4477E-06	24,345.03	48,690.06	0.00E+00	8.39E-02	1.68E-01
Cs-137	1.4365E+00	24,345.03	48,690.06	0.00E+00	3.50E+04	6.99E+04
Eu-154	7.3230E-03	24,345.03	48,690.06	0.00E+00	1.78E+02	3.57E+02
Eu-155	5.9259E-04	24,345.03	48,690.06	0.00E+00	1.44E+01	2.89E+01
Fe-55	2.2791E-06	24,345.03	48,690.06	0.00E+00	5.55E-02	1.11E-01
H-3	1.9698E-03	24,345.03	48,690.06	0.00E+00	4.80E+01	9.59E+01
I-129	7.5300E-07	24,345.03	48,690.06	0.00E+00	1.83E-02	3.67E-02
Kr-85	4.1176E-02	24,345.03	48,690.06	0.00E+00	1.00E+03	2.00E+03
Np-237	9.5752E-06	24,345.03	48,690.06	0.00E+00	2.33E-01	4.66E-01
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
Tl-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
U-234	1.8562E-04	24,345.03	48,690.06	0.00E+00	4.52E+00	9.04E+00
U-235	-2.7235E-06	24,345.03	0.00	3.40E-01	2.74E-01	3.40E-01
U-236	1.5493E-05	24,345.03	48,690.06	0.00E+00	3.77E-01	7.54E-01
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.586E+15
0.0250	7.446E+14
0.0375	6.473E+14
0.0575	6.967E+14
0.0850	4.198E+14
0.1250	2.773E+14
0.2250	3.624E+14
0.3750	1.577E+14
0.5750	2.606E+15
0.8500	3.183E+13
1.2500	1.539E+13
1.7500	8.664E+11
2.2500	7.244E+07
2.7500	6.914E+07
3.5000	4.040E+04
5.0000	1.651E+04
7.0000	1.808E+03
11.0000	2.016E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.07E+02	8.15E+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 %:	45.011	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:		24,345.03
Bounding:		48,690.06

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:	0.22	
Bounding:	0.44	

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: 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

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 357.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 4.22

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	6,794.30	13,588.59	0.00E+00	1.36E-05	2.73E-05
Am-241	2.5251E-03	6,794.30	13,588.59	0.00E+00	1.72E+01	3.43E+01
Am-242m	3.9624E-07	6,794.30	13,588.59	0.00E+00	2.69E-03	5.38E-03
Am-243	1.4880E-06	6,794.30	13,588.59	0.00E+00	1.01E-02	2.02E-02
C-14	5.7053E-09	6,794.30	13,588.59	0.00E+00	3.88E-05	7.75E-05
Cl-36	1.3124E-32	6,794.30	13,588.59	0.00E+00	8.92E-29	1.78E-28
Cm-243	1.1419E-07	6,794.30	13,588.59	0.00E+00	7.76E-04	1.55E-03
Cm-244	1.6522E-05	6,794.30	13,588.59	0.00E+00	1.12E-01	2.25E-01
Co-60	7.4047E-07	6,794.30	13,588.59	0.00E+00	5.03E-03	1.01E-02
Cs-134	2.0455E-05	6,794.30	13,588.59	0.00E+00	1.39E-01	2.78E-01
Cs-135	3.4477E-06	6,794.30	13,588.59	0.00E+00	2.34E-02	4.68E-02
Cs-137	1.4365E+00	6,794.30	13,588.59	0.00E+00	9.76E+03	1.95E+04
Eu-154	7.3230E-03	6,794.30	13,588.59	0.00E+00	4.98E+01	9.95E+01
Eu-155	5.9259E-04	6,794.30	13,588.59	0.00E+00	4.03E+00	8.05E+00
Fe-55	2.2791E-06	6,794.30	13,588.59	0.00E+00	1.55E-02	3.10E-02
H-3	1.9698E-03	6,794.30	13,588.59	0.00E+00	1.34E+01	2.68E+01
I-129	7.5300E-07	6,794.30	13,588.59	0.00E+00	5.12E-03	1.02E-02
Kr-85	4.1176E-02	6,794.30	13,588.59	0.00E+00	2.80E+02	5.60E+02
Np-237	9.5752E-06	6,794.30	13,588.59	0.00E+00	6.51E-02	1.30E-01
Pa-231	3.9379E-09	6,794.30	13,588.59	0.00E+00	2.68E-05	5.35E-05
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	2.61E-10	5.21E-10
Tl-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	2.46E-06	4.93E-06
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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.001E+15
0.0250	2.078E+14
0.0375	1.806E+14
0.0575	1.944E+14
0.0850	1.172E+14
0.1250	7.738E+13
0.2250	1.011E+14
0.3750	4.400E+13
0.5750	7.272E+14
0.8500	8.882E+12
1.2500	4.296E+12
1.7500	2.418E+11
2.2500	2.022E+07
2.7500	1.930E+07
3.5000	1.118E+04
5.0000	4.570E+03
7.0000	5.001E+02
11.0000	5.576E+01

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.18522593	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,794.30
Bounding:		13,588.59

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.49	
Bounding:	0.97	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-2 (UALX-HEU 45%) JAPAN
SNF ID #: 685
Fuel Units & Descr: 144 - 12 CURVED PLATES
Heavy Metal Mass: BOL=70.229kg; EOL=62.496kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 4.00

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	9.5869E-10	7,122.71	14,245.41	0.00E+00	6.83E-06	1.37E-05
Am-241	1.0109E-02	7,122.71	14,245.41	0.00E+00	7.20E+01	1.44E+02
Am-242m	1.2789E-06	7,122.71	14,245.41	0.00E+00	9.11E-03	1.82E-02
Am-243	3.7047E-05	7,122.71	14,245.41	0.00E+00	2.64E-01	5.28E-01
C-14	2.6416E-08	7,122.71	14,245.41	0.00E+00	1.88E-04	3.76E-04
Cl-36	4.4441E-31	7,122.71	14,245.41	0.00E+00	3.17E-27	6.33E-27
Cm-243	3.9605E-06	7,122.71	14,245.41	0.00E+00	2.82E-02	5.64E-02
Cm-244	2.6227E-03	7,122.71	14,245.41	0.00E+00	1.87E+01	3.74E+01
Co-60	6.7740E-06	7,122.71	14,245.41	0.00E+00	4.82E-02	9.65E-02
Cs-134	6.8894E-05	7,122.71	14,245.41	0.00E+00	4.91E-01	9.81E-01
Cs-135	4.2564E-06	7,122.71	14,245.41	0.00E+00	3.03E-02	6.06E-02
Cs-137	1.4399E+00	7,122.71	14,245.41	0.00E+00	1.03E+04	2.05E+04
Eu-154	1.5522E-02	7,122.71	14,245.41	0.00E+00	1.11E+02	2.21E+02
Eu-155	1.7588E-03	7,122.71	14,245.41	0.00E+00	1.25E+01	2.51E+01
Fe-55	2.4933E-05	7,122.71	14,245.41	0.00E+00	1.78E-01	3.55E-01
H-3	1.9945E-03	7,122.71	14,245.41	0.00E+00	1.42E+01	2.84E+01
I-129	6.6403E-07	7,122.71	14,245.41	0.00E+00	4.73E-03	9.46E-03
Kr-85	4.1002E-02	7,122.71	14,245.41	0.00E+00	2.92E+02	5.84E+02
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	3.31E+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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.052E+15
0.0250	2.162E+14
0.0375	1.895E+14
0.0575	2.039E+14
0.0850	1.220E+14
0.1250	8.227E+13
0.2250	1.054E+14
0.3750	4.575E+13
0.5750	7.842E+14
0.8500	1.132E+13
1.2500	6.763E+12
1.7500	3.199E+11
2.2500	2.215E+07
2.7500	2.226E+07
3.5000	5.919E+05
5.0000	2.516E+05
7.0000	2.880E+04
11.0000	3.296E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.80E+02	3.00E+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 HM Constituents:	U	U
BOL Enrichment %:	44.93930164	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		7,122.71	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		14,245.41	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.46	

Estimated EOL HM/Given EOL HM: 1.00

[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: JRR-2 (UALX-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

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template 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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	9.5869E-10	1,584.67	3,169.33	0.00E+00	1.52E-06	3.04E-06
Am-241	1.0109E-02	1,584.67	3,169.33	0.00E+00	1.60E+01	3.20E+01
Am-242m	1.2789E-06	1,584.67	3,169.33	0.00E+00	2.03E-03	4.05E-03
Am-243	3.7047E-05	1,584.67	3,169.33	0.00E+00	5.87E-02	1.17E-01
C-14	2.6416E-08	1,584.67	3,169.33	0.00E+00	4.19E-05	8.37E-05
Cl-36	4.4441E-31	1,584.67	3,169.33	0.00E+00	7.04E-28	1.41E-27
Cm-243	3.9605E-06	1,584.67	3,169.33	0.00E+00	6.28E-03	1.26E-02
Cm-244	2.6227E-03	1,584.67	3,169.33	0.00E+00	4.16E+00	8.31E+00
Co-60	6.7740E-06	1,584.67	3,169.33	0.00E+00	1.07E-02	2.15E-02
Cs-134	6.8894E-05	1,584.67	3,169.33	0.00E+00	1.09E-01	2.18E-01
Cs-135	4.2564E-06	1,584.67	3,169.33	0.00E+00	6.74E-03	1.35E-02
Cs-137	1.4399E+00	1,584.67	3,169.33	0.00E+00	2.28E+03	4.56E+03
Eu-154	1.5522E-02	1,584.67	3,169.33	0.00E+00	2.46E+01	4.92E+01
Eu-155	1.7588E-03	1,584.67	3,169.33	0.00E+00	2.79E+00	5.57E+00
Fe-55	2.4933E-05	1,584.67	3,169.33	0.00E+00	3.95E-02	7.90E-02
H-3	1.9945E-03	1,584.67	3,169.33	0.00E+00	3.16E+00	6.32E+00
I-129	6.6403E-07	1,584.67	3,169.33	0.00E+00	1.05E-03	2.10E-03
Kr-85	4.1002E-02	1,584.67	3,169.33	0.00E+00	6.50E+01	1.30E+02
Np-237	3.1610E-05	1,584.67	3,169.33	0.00E+00	5.01E-02	1.00E-01
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
Tl-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	6.1543E-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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.341E+14
0.0250	4.810E+13
0.0375	4.216E+13
0.0575	4.535E+13
0.0850	2.714E+13
0.1250	1.830E+13
0.2250	2.345E+13
0.3750	1.018E+13
0.5750	1.700E+14
0.8500	2.518E+12
1.2500	1.505E+12
1.7500	7.118E+10
2.2500	4.928E+08
2.7500	4.953E+08
3.5000	1.317E+05
5.0000	5.596E+04
7.0000	6.407E+03
11.0000	7.331E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.34E+01	6.68E+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 %:	93.01903552	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,584.67	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,169.33	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

[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: JRR-3M (ULAX LEU)
SNF ID #: 1056
Fuel Units & Descr: 111 - 20 FLAT PLATES
Heavy Metal Mass: BOL=165.701kg; EOL=157.043kg
R/OD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6507E-09	8,229.12	16,458.25	0.00E+00	2.18E-05	4.36E-05
Am-241	2.8587E-02	8,229.12	16,458.25	0.00E+00	2.35E+02	4.70E+02
Am-242m	8.3267E-06	8,229.12	16,458.25	0.00E+00	6.85E-02	1.37E-01
Am-243	6.3920E-06	8,229.12	16,458.25	0.00E+00	5.26E-02	1.05E-01
C-14	2.9567E-08	8,229.12	16,458.25	0.00E+00	2.43E-04	4.87E-04
Cl-36	5.9507E-35	8,229.12	16,458.25	0.00E+00	4.90E-31	9.79E-31
Cm-243	1.5333E-06	8,229.12	16,458.25	0.00E+00	1.26E-02	2.52E-02
Cm-244	6.1980E-05	8,229.12	16,458.25	0.00E+00	5.10E-01	1.02E+00
Co-60	2.2720E-06	8,229.12	16,458.25	0.00E+00	1.87E-02	3.74E-02
Cs-134	1.3787E-05	8,229.12	16,458.25	0.00E+00	1.13E-01	2.27E-01
Cs-135	4.8607E-06	8,229.12	16,458.25	0.00E+00	4.00E-02	8.00E-02
Cs-137	1.4300E+00	8,229.12	16,458.25	0.00E+00	1.18E+04	2.35E+04
Eu-154	6.2340E-03	8,229.12	16,458.25	0.00E+00	5.13E+01	1.03E+02
Eu-155	5.0213E-04	8,229.12	16,458.25	0.00E+00	4.13E+00	8.26E+00
Fe-55	2.5980E-05	8,229.12	16,458.25	0.00E+00	2.14E-01	4.28E-01
H-3	2.0100E-03	8,229.12	16,458.25	0.00E+00	1.65E+01	3.31E+01
I-129	7.1600E-07	8,229.12	16,458.25	0.00E+00	5.89E-03	1.18E-02
Kr-85	3.8813E-02	8,229.12	16,458.25	0.00E+00	3.19E+02	6.39E+02
Np-237	3.9360E-06	8,229.12	16,458.25	0.00E+00	3.24E-02	6.48E-02
Pa-231	5.2460E-09	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
Tl-208	6.6553E-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	6.64E-03	1.33E-02
U-235	-2.5335E-06	8,229.12	0.00	7.10E-02	5.02E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.165E+15
0.0250	2.415E+14
0.0375	2.115E+14
0.0575	2.314E+14
0.0850	1.358E+14
0.1250	8.948E+13
0.2250	1.171E+14
0.3750	5.092E+13
0.5750	8.759E+14
0.8500	1.005E+13
1.2500	4.727E+12
1.7500	2.724E+11
2.2500	2.352E+07
2.7500	3.927E+06
3.5000	7.104E+04
5.0000	2.980E+04
7.0000	3.353E+03
11.0000	3.804E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.42E+02	2.84E+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 HM Constituents:	U	U
BOL Enrichment %:	19.837	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		8,229.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		16,458.25	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.13	
Bounding:	2.27	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (U3Si2 LEU)
SNF ID #: 1071
Fuel Units & Descr: 47 - ASSEMBLY
Heavy Metal Mass: BOL=47kg; EOL=44.655kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
1.96

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	2,221.04	4,442.09	0.00E+00	4.46E-06	8.91E-06
Am-241	2.5251E-03	2,221.04	4,442.09	0.00E+00	5.61E+00	1.12E+01
Am-242m	3.9624E-07	2,221.04	4,442.09	0.00E+00	8.80E-04	1.76E-03
Am-243	1.4880E-06	2,221.04	4,442.09	0.00E+00	3.30E-03	6.61E-03
C-14	5.7053E-09	2,221.04	4,442.09	0.00E+00	1.27E-05	2.53E-05
Cl-36	1.3124E-32	2,221.04	4,442.09	0.00E+00	2.91E-29	5.83E-29
Cm-243	1.1419E-07	2,221.04	4,442.09	0.00E+00	2.54E-04	5.07E-04
Cm-244	1.6522E-05	2,221.04	4,442.09	0.00E+00	3.67E-02	7.34E-02
Co-60	7.4047E-07	2,221.04	4,442.09	0.00E+00	1.64E-03	3.29E-03
Cs-134	2.0455E-05	2,221.04	4,442.09	0.00E+00	4.54E-02	9.09E-02
Cs-135	3.4477E-06	2,221.04	4,442.09	0.00E+00	7.66E-03	1.53E-02
Cs-137	1.4365E+00	2,221.04	4,442.09	0.00E+00	3.19E+03	6.38E+03
Eu-154	7.3230E-03	2,221.04	4,442.09	0.00E+00	1.63E+01	3.25E+01
Eu-155	5.9259E-04	2,221.04	4,442.09	0.00E+00	1.32E+00	2.63E+00
Fe-55	2.2791E-06	2,221.04	4,442.09	0.00E+00	5.06E-03	1.01E-02
H-3	1.9698E-03	2,221.04	4,442.09	0.00E+00	4.37E+00	8.75E+00
I-129	7.5300E-07	2,221.04	4,442.09	0.00E+00	1.67E-03	3.34E-03
Kr-85	4.1176E-02	2,221.04	4,442.09	0.00E+00	9.15E+01	1.83E+02
Np-237	9.5752E-06	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.272E+14
0.0250	6.794E+13
0.0375	5.905E+13
0.0575	6.356E+13
0.0850	3.830E+13
0.1250	2.530E+13
0.2250	3.306E+13
0.3750	1.438E+13
0.5750	2.377E+14
0.8500	2.904E+12
1.2500	1.404E+12
1.7500	7.904E+10
2.2500	6.609E+06
2.7500	6.308E+06
3.5000	3.721E+03
5.0000	1.522E+03
7.0000	1.667E+02
11.0000	1.860E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.72E+01	7.43E+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 %:	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:		2,221.04
Bounding:		4,442.09

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:	0.15	
Bounding:	0.30	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (UALX HEU)
SNF ID #: 505
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=7.676kg; EOL=6.338kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 16"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)[2]	Bounding 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
Cl-36	1.3124E-32	1,266.45	2,532.90	0.00E+00	1.66E-29	3.32E-29	0.0850	2.184E+13
Cm-243	1.1419E-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	1.656E+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	3.768E+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	3.9379E-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	1.6217E-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	1.6242E-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	4.60E-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	1.64E-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-08	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		
Tl-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	Thermal Power	
U-233	3.6275E-09	1,266.45	2,532.90	0.00E+00	4.59E-06	9.19E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	2.12E+01	4.24E+01
U-238	-4.2851E-09	1,266.45	0.00	1.80E-04	1.74E-04	1.80E-04	Total	Total
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	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,266.45	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,532.90	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

[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: JRR-4 (UALX HEU)
SNF ID #: 1070
Fuel Units & Descr: 11 - ASSEMBLY
Heavy Metal Mass: BOL=1.964kg; EOL=1.621kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	323.98	647.95	0.00E+00	6.50E-07	1.30E-06
Am-241	2.5251E-03	323.98	647.95	0.00E+00	8.18E-01	1.64E+00
Am-242m	3.9624E-07	323.98	647.95	0.00E+00	1.28E-04	2.57E-04
Am-243	1.4880E-06	323.98	647.95	0.00E+00	4.82E-04	9.64E-04
C-14	5.7053E-09	323.98	647.95	0.00E+00	1.85E-06	3.70E-06
Cl-36	1.3124E-32	323.98	647.95	0.00E+00	4.25E-30	8.50E-30
Cm-243	1.1419E-07	323.98	647.95	0.00E+00	3.70E-05	7.40E-05
Cm-244	1.6522E-05	323.98	647.95	0.00E+00	5.35E-03	1.07E-02
Co-60	7.4047E-07	323.98	647.95	0.00E+00	2.40E-04	4.80E-04
Cs-134	2.0455E-05	323.98	647.95	0.00E+00	6.63E-03	1.33E-02
Cs-135	3.4477E-06	323.98	647.95	0.00E+00	1.12E-03	2.23E-03
Cs-137	1.4365E+00	323.98	647.95	0.00E+00	4.65E+02	9.31E+02
Eu-154	7.3230E-03	323.98	647.95	0.00E+00	2.37E+00	4.74E+00
Eu-155	5.9259E-04	323.98	647.95	0.00E+00	1.92E-01	3.84E-01
Fe-55	2.2791E-06	323.98	647.95	0.00E+00	7.38E-04	1.48E-03
H-3	1.9696E-03	323.98	647.95	0.00E+00	6.38E-01	1.28E+00
I-129	7.5300E-07	323.98	647.95	0.00E+00	2.44E-04	4.88E-04
Kr-85	4.1176E-02	323.98	647.95	0.00E+00	1.33E+01	2.67E+01
Np-237	9.5752E-06	323.98	647.95	0.00E+00	3.10E-03	6.20E-03
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
Tl-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	4.60E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.772E+13
0.0250	9.910E+12
0.0375	8.613E+12
0.0575	9.271E+12
0.0850	5.586E+12
0.1250	3.690E+12
0.2250	4.823E+12
0.3750	2.098E+12
0.5750	3.467E+13
0.8500	4.235E+11
1.2500	2.049E+11
1.7500	1.153E+10
2.2500	9.640E+08
2.7500	9.201E+05
3.5000	5.332E+02
5.0000	2.179E+02
7.0000	2.384E+01
11.0000	2.659E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.42E+00	1.08E+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 %:	93.03204799	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		323.98	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		647.95	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

[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: KURR (UALX-HEU) JAPAN
SNF ID #: 601
Fuel Units & Descr: 240 - 18 CURVED PLATES
Heavy Metal Mass: BOL=40.824kg; EOL=33.48kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	6,954.91	13,909.82	0.00E+00	4.61E-06	9.22E-06
Am-241	2.0060E-03	6,954.91	13,909.82	0.00E+00	1.40E+01	2.79E+01
Am-242m	4.2429E-07	6,954.91	13,909.82	0.00E+00	2.95E-03	5.90E-03
Am-243	1.4899E-06	6,954.91	13,909.82	0.00E+00	1.04E-02	2.07E-02
C-14	5.7135E-09	6,954.91	13,909.82	0.00E+00	3.97E-05	7.95E-05
Cl-36	1.3124E-32	6,954.91	13,909.82	0.00E+00	9.13E-29	1.83E-28
Cm-243	1.6443E-07	6,954.91	13,909.82	0.00E+00	1.14E-03	2.29E-03
Cm-244	2.9330E-05	6,954.91	13,909.82	0.00E+00	2.04E-01	4.08E-01
Co-60	5.3186E-06	6,954.91	13,909.82	0.00E+00	3.70E-02	7.40E-02
Cs-134	3.1563E-03	6,954.91	13,909.82	0.00E+00	2.20E+01	4.39E+01
Cs-135	3.4477E-06	6,954.91	13,909.82	0.00E+00	2.40E-02	4.80E-02
Cs-137	2.0313E+00	6,954.91	13,909.82	0.00E+00	1.41E+04	2.83E+04
Eu-154	2.4513E-02	6,954.91	13,909.82	0.00E+00	1.70E+02	3.41E+02
Eu-155	4.8175E-03	6,954.91	13,909.82	0.00E+00	3.35E+01	6.70E+01
Fe-55	1.2397E-04	6,954.91	13,909.82	0.00E+00	8.62E-01	1.72E+00
H-3	4.5697E-03	6,954.91	13,909.82	0.00E+00	3.18E+01	6.36E+01
I-129	7.5300E-07	6,954.91	13,909.82	0.00E+00	5.24E-03	1.05E-02
Kr-85	1.0850E-01	6,954.91	13,909.82	0.00E+00	7.55E+02	1.51E+03
Np-237	9.5561E-06	6,954.91	13,909.82	0.00E+00	6.65E-02	1.33E-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
Tl-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
U-234	1.8450E-04	6,954.91	13,909.82	0.00E+00	1.28E+00	2.57E+00
U-235	-2.7235E-06	6,954.91	0.00	8.22E-02	6.33E-02	8.22E-02
U-236	1.5493E-05	6,954.91	13,909.82	0.00E+00	1.08E-01	2.16E-01
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.468E+15
0.0250	3.063E+14
0.0375	2.663E+14
0.0575	2.852E+14
0.0850	1.724E+14
0.1250	1.166E+14
0.2250	1.487E+14
0.3750	6.474E+13
0.5750	1.056E+15
0.8500	1.785E+13
1.2500	1.019E+13
1.7500	4.679E+11
2.2500	4.105E+07
2.7500	2.321E+07
3.5000	1.065E+05
5.0000	6.028E+03
7.0000	6.655E+02
11.0000	7.459E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E+02	3.32E+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 %:	93.175	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		6,954.91	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		13,909.82	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LWR SAMPLES
SNF ID #: 134
Fuel Units & Descr: 5 - ROD
Heavy Metal Mass: BOL= ; EOL=12.74kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 50 years

Estimated Canister usage: 18"x15' 0.18

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.5200E-06	12,107.49	12,107.49	0.00E+00	3.05E-02	3.05E-02
Am-241	8.6432E+00	12,107.49	12,107.49	0.00E+00	1.05E+05	1.05E+05
Am-242m	1.5728E-02	12,107.49	12,107.49	0.00E+00	1.90E+02	1.90E+02
Am-243	1.6288E-02	12,107.49	12,107.49	0.00E+00	1.97E+02	1.97E+02
C-14	1.2068E-01	12,107.49	12,107.49	0.00E+00	1.46E+03	1.46E+03
Cl-36	2.2849E-03	12,107.49	12,107.49	0.00E+00	2.77E+01	2.77E+01
Cm-243	6.0144E-04	12,107.49	12,107.49	0.00E+00	7.28E+00	7.28E+00
Cm-244	9.4880E-02	12,107.49	12,107.49	0.00E+00	1.15E+03	1.15E+03
Co-60	3.9052E+00	12,107.49	12,107.49	0.00E+00	4.73E+04	4.73E+04
Cs-134	2.2139E-06	12,107.49	12,107.49	0.00E+00	2.68E-02	2.68E-02
Cs-135	4.3976E-04	12,107.49	12,107.49	0.00E+00	5.32E+00	5.32E+00
Cs-137	1.4887E+01	12,107.49	12,107.49	0.00E+00	1.80E+05	1.80E+05
Eu-154	3.7342E-01	12,107.49	12,107.49	0.00E+00	4.52E+03	4.52E+03
Eu-155	8.4893E-03	12,107.49	12,107.49	0.00E+00	1.03E+02	1.03E+02
Fe-55	5.3750E-03	12,107.49	12,107.49	0.00E+00	6.51E+01	6.51E+01
H-3	1.0472E-01	12,107.49	12,107.49	0.00E+00	1.27E+03	1.27E+03
I-129	1.0618E-05	12,107.49	12,107.49	0.00E+00	1.29E-01	1.29E-01
Kr-85	2.2717E-01	12,107.49	12,107.49	0.00E+00	2.75E+03	2.75E+03
Np-237	1.6400E-04	12,107.49	12,107.49	0.00E+00	1.99E+00	1.99E+00
Pa-231	2.8688E-06	12,107.49	12,107.49	0.00E+00	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
Pm-147	3.2198E-04	12,107.49	12,107.49	0.00E+00	3.90E+00	3.90E+00
Pu-238	-1.1924E+00	12,107.49	0.00	3.27E+03	0.00E+00	3.27E+03
Pu-239	-4.8600E-02	12,107.49	0.00	3.96E+02	0.00E+00	3.96E+02
Pu-240	-3.0127E-01	12,107.49	0.00	5.06E+02	0.00E+00	5.06E+02
Pu-241	-1.2917E+02	12,107.49	0.00	1.30E+05	0.00E+00	1.30E+05
Pu-242	-1.1381E-04	12,107.49	0.00	2.19E+00	8.12E-01	2.19E+00
Ra-226	1.0760E-07	12,107.49	12,107.49	0.00E+00	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
Ru-106	1.3388E-13	12,107.49	12,107.49	0.00E+00	1.62E-09	1.62E-09
Se-79	1.9179E-04	12,107.49	12,107.49	0.00E+00	2.32E+00	2.32E+00
Sn-126	1.6669E-04	12,107.49	12,107.49	0.00E+00	2.02E+00	2.02E+00
Sr-90	1.3859E+01	12,107.49	12,107.49	0.00E+00	1.68E+05	1.68E+05
Tc-99	6.7678E-03	12,107.49	12,107.49	0.00E+00	8.19E+01	8.19E+01
Th-229	2.2592E-06	12,107.49	12,107.49	0.00E+00	2.74E-02	2.74E-02
Th-230	7.5955E-06	12,107.49	12,107.49	0.00E+00	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
Tl-208	7.5795E-05	12,107.49	12,107.49	0.00E+00	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
U-233	3.6128E-04	12,107.49	12,107.49	0.00E+00	4.37E+00	4.37E+00
U-234	1.2788E-02	12,107.49	12,107.49	0.00E+00	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
U-236	2.3485E-04	12,107.49	12,107.49	0.00E+00	2.84E+00	2.84E+00
U-238	1.1581E-04	12,107.49	12,107.49	1.36E-03	1.40E+00	1.40E+00
Y-90	1.3861E+01	12,107.49	12,107.49	0.00E+00	1.68E+05	1.68E+05
Other Radionuclides					6.22E+05	6.22E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.026E+16
0.0250	2.027E+15
0.0375	1.713E+15
0.0575	3.237E+15
0.0850	1.085E+15
0.1250	7.676E+14
0.2250	9.390E+14
0.3750	4.064E+14
0.5750	6.725E+15
0.8500	1.473E+14
1.2500	3.611E+15
1.7500	4.339E+12
2.2500	1.876E+10
2.7500	3.230E+10
3.5000	1.759E+07
5.0000	7.432E+06
7.0000	8.464E+05
11.0000	9.654E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.50E+03	6.64E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC OR 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:		12,107.49
Bounding:		12,107.49

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

[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: MIT
SNF ID #: 135
Fuel Units & Descr: 525 - 15 FLAT PLATES
Heavy Metal Mass: BOL=286.02kg; EOL=232.68kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10"
17.50

II. Estimates

Radionuclide	a_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	95,816.70	191,633.40	0.00E+00	1.39E-05	2.79E-05
Am-241	1.1190E-03	95,816.70	191,633.40	0.00E+00	1.07E+02	2.14E+02
Am-242m	4.5425E-07	95,816.70	191,633.40	0.00E+00	4.35E-02	8.70E-02
Am-243	1.4921E-06	95,816.70	191,633.40	0.00E+00	1.43E-01	2.86E-01
C-14	5.7244E-09	95,816.70	191,633.40	0.00E+00	5.48E-04	1.10E-03
Cl-36	1.3124E-32	95,816.70	191,633.40	0.00E+00	1.26E-27	2.51E-27
Cm-243	2.3676E-07	95,816.70	191,633.40	0.00E+00	2.27E-02	4.54E-02
Cm-244	5.2042E-05	95,816.70	191,633.40	0.00E+00	4.99E+00	9.97E+00
Co-60	3.8208E-05	95,816.70	191,633.40	0.00E+00	3.66E+00	7.32E+00
Cs-134	4.8693E-01	95,816.70	191,633.40	0.00E+00	4.67E+04	9.33E+04
Cs-135	3.4477E-06	95,816.70	191,633.40	0.00E+00	3.30E-01	6.61E-01
Cs-137	2.8731E+00	95,816.70	191,633.40	0.00E+00	2.75E+05	5.51E+05
Eu-154	8.2053E-02	95,816.70	191,633.40	0.00E+00	7.86E+03	1.57E+04
Eu-155	3.9134E-02	95,816.70	191,633.40	0.00E+00	3.75E+03	7.50E+03
Fe-55	6.7429E-03	95,816.70	191,633.40	0.00E+00	6.46E+02	1.29E+03
H-3	1.0599E-02	95,816.70	191,633.40	0.00E+00	1.02E+03	2.03E+03
I-129	7.5300E-07	95,816.70	191,633.40	0.00E+00	7.21E-02	1.44E-01
Kr-85	2.8595E-01	95,816.70	191,633.40	0.00E+00	2.74E+04	5.48E+04
Np-237	9.5479E-06	95,816.70	191,633.40	0.00E+00	9.15E-01	1.83E+00
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
Tl-208	4.4063E-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.697E+16
0.0250	7.965E+15
0.0375	7.350E+15
0.0575	7.227E+15
0.0850	4.607E+15
0.1250	3.990E+15
0.2250	3.905E+15
0.3750	1.890E+15
0.5750	2.596E+16
0.8500	3.636E+15
1.2500	6.765E+14
1.7500	2.837E+13
2.2500	5.950E+13
2.7500	3.423E+11
3.5000	3.797E+10
5.0000	1.135E+05
7.0000	1.265E+04
11.0000	1.426E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.86E+03	9.72E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1245618	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	95,816.70	50,514.01	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		191,633.40	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.06	0.53
Bounding:	2.13	

Estimated EOL HM/Given EOL HM: 0.82

[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: MIT
SNF ID #: 136
Fuel Units & Descr: 120 - 15 FLAT PLATES
Heavy Metal Mass: BOL=65.46kg; EOL=43.032kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	21,239.75	42,479.50	0.00E+00	4.26E-05	8.52E-05
Am-241	2.5251E-03	21,239.75	42,479.50	0.00E+00	5.36E+01	1.07E+02
Am-242m	3.9624E-07	21,239.75	42,479.50	0.00E+00	8.42E-03	1.68E-02
Am-243	1.4880E-06	21,239.75	42,479.50	0.00E+00	3.16E-02	6.32E-02
C-14	5.7053E-09	21,239.75	42,479.50	0.00E+00	1.21E-04	2.42E-04
Cl-36	1.3124E-32	21,239.75	42,479.50	0.00E+00	2.79E-28	5.57E-28
Cm-243	1.1419E-07	21,239.75	42,479.50	0.00E+00	2.43E-03	4.85E-03
Cm-244	1.6522E-05	21,239.75	42,479.50	0.00E+00	3.51E-01	7.02E-01
Co-60	7.4047E-07	21,239.75	42,479.50	0.00E+00	1.57E-02	3.15E-02
Cs-134	2.0455E-05	21,239.75	42,479.50	0.00E+00	4.34E-01	8.69E-01
Cs-135	3.4477E-06	21,239.75	42,479.50	0.00E+00	7.32E-02	1.46E-01
Cs-137	1.4365E+00	21,239.75	42,479.50	0.00E+00	3.05E+04	6.10E+04
Eu-154	7.3230E-03	21,239.75	42,479.50	0.00E+00	1.56E+02	3.11E+02
Eu-155	5.9259E-04	21,239.75	42,479.50	0.00E+00	1.26E+01	2.52E+01
Fe-55	2.2791E-06	21,239.75	42,479.50	0.00E+00	4.84E-02	9.68E-02
H-3	1.9698E-03	21,239.75	42,479.50	0.00E+00	4.18E+01	8.37E+01
I-129	7.5300E-07	21,239.75	42,479.50	0.00E+00	1.60E-02	3.20E-02
Kr-85	4.1176E-02	21,239.75	42,479.50	0.00E+00	8.75E+02	1.75E+03
Np-237	9.5752E-06	21,239.75	42,479.50	0.00E+00	2.03E-01	4.07E-01
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-06	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-79	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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.129E+15
0.0250	6.497E+14
0.0375	5.647E+14
0.0575	6.078E+14
0.0850	3.662E+14
0.1250	2.419E+14
0.2250	3.162E+14
0.3750	1.375E+14
0.5750	2.273E+15
0.8500	2.777E+13
1.2500	1.343E+13
1.7500	7.559E+11
2.2500	6.320E+07
2.7500	6.032E+07
3.5000	3.495E+04
5.0000	1.428E+04
7.0000	1.563E+03
11.0000	1.742E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.55E+02	7.11E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.145832	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		21,239.75	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		42,479.50	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

[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: 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

[1]Fuel decay start date: 1965
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5940E-08	316.46	632.91	0.00E+00	1.45E-05	2.91E-05
Am-241	1.1471E-04	316.46	632.91	0.00E+00	3.63E-02	7.26E-02
Am-242m	7.4210E-09	316.46	632.91	0.00E+00	2.35E-06	4.70E-06
Am-243	9.8236E-10	316.46	632.91	0.00E+00	3.11E-07	6.22E-07
C-14	2.2928E-04	316.46	632.91	0.00E+00	7.26E-02	1.45E-01
Cl-36	1.2260E-06	316.46	632.91	0.00E+00	3.88E-04	7.76E-04
Cm-243	1.2000E-10	316.46	632.91	0.00E+00	3.80E-08	7.59E-08
Cm-244	7.3577E-10	316.46	632.91	0.00E+00	2.33E-07	4.66E-07
Co-60	1.3732E-03	316.46	632.91	0.00E+00	4.35E-01	8.69E-01
Cs-134	1.2709E-10	316.46	632.91	0.00E+00	4.02E-08	8.04E-08
Cs-135	3.0316E-05	316.46	632.91	0.00E+00	9.59E-03	1.92E-02
Cs-137	7.2579E-01	316.46	632.91	0.00E+00	2.30E+02	4.59E+02
Eu-154	5.9750E-05	316.46	632.91	0.00E+00	1.89E-02	3.78E-02
Eu-155	1.0577E-05	316.46	632.91	0.00E+00	3.35E-03	6.69E-03
Fe-55	4.1631E-07	316.46	632.91	0.00E+00	1.32E-04	2.63E-04
H-3	4.6722E-04	316.46	632.91	0.00E+00	1.48E-01	2.96E-01
I-129	7.3195E-07	316.46	632.91	0.00E+00	2.32E-04	4.63E-04
Kr-85	5.9418E-03	316.46	632.91	0.00E+00	1.88E+00	3.76E+00
Np-237	1.1499E-06	316.46	632.91	0.00E+00	3.64E-04	7.28E-04
Pa-231	7.0899E-08	316.46	632.91	0.00E+00	2.24E-05	4.49E-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
Tl-208	1.6228E-06	316.46	632.91	0.00E+00	5.14E-06	1.03E-05
U-232	4.3960E-06	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	1.6190E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.310E+13
0.0250	4.800E+12
0.0375	4.171E+12
0.0575	4.476E+12
0.0850	2.704E+12
0.1250	1.754E+12
0.2250	2.332E+12
0.3750	1.016E+12
0.5750	1.710E+13
0.8500	1.660E+11
1.2500	1.202E+11
1.7500	4.271E+09
2.2500	8.077E+05
2.7500	3.618E+05
3.5000	4.749E+01
5.0000	1.969E+01
7.0000	2.187E+00
11.0000	2.462E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.88E+00	5.16E+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:	HASTELLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.143	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		316.46
Bounding:		632.91

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.12	
Bounding:	0.23	

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: MNR (UALX-HEU) CANADA
SNF ID #: 614
Fuel Units & Descr: 83 - 18 CURVED PLATES
Heavy Metal Mass: BOL=14.782kg; EOL=10.433kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 2.31

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	4,118.78	8,237.55	0.00E+00	2.73E-06	5.46E-06
Am-241	2.0060E-03	4,118.78	8,237.55	0.00E+00	8.26E+00	1.65E+01
Am-242m	4.2429E-07	4,118.78	8,237.55	0.00E+00	1.75E-03	3.50E-03
Am-243	1.4899E-06	4,118.78	8,237.55	0.00E+00	6.14E-03	1.23E-02
C-14	5.7135E-09	4,118.78	8,237.55	0.00E+00	2.35E-05	4.71E-05
Cl-36	1.3124E-32	4,118.78	8,237.55	0.00E+00	5.41E-29	1.08E-28
Cm-243	1.6443E-07	4,118.78	8,237.55	0.00E+00	6.77E-04	1.35E-03
Cm-244	2.9330E-05	4,118.78	8,237.55	0.00E+00	1.21E-01	2.42E-01
Co-60	5.3186E-06	4,118.78	8,237.55	0.00E+00	2.19E-02	4.38E-02
Cs-134	3.1563E-03	4,118.78	8,237.55	0.00E+00	1.30E+01	2.60E+01
Cs-135	3.4477E-06	4,118.78	8,237.55	0.00E+00	1.42E-02	2.84E-02
Cs-137	2.0313E+00	4,118.78	8,237.55	0.00E+00	8.37E+03	1.67E+04
Eu-154	2.4513E-02	4,118.78	8,237.55	0.00E+00	1.01E+02	2.02E+02
Eu-155	4.8175E-03	4,118.78	8,237.55	0.00E+00	1.98E+01	3.97E+01
Fe-55	1.2397E-04	4,118.78	8,237.55	0.00E+00	5.11E-01	1.02E+00
H-3	4.5697E-03	4,118.78	8,237.55	0.00E+00	1.88E+01	3.76E+01
I-129	7.5300E-07	4,118.78	8,237.55	0.00E+00	3.10E-03	6.20E-03
Kr-85	1.0850E-01	4,118.78	8,237.55	0.00E+00	4.47E+02	8.94E+02
Np-237	9.5561E-06	4,118.78	8,237.55	0.00E+00	3.94E-02	7.87E-02
Pa-231	2.0359E-09	4,118.78	8,237.55	0.00E+00	8.39E-06	1.68E-05
Pb-210	4.9728E-11	4,118.78	8,237.55	0.00E+00	2.05E-07	4.10E-07
Pm-147	4.8502E-02	4,118.78	8,237.55	0.00E+00	2.00E+02	4.00E+02
Pu-238	1.8254E-02	4,118.78	8,237.55	0.00E+00	7.52E+01	1.50E+02
Pu-239	4.2810E-04	4,118.78	8,237.55	0.00E+00	1.76E+00	3.53E+00
Pu-240	2.4368E-04	4,118.78	8,237.55	0.00E+00	1.00E+00	2.01E+00
Pu-241	3.3415E-02	4,118.78	8,237.55	0.00E+00	1.38E+02	2.75E+02
Pu-242	3.6329E-07	4,118.78	8,237.55	0.00E+00	1.50E-03	2.99E-03
Ra-226	2.2854E-10	4,118.78	8,237.55	0.00E+00	9.41E-07	1.88E-06
Ra-228	1.2426E-14	4,118.78	8,237.55	0.00E+00	5.12E-11	1.02E-10
Ru-106	6.3589E-06	4,118.78	8,237.55	0.00E+00	2.62E-02	5.24E-02
Se-79	1.2933E-05	4,118.78	8,237.55	0.00E+00	5.33E-02	1.07E-01
Sn-126	1.1574E-05	4,118.78	8,237.55	0.00E+00	4.77E-02	9.53E-02
Sr-90	1.9248E+00	4,118.78	8,237.55	0.00E+00	7.93E+03	1.59E+04
Tc-99	4.2239E-04	4,118.78	8,237.55	0.00E+00	1.74E+00	3.48E+00
Th-229	5.0953E-12	4,118.78	8,237.55	0.00E+00	2.10E-08	4.20E-08
Th-230	4.1885E-06	4,118.78	8,237.55	0.00E+00	1.73E-04	3.45E-04
Th-232	1.9270E-14	4,118.78	8,237.55	0.00E+00	7.94E-11	1.59E-10
Tl-208	4.6024E-06	4,118.78	8,237.55	0.00E+00	1.90E-04	3.79E-04
U-232	1.2582E-07	4,118.78	8,237.55	0.00E+00	5.18E-04	1.04E-03
U-233	2.5825E-09	4,118.78	8,237.55	0.00E+00	1.06E-05	2.13E-05
U-234	1.8450E-04	4,118.78	8,237.55	0.00E+00	7.60E-01	1.52E+00
U-235	-2.7235E-06	4,118.78	0.00	2.97E-02	1.85E-02	2.97E-02
U-236	1.5493E-05	4,118.78	8,237.55	0.00E+00	6.38E-02	1.28E-01
U-238	-4.2851E-09	4,118.78	0.00	3.42E-04	3.24E-04	3.42E-04
Y-90	1.9254E+00	4,118.78	8,237.55	0.00E+00	7.93E+03	1.59E+04
Other Radionuclides					7.97E+03	1.59E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.695E+14
0.0250	1.808E+14
0.0375	1.577E+14
0.0575	1.689E+14
0.0850	1.021E+14
0.1250	6.907E+13
0.2250	8.808E+13
0.3750	3.834E+13
0.5750	6.254E+14
0.8500	1.057E+13
1.2500	6.037E+12
1.7500	2.771E+11
2.2500	2.431E+07
2.7500	1.374E+07
3.5000	6.313E+04
5.0000	3.569E+03
7.0000	3.940E+02
11.0000	4.416E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.82E+01	1.96E+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 %:	93.11672336	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		4,118.78	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		8,237.55	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.89	
Bounding:	1.77	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MNR (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

[1]Fuel decay start date: 2006
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	545.86	1,091.72	0.00E+00	3.62E-07	7.24E-07
Am-241	2.0060E-03	545.86	1,091.72	0.00E+00	1.09E+00	2.19E+00
Am-242m	4.2429E-07	545.86	1,091.72	0.00E+00	2.32E-04	4.63E-04
Am-243	1.4899E-06	545.86	1,091.72	0.00E+00	8.13E-04	1.63E-03
C-14	5.7135E-09	545.86	1,091.72	0.00E+00	3.12E-06	6.24E-06
Cl-36	1.3124E-32	545.86	1,091.72	0.00E+00	7.16E-30	1.43E-29
Cm-243	1.6443E-07	545.86	1,091.72	0.00E+00	8.98E-05	1.80E-04
Cm-244	2.9330E-05	545.86	1,091.72	0.00E+00	1.60E-02	3.20E-02
Co-60	5.3186E-06	545.86	1,091.72	0.00E+00	2.90E-03	5.81E-03
Cs-134	3.1563E-03	545.86	1,091.72	0.00E+00	1.72E+00	3.45E+00
Cs-135	3.4477E-06	545.86	1,091.72	0.00E+00	1.88E-03	3.76E-03
Cs-137	2.0313E+00	545.86	1,091.72	0.00E+00	1.11E+03	2.22E+03
Eu-154	2.4513E-02	545.86	1,091.72	0.00E+00	1.34E+01	2.68E+01
Eu-155	4.8175E-03	545.86	1,091.72	0.00E+00	2.63E+00	5.26E+00
Fe-55	1.2397E-04	545.86	1,091.72	0.00E+00	6.77E-02	1.35E-01
H-3	4.5697E-03	545.86	1,091.72	0.00E+00	2.49E+00	4.99E+00
I-129	7.5300E-07	545.86	1,091.72	0.00E+00	4.11E-04	8.22E-04
Kr-85	1.0850E-01	545.86	1,091.72	0.00E+00	5.92E+01	1.18E+02
Np-237	9.5561E-06	545.86	1,091.72	0.00E+00	5.22E-03	1.04E-02
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
Tl-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	-4.2651E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.152E+14
0.0250	2.396E+13
0.0375	2.090E+13
0.0575	2.239E+13
0.0850	1.353E+13
0.1250	9.154E+12
0.2250	1.167E+13
0.3750	5.081E+12
0.5750	8.289E+13
0.8500	1.401E+12
1.2500	8.001E+11
1.7500	3.673E+10
2.2500	3.222E+06
2.7500	1.821E+06
3.5000	8.367E+03
5.0000	4.730E+02
7.0000	5.222E+01
11.0000	5.853E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.30E+01	2.60E+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 %:	93.11672336	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		545.86	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,091.72	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.89	
Bounding:	1.77	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MURR (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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	97,941.50	195,883.01	0.00E+00	1.42E-05	2.85E-05
Am-241	1.1190E-03	97,941.50	195,883.01	0.00E+00	1.10E+02	2.19E+02
Am-242m	4.5425E-07	97,941.50	195,883.01	0.00E+00	4.45E-02	8.90E-02
Am-243	1.4921E-06	97,941.50	195,883.01	0.00E+00	1.46E-01	2.92E-01
C-14	5.7244E-09	97,941.50	195,883.01	0.00E+00	5.61E-04	1.12E-03
Cl-36	1.3124E-32	97,941.50	195,883.01	0.00E+00	1.29E-27	2.57E-27
Cm-243	2.3676E-07	97,941.50	195,883.01	0.00E+00	2.32E-02	4.64E-02
Cm-244	5.2042E-05	97,941.50	195,883.01	0.00E+00	5.10E+00	1.02E+01
Co-60	3.8208E-05	97,941.50	195,883.01	0.00E+00	3.74E+00	7.48E+00
Cs-134	4.8693E-01	97,941.50	195,883.01	0.00E+00	4.77E+04	9.54E+04
Cs-135	3.4477E-06	97,941.50	195,883.01	0.00E+00	3.38E-01	6.75E-01
Cs-137	2.8731E+00	97,941.50	195,883.01	0.00E+00	2.81E+05	5.63E+05
Eu-154	8.2053E-02	97,941.50	195,883.01	0.00E+00	8.04E+03	1.61E+04
Eu-155	3.9134E-02	97,941.50	195,883.01	0.00E+00	3.83E+03	7.67E+03
Fe-55	6.7429E-03	97,941.50	195,883.01	0.00E+00	6.60E+02	1.32E+03
H-3	1.0599E-02	97,941.50	195,883.01	0.00E+00	1.04E+03	2.08E+03
I-129	7.5300E-07	97,941.50	195,883.01	0.00E+00	7.37E-02	1.47E-01
Kr-85	2.8595E-01	97,941.50	195,883.01	0.00E+00	2.80E+04	5.60E+04
Np-237	9.5479E-06	97,941.50	195,883.01	0.00E+00	9.35E-01	1.87E+00
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	4.2838E-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-06	7.45E-06
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.779E+16
0.0250	8.142E+15
0.0375	7.513E+15
0.0575	7.387E+15
0.0850	4.710E+15
0.1250	4.078E+15
0.2250	3.992E+15
0.3750	1.932E+15
0.5750	2.654E+16
0.8500	3.717E+15
1.2500	6.915E+14
1.7500	2.900E+13
2.2500	6.082E+13
2.7500	3.499E+11
3.5000	3.881E+10
5.0000	1.161E+05
7.0000	1.294E+04
11.0000	1.458E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.97E+03	9.93E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.26113117	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		97,941.50	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		195,883.01	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	
Bounding:	0.77	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1990
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	43,522.74	87,045.48	0.00E+00	8.73E-05	1.75E-04
Am-241	2.5251E-03	43,522.74	87,045.48	0.00E+00	1.10E+02	2.20E+02
Am-242m	3.9624E-07	43,522.74	87,045.48	0.00E+00	1.72E-02	3.45E-02
Am-243	1.4880E-06	43,522.74	87,045.48	0.00E+00	6.48E-02	1.30E-01
C-14	5.7053E-09	43,522.74	87,045.48	0.00E+00	2.48E-04	4.97E-04
Cl-36	1.3124E-32	43,522.74	87,045.48	0.00E+00	5.71E-28	1.14E-27
Cm-243	1.1419E-07	43,522.74	87,045.48	0.00E+00	4.97E-03	9.94E-03
Cm-244	1.6522E-05	43,522.74	87,045.48	0.00E+00	7.19E-01	1.44E+00
Co-60	7.4047E-07	43,522.74	87,045.48	0.00E+00	3.22E-02	6.45E-02
Cs-134	2.0455E-05	43,522.74	87,045.48	0.00E+00	8.90E-01	1.78E+00
Cs-135	3.4477E-06	43,522.74	87,045.48	0.00E+00	1.50E-01	3.00E-01
Cs-137	1.4365E+00	43,522.74	87,045.48	0.00E+00	6.25E+04	1.25E+05
Eu-154	7.3230E-03	43,522.74	87,045.48	0.00E+00	3.19E+02	6.37E+02
Eu-155	5.9259E-04	43,522.74	87,045.48	0.00E+00	2.58E+01	5.16E+01
Fe-55	2.2791E-06	43,522.74	87,045.48	0.00E+00	9.92E-02	1.98E-01
H-3	1.9698E-03	43,522.74	87,045.48	0.00E+00	8.57E+01	1.71E+02
I-129	7.5300E-07	43,522.74	87,045.48	0.00E+00	3.28E-02	6.55E-02
Kr-85	4.1176E-02	43,522.74	87,045.48	0.00E+00	1.79E+03	3.58E+03
Np-237	9.5752E-06	43,522.74	87,045.48	0.00E+00	4.17E-01	8.33E-01
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	5.63E-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	3.8371E-14	43,522.74	87,045.48	0.00E+00	1.67E-09	3.34E-09
Tl-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
Y-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.411E+15
0.0250	1.331E+15
0.0375	1.157E+15
0.0575	1.245E+15
0.0850	7.504E+14
0.1250	4.957E+14
0.2250	6.479E+14
0.3750	2.819E+14
0.5750	4.658E+15
0.8500	5.690E+13
1.2500	2.752E+13
1.7500	1.549E+12
2.2500	1.295E+08
2.7500	1.236E+08
3.5000	7.163E+04
5.0000	2.927E+04
7.0000	3.203E+03
11.0000	3.571E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.28E+02	1.46E+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:	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	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		87,045.48	Bounding burnup assumed to be twice nominal burnup.

Basis for burnup used in estimate:

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.53	
Bounding:	1.07	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).*

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: N.S. SAVANNAH (UO2)
SNF ID #: 854
Fuel Units & Descr: 12 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=21.09kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1963
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.2581E-09	31.68	31.68	0.00E+00	3.99E-08	3.99E-08
Am-241	1.4761E-01	31.68	31.68	0.00E+00	4.68E+00	4.68E+00
Am-242m	2.5032E-04	31.68	31.68	0.00E+00	7.93E-03	7.93E-03
Am-243	6.2387E-04	31.68	31.68	0.00E+00	1.98E-02	1.98E-02
C-14	4.7739E-05	31.68	31.68	0.00E+00	1.51E-03	1.51E-03
Cl-36	8.0297E-07	31.68	31.68	0.00E+00	2.54E-05	2.54E-05
Cm-243	1.2099E-04	31.68	31.68	0.00E+00	3.83E-03	3.83E-03
Cm-244	1.5560E-02	31.68	31.68	0.00E+00	4.93E-01	4.93E-01
Co-60	4.9580E-05	31.68	31.68	0.00E+00	1.57E-03	1.57E-03
Cs-134	1.7022E-09	31.68	31.68	0.00E+00	5.39E-08	5.39E-08
Cs-135	1.4433E-05	31.68	31.68	0.00E+00	4.57E-04	4.57E-04
Cs-137	6.9929E-01	31.68	31.68	0.00E+00	2.22E+01	2.22E+01
Eu-154	1.8023E-03	31.68	31.68	0.00E+00	5.71E-02	5.71E-02
Eu-155	2.6793E-05	31.68	31.68	0.00E+00	8.49E-04	8.49E-04
Fe-55	1.4580E-08	31.68	31.68	0.00E+00	4.62E-07	4.62E-07
H-3	3.8566E-03	31.68	31.68	0.00E+00	1.22E-01	1.22E-01
I-129	9.8288E-07	31.68	31.68	0.00E+00	3.11E-05	3.11E-05
Kr-85	4.0617E-03	31.68	31.68	0.00E+00	1.29E-01	1.29E-01
Np-237	1.2645E-05	31.68	31.68	0.00E+00	4.01E-04	4.01E-04
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-06	4.20E-06
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	6.4260E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.578E+11
0.0250	1.704E+11
0.0375	1.593E+11
0.0575	2.186E+11
0.0850	9.324E+10
0.1250	6.083E+10
0.2250	7.932E+10
0.3750	3.432E+10
0.5750	8.169E+11
0.8500	6.549E+09
1.2500	3.062E+09
1.7500	1.761E+08
2.2500	3.109E+04
2.7500	1.543E+05
3.5000	7.694E+03
5.0000	3.286E+03
7.0000	3.783E+02
11.0000	4.342E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.65E-01	4.65E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		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:		31.68
Bounding:		31.68

Basis for burnup used in estimate:
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
Nominal:	0.04	
Bounding:	0.04	

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: NEREIDE (FRANCE)
SNF ID #: 751
Fuel Units & Descr: 46 - 12 CURVED PLATES
Heavy Metal Mass: BOL= ; EOL=35.42kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1982
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	21.27	42.53	0.00E+00	4.27E-08	8.54E-08
Am-241	2.5251E-03	21.27	42.53	0.00E+00	5.37E-02	1.07E-01
Am-242m	3.9624E-07	21.27	42.53	0.00E+00	8.43E-06	1.69E-05
Am-243	1.4880E-06	21.27	42.53	0.00E+00	3.16E-05	6.33E-05
C-14	5.7053E-09	21.27	42.53	0.00E+00	1.21E-07	2.43E-07
Cl-36	1.3124E-32	21.27	42.53	0.00E+00	2.79E-31	5.58E-31
Cm-243	1.1419E-07	21.27	42.53	0.00E+00	2.43E-06	4.86E-06
Cm-244	1.6522E-05	21.27	42.53	0.00E+00	3.51E-04	7.03E-04
Co-60	7.4047E-07	21.27	42.53	0.00E+00	1.57E-05	3.15E-05
Cs-134	2.0455E-05	21.27	42.53	0.00E+00	4.35E-04	8.70E-04
Cs-135	3.4477E-06	21.27	42.53	0.00E+00	7.33E-05	1.47E-04
Cs-137	1.4365E+00	21.27	42.53	0.00E+00	3.05E+01	6.11E+01
Eu-154	7.3230E-03	21.27	42.53	0.00E+00	1.56E-01	3.11E-01
Eu-155	5.9259E-04	21.27	42.53	0.00E+00	1.26E-02	2.52E-02
Fe-55	2.2791E-06	21.27	42.53	0.00E+00	4.85E-05	9.69E-05
H-3	1.9698E-03	21.27	42.53	0.00E+00	4.19E-02	8.38E-02
I-129	7.5300E-07	21.27	42.53	0.00E+00	1.60E-05	3.20E-05
Kr-85	4.1176E-02	21.27	42.53	0.00E+00	8.76E-01	1.75E+00
Np-237	9.5752E-06	21.27	42.53	0.00E+00	2.04E-04	4.07E-04
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	2.75E-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	8.98E-03	1.80E-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
Tl-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	7.05E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.134E+12
0.0250	6.505E+11
0.0375	5.654E+11
0.0575	6.086E+11
0.0850	3.669E+11
0.1250	2.426E+11
0.2250	3.180E+11
0.3750	1.377E+11
0.5750	2.276E+12
0.8500	2.780E+10
1.2500	1.345E+10
1.7500	7.568E+08
2.2500	6.329E+04
2.7500	6.040E+04
3.5000	4.116E+01
5.0000	1.689E+01
7.0000	1.856E+00
11.0000	2.075E-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
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)[2]

	From SFD	Estimated
Nominal:		21.27
Bounding:		42.53

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=35.442kg
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: 0.96

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: NIST
SNF ID #: 154
Fuel Units & Descr: 980 - 17 CURVED PLATES
Heavy Metal Mass: BOL=367.5kg; EOL=159.74kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	5.4520E-10	191,368.36	338,505.35	0.00E+00	1.04E-04	1.85E-04
Am-241	9.2284E-03	191,368.36	338,505.35	0.00E+00	1.77E+03	3.12E+03
Am-242m	1.3390E-06	191,368.36	338,505.35	0.00E+00	2.56E-01	4.53E-01
Am-243	3.7084E-05	191,368.36	338,505.35	0.00E+00	7.10E+00	1.26E+01
C-14	2.6452E-08	191,368.36	338,505.35	0.00E+00	5.06E-03	8.95E-03
Cl-36	4.4441E-31	191,368.36	338,505.35	0.00E+00	8.50E-26	1.50E-25
Cm-243	5.0498E-06	191,368.36	338,505.35	0.00E+00	9.66E-01	1.71E+00
Cm-244	3.8451E-03	191,368.36	338,505.35	0.00E+00	7.36E+02	1.30E+03
Co-60	2.5225E-05	191,368.36	338,505.35	0.00E+00	4.83E+00	8.54E+00
Cs-134	1.9830E-03	191,368.36	338,505.35	0.00E+00	3.79E+02	6.71E+02
Cs-135	4.2564E-06	191,368.36	338,505.35	0.00E+00	8.15E-01	1.44E+00
Cs-137	1.8141E+00	191,368.36	338,505.35	0.00E+00	3.47E+05	6.14E+05
Eu-154	3.4733E-02	191,368.36	338,505.35	0.00E+00	6.65E+03	1.18E+04
Eu-155	7.1081E-03	191,368.36	338,505.35	0.00E+00	1.36E+03	2.41E+03
Fe-55	3.5790E-04	191,368.36	338,505.35	0.00E+00	6.85E+01	1.21E+02
H-3	3.4945E-03	191,368.36	338,505.35	0.00E+00	6.69E+02	1.18E+03
I-129	6.6403E-07	191,368.36	338,505.35	0.00E+00	1.27E-01	2.25E-01
Kr-85	7.8250E-02	191,368.36	338,505.35	0.00E+00	1.50E+04	2.65E+04
Np-237	3.1567E-05	191,368.36	338,505.35	0.00E+00	6.04E+00	1.07E+01
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
Tl-208	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-236	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	6.43E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.173E+16
0.0250	6.532E+15
0.0375	5.767E+15
0.0575	6.151E+15
0.0850	3.702E+15
0.1250	2.569E+15
0.2250	3.198E+15
0.3750	1.383E+15
0.5750	2.294E+16
0.8500	4.518E+14
1.2500	3.049E+14
1.7500	1.262E+13
2.2500	6.803E+08
2.7500	5.848E+08
3.5000	2.008E+07
5.0000	8.511E+06
7.0000	9.762E+05
11.0000	1.118E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.96E+03	8.78E+03
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 %:	93.33333333	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		191,368.36	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	190,365.00	338,505.35	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.19	
Bounding:	2.11	1.78

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	5.4520E-10	35,243.24	66,463.11	0.00E+00	1.92E-05	3.62E-05
Am-241	9.2284E-03	35,243.24	66,463.11	0.00E+00	3.25E+02	6.13E+02
Am-242m	1.3390E-06	35,243.24	66,463.11	0.00E+00	4.72E-02	8.90E-02
Am-243	3.7084E-05	35,243.24	66,463.11	0.00E+00	1.31E+00	2.46E+00
C-14	2.6452E-08	35,243.24	66,463.11	0.00E+00	9.32E-04	1.76E-03
Cl-36	4.4441E-31	35,243.24	66,463.11	0.00E+00	1.57E-26	2.95E-26
Cm-243	5.0498E-06	35,243.24	66,463.11	0.00E+00	1.78E-01	3.36E-01
Cm-244	3.8451E-03	35,243.24	66,463.11	0.00E+00	1.36E+02	2.56E+02
Co-60	2.5225E-05	35,243.24	66,463.11	0.00E+00	8.89E-01	1.68E+00
Cs-134	1.9830E-03	35,243.24	66,463.11	0.00E+00	6.99E+01	1.32E+02
Cs-135	4.2564E-06	35,243.24	66,463.11	0.00E+00	1.50E-01	2.83E-01
Cs-137	1.8141E+00	35,243.24	66,463.11	0.00E+00	6.39E+04	1.21E+05
Eu-154	3.4733E-02	35,243.24	66,463.11	0.00E+00	1.22E+03	2.31E+03
Eu-155	7.1081E-03	35,243.24	66,463.11	0.00E+00	2.51E+02	4.72E+02
Fe-55	3.5790E-04	35,243.24	66,463.11	0.00E+00	1.26E+01	2.38E+01
H-3	3.4945E-03	35,243.24	66,463.11	0.00E+00	1.23E+02	2.32E+02
I-129	6.6403E-07	35,243.24	66,463.11	0.00E+00	2.34E-02	4.41E-02
Kr-85	7.8250E-02	35,243.24	66,463.11	0.00E+00	2.76E+03	5.20E+03
Np-237	3.1567E-05	35,243.24	66,463.11	0.00E+00	1.11E+00	2.10E+00
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	4.62E+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
Tl-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	1.66E-03	1.32E-03	1.66E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.231E+15
0.0250	1.282E+15
0.0375	1.132E+15
0.0575	1.208E+15
0.0850	7.269E+14
0.1250	5.044E+14
0.2250	6.274E+14
0.3750	2.716E+14
0.5750	4.504E+15
0.8500	6.871E+13
1.2500	5.987E+13
1.7500	2.478E+12
2.2500	1.336E+08
2.7500	1.148E+08
3.5000	3.942E+06
5.0000	1.671E+06
7.0000	1.917E+05
11.0000	2.195E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.14E+02	1.72E+03
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 %:	93.17430199	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	43.29	35,243.24	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		66,463.11	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	814.05
Bounding:	2.11	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OHIO STATE (HEU)
SNF ID #: 157
Fuel Units & Descr: 24 - 18 FLAT PLATES
Heavy Metal Mass: BOL=3.41kg; EOL=3.41kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2030
Template: ATR (Light Water, Alum., 80 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	64.59	129.19	0.00E+00	1.30E-07	2.59E-07
Am-241	2.5251E-03	64.59	129.19	0.00E+00	1.63E-01	3.26E-01
Am-242m	3.9624E-07	64.59	129.19	0.00E+00	2.56E-05	5.12E-05
Am-243	1.4880E-06	64.59	129.19	0.00E+00	9.61E-05	1.92E-04
C-14	5.7053E-09	64.59	129.19	0.00E+00	3.69E-07	7.37E-07
Cl-36	1.3124E-32	64.59	129.19	0.00E+00	8.48E-31	1.70E-30
Cm-243	1.1419E-07	64.59	129.19	0.00E+00	7.38E-06	1.48E-05
Cm-244	1.6522E-05	64.59	129.19	0.00E+00	1.07E-03	2.13E-03
Co-60	7.4047E-07	64.59	129.19	0.00E+00	4.78E-05	9.57E-05
Cs-134	2.0455E-05	64.59	129.19	0.00E+00	1.32E-03	2.64E-03
Cs-135	3.4477E-06	64.59	129.19	0.00E+00	2.23E-04	4.45E-04
Cs-137	1.4365E+00	64.59	129.19	0.00E+00	9.28E+01	1.86E+02
Eu-154	7.3230E-03	64.59	129.19	0.00E+00	4.73E-01	9.46E-01
Eu-155	5.9259E-04	64.59	129.19	0.00E+00	3.83E-02	7.66E-02
Fe-55	2.2791E-06	64.59	129.19	0.00E+00	1.47E-04	2.94E-04
H-3	1.9698E-03	64.59	129.19	0.00E+00	1.27E-01	2.54E-01
I-129	7.5300E-07	64.59	129.19	0.00E+00	4.86E-05	9.73E-05
Kr-85	4.1176E-02	64.59	129.19	0.00E+00	2.66E+00	5.32E+00
Np-237	9.5752E-06	64.59	129.19	0.00E+00	6.19E-04	1.24E-03
Pa-231	3.9379E-09	64.59	129.19	0.00E+00	2.54E-07	5.09E-07
Pb-210	3.3115E-10	64.59	129.19	0.00E+00	2.14E-08	4.28E-08
Pm-147	9.2402E-04	64.59	129.19	0.00E+00	5.97E-02	1.19E-01
Pu-238	1.6217E-02	64.59	129.19	0.00E+00	1.05E+00	2.10E+00
Pu-239	4.2810E-04	64.59	129.19	0.00E+00	2.77E-02	5.53E-02
Pu-240	2.4333E-04	64.59	129.19	0.00E+00	1.57E-02	3.14E-02
Pu-241	1.6242E-02	64.59	129.19	0.00E+00	1.05E+00	2.10E+00
Pu-242	3.6329E-07	64.59	129.19	0.00E+00	2.35E-05	4.69E-05
Ra-226	9.0114E-10	64.59	129.19	0.00E+00	5.82E-08	1.16E-07
Ra-228	3.1019E-14	64.59	129.19	0.00E+00	2.00E-12	4.01E-12
Ru-106	2.1225E-10	64.59	129.19	0.00E+00	1.37E-08	2.74E-08
Se-79	1.2930E-05	64.59	129.19	0.00E+00	8.35E-04	1.67E-03
Sn-126	1.1571E-05	64.59	129.19	0.00E+00	7.47E-04	1.49E-03
Sr-90	1.3472E+00	64.59	129.19	0.00E+00	8.70E+01	1.74E+02
Tc-99	4.2239E-04	64.59	129.19	0.00E+00	2.73E-02	5.46E-02
Th-229	1.2407E-11	64.59	129.19	0.00E+00	8.01E-10	1.60E-09
Th-230	8.3497E-06	64.59	129.19	0.00E+00	5.39E-06	1.08E-05
Th-232	3.8371E-14	64.59	129.19	0.00E+00	2.48E-12	4.96E-12
Tl-208	4.0414E-06	64.59	129.19	0.00E+00	2.61E-06	5.22E-06
U-232	1.0948E-07	64.59	129.19	0.00E+00	7.07E-06	1.41E-05
U-233	3.6275E-09	64.59	129.19	0.00E+00	2.34E-07	4.69E-07
U-234	1.8562E-04	64.59	129.19	0.00E+00	1.20E-02	2.40E-02
U-235	-2.7235E-06	64.59	0.00	6.87E-03	6.70E-03	6.87E-03
U-236	1.5493E-05	64.59	129.19	0.00E+00	1.00E-03	2.00E-03
U-238	-4.2851E-09	64.59	0.00	7.73E-05	7.70E-05	7.73E-05
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.515E+12
0.0250	1.976E+12
0.0375	1.717E+12
0.0575	1.848E+12
0.0850	1.114E+12
0.1250	7.357E+11
0.2250	9.616E+11
0.3750	4.183E+11
0.5750	6.913E+12
0.8500	8.445E+10
1.2500	4.084E+10
1.7500	2.299E+09
2.2500	1.922E+05
2.7500	1.834E+05
3.5000	1.069E+02
5.0000	4.368E+01
7.0000	4.781E+00
11.0000	5.331E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.08E+00	2.16E+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 %:	93.25425219	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		64.59
Bounding:		129.19

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[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: 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	495.31	990.62	0.00E+00	7.20E-08	1.44E-07
Am-241	1.1190E-03	495.31	990.62	0.00E+00	5.54E-01	1.11E+00
Am-242m	4.5425E-07	495.31	990.62	0.00E+00	2.25E-04	4.50E-04
Am-243	1.4921E-06	495.31	990.62	0.00E+00	7.39E-04	1.48E-03
C-14	5.7244E-09	495.31	990.62	0.00E+00	2.84E-06	5.67E-06
Cl-36	1.3124E-32	495.31	990.62	0.00E+00	6.50E-30	1.30E-29
Cm-243	2.3676E-07	495.31	990.62	0.00E+00	1.17E-04	2.35E-04
Cm-244	5.2042E-05	495.31	990.62	0.00E+00	2.58E-02	5.16E-02
Co-60	3.8208E-05	495.31	990.62	0.00E+00	1.89E-02	3.78E-02
Cs-134	4.8693E-01	495.31	990.62	0.00E+00	2.41E+02	4.82E+02
Cs-135	3.4477E-06	495.31	990.62	0.00E+00	1.71E-03	3.42E-03
Cs-137	2.8731E+00	495.31	990.62	0.00E+00	1.42E+03	2.85E+03
Eu-154	8.2053E-02	495.31	990.62	0.00E+00	4.06E+01	8.13E+01
Eu-155	3.9134E-02	495.31	990.62	0.00E+00	1.94E+01	3.88E+01
Fe-55	6.7429E-03	495.31	990.62	0.00E+00	3.34E+00	6.68E+00
H-3	1.0599E-02	495.31	990.62	0.00E+00	5.25E+00	1.05E+01
I-129	7.5300E-07	495.31	990.62	0.00E+00	3.73E-04	7.46E-04
Kr-85	2.8595E-01	495.31	990.62	0.00E+00	1.42E+02	2.83E+02
Np-237	9.5479E-06	495.31	990.62	0.00E+00	4.73E-03	9.46E-03
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
Tl-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	9.69E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.911E+14
0.0250	4.117E+13
0.0375	3.799E+13
0.0575	3.736E+13
0.0850	2.362E+13
0.1250	2.063E+13
0.2250	2.019E+13
0.3750	9.771E+12
0.5750	1.342E+14
0.8500	1.880E+13
1.2500	3.497E+12
1.7500	1.466E+11
2.2500	3.076E+11
2.7500	1.770E+09
3.5000	1.963E+08
5.0000	6.030E+02
7.0000	6.728E+01
11.0000	7.588E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.51E+01	5.02E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76578383	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:		495.31
Bounding:		990.62

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[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: OMEGA WEST (204)
SNF ID #: 406
Fuel Units & Descr: 16 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=3.264kg; EOL=2.525kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	848.64	1,021.63	0.00E+00	1.70E-06	2.05E-06
Am-241	2.5251E-03	848.64	1,021.63	0.00E+00	2.14E+00	2.58E+00
Am-242m	3.9624E-07	848.64	1,021.63	0.00E+00	3.36E-04	4.05E-04
Am-243	1.4880E-06	848.64	1,021.63	0.00E+00	1.26E-03	1.52E-03
C-14	5.7053E-09	848.64	1,021.63	0.00E+00	4.84E-06	5.83E-06
Cl-36	1.3124E-32	848.64	1,021.63	0.00E+00	1.11E-29	1.34E-29
Cm-243	1.1419E-07	848.64	1,021.63	0.00E+00	9.69E-05	1.17E-04
Cm-244	1.6522E-05	848.64	1,021.63	0.00E+00	1.40E-02	1.69E-02
Co-60	7.4047E-07	848.64	1,021.63	0.00E+00	6.28E-04	7.56E-04
Cs-134	2.0455E-05	848.64	1,021.63	0.00E+00	1.74E-02	2.09E-02
Cs-135	3.4477E-06	848.64	1,021.63	0.00E+00	2.93E-03	3.52E-03
Cs-137	1.4365E+00	848.64	1,021.63	0.00E+00	1.22E+03	1.47E+03
Eu-154	7.3230E-03	848.64	1,021.63	0.00E+00	6.21E+00	7.48E+00
Eu-155	5.9259E-04	848.64	1,021.63	0.00E+00	5.03E-01	6.05E-01
Fe-55	2.2791E-06	848.64	1,021.63	0.00E+00	1.93E-03	2.33E-03
H-3	1.9698E-03	848.64	1,021.63	0.00E+00	1.67E+00	2.01E+00
I-129	7.5300E-07	848.64	1,021.63	0.00E+00	6.39E-04	7.69E-04
Kr-85	4.1176E-02	848.64	1,021.63	0.00E+00	3.49E+01	4.21E+01
Np-237	9.5752E-06	848.64	1,021.63	0.00E+00	8.13E-03	9.78E-03
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-05	8.53E-05
Th-232	3.8371E-14	848.64	1,021.63	0.00E+00	3.26E-11	3.92E-11
Tl-208	4.0414E-08	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					1.16E+03	1.40E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.524E+13
0.0250	1.562E+13
0.0375	1.358E+13
0.0575	1.462E+13
0.0850	8.808E+12
0.1250	5.818E+12
0.2250	7.604E+12
0.3750	3.308E+12
0.5750	5.467E+13
0.8500	6.678E+11
1.2500	3.230E+11
1.7500	1.818E+10
2.2500	1.520E+08
2.7500	1.451E+08
3.5000	8.408E+02
5.0000	3.436E+02
7.0000	3.760E+01
11.0000	4.192E+00

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)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	848.64	700.04	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	1,021.63	1,400.07	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: 0.96

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OMEGA WEST (236)
SNF ID #: 407
Fuel Units & Descr: 44 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=10.384kg; EOL=7.264kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	3,665.55	4,475.50	0.00E+00	7.36E-06	8.98E-06
Am-241	2.5251E-03	3,665.55	4,475.50	0.00E+00	9.26E+00	1.13E+01
Am-242m	3.9624E-07	3,665.55	4,475.50	0.00E+00	1.45E-03	1.77E-03
Am-243	1.4880E-06	3,665.55	4,475.50	0.00E+00	5.45E-03	6.66E-03
C-14	5.7053E-09	3,665.55	4,475.50	0.00E+00	2.09E-05	2.55E-05
Cl-36	1.3124E-32	3,665.55	4,475.50	0.00E+00	4.81E-29	5.87E-29
Cm-243	1.1419E-07	3,665.55	4,475.50	0.00E+00	4.19E-04	5.11E-04
Cm-244	1.6522E-05	3,665.55	4,475.50	0.00E+00	6.06E-02	7.39E-02
Co-60	7.4047E-07	3,665.55	4,475.50	0.00E+00	2.71E-03	3.31E-03
Cs-134	2.0455E-05	3,665.55	4,475.50	0.00E+00	7.50E-02	9.15E-02
Cs-135	3.4477E-06	3,665.55	4,475.50	0.00E+00	1.26E-02	1.54E-02
Cs-137	1.4365E+00	3,665.55	4,475.50	0.00E+00	5.27E+03	6.43E+03
Eu-154	7.3230E-03	3,665.55	4,475.50	0.00E+00	2.68E+01	3.28E+01
Eu-155	5.9259E-04	3,665.55	4,475.50	0.00E+00	2.17E+00	2.65E+00
Fe-55	2.2791E-06	3,665.55	4,475.50	0.00E+00	8.35E-03	1.02E-02
H-3	1.9698E-03	3,665.55	4,475.50	0.00E+00	7.22E+00	8.82E+00
I-129	7.5300E-07	3,665.55	4,475.50	0.00E+00	2.76E-03	3.37E-03
Kr-85	4.1176E-02	3,665.55	4,475.50	0.00E+00	1.51E+02	1.84E+02
Np-237	9.5752E-06	3,665.55	4,475.50	0.00E+00	3.51E-02	4.29E-02
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.296E+14
0.0250	6.845E+13
0.0375	5.949E+13
0.0575	6.404E+13
0.0850	3.858E+13
0.1250	2.549E+13
0.2250	3.331E+13
0.3750	1.449E+13
0.5750	2.395E+14
0.8500	2.925E+12
1.2500	1.415E+12
1.7500	7.964E+10
2.2500	6.658E+06
2.7500	6.355E+06
3.5000	3.682E+03
5.0000	1.505E+03
7.0000	1.647E+02
11.0000	1.836E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.13E+01	7.49E+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 %:	93.22033898	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3,665.55	2,954.32	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	4,475.50	5,908.64	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

[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: OMEGA WEST (250)
SNF ID #: 406
Fuel Units & Descr: 27 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=6.75kg; EOL=5.2kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 1.13

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1,559.25	2,949.75	0.00E+00	3.13E-06	5.92E-06
Am-241	2.5251E-03	1,559.25	2,949.75	0.00E+00	3.94E+00	7.45E+00
Am-242m	3.9624E-07	1,559.25	2,949.75	0.00E+00	6.18E-04	1.17E-03
Am-243	1.4880E-06	1,559.25	2,949.75	0.00E+00	2.32E-03	4.39E-03
C-14	5.7053E-09	1,559.25	2,949.75	0.00E+00	8.90E-06	1.68E-05
Cl-36	1.3124E-32	1,559.25	2,949.75	0.00E+00	2.05E-29	3.87E-29
Cm-243	1.1419E-07	1,559.25	2,949.75	0.00E+00	1.78E-04	3.37E-04
Cm-244	1.6522E-05	1,559.25	2,949.75	0.00E+00	2.58E-02	4.87E-02
Co-60	7.4047E-07	1,559.25	2,949.75	0.00E+00	1.15E-03	2.18E-03
Cs-134	2.0455E-05	1,559.25	2,949.75	0.00E+00	3.19E-02	6.03E-02
Cs-135	3.4477E-06	1,559.25	2,949.75	0.00E+00	5.38E-03	1.02E-02
Cs-137	1.4365E+00	1,559.25	2,949.75	0.00E+00	2.24E+03	4.24E+03
Eu-154	7.3230E-03	1,559.25	2,949.75	0.00E+00	1.14E+01	2.16E+01
Eu-155	5.9259E-04	1,559.25	2,949.75	0.00E+00	9.24E-01	1.75E+00
Fe-55	2.2791E-06	1,559.25	2,949.75	0.00E+00	3.55E-03	6.72E-03
H-3	1.9698E-03	1,559.25	2,949.75	0.00E+00	3.07E+00	5.81E+00
I-129	7.5300E-07	1,559.25	2,949.75	0.00E+00	1.17E-03	2.22E-03
Kr-85	4.1176E-02	1,559.25	2,949.75	0.00E+00	6.42E+01	1.21E+02
Np-237	9.5752E-06	1,559.25	2,949.75	0.00E+00	1.49E-02	2.82E-02
Pa-231	3.9379E-09	1,559.25	2,949.75	0.00E+00	6.14E-06	1.16E-05
Pb-210	3.3115E-10	1,559.25	2,949.75	0.00E+00	5.16E-07	9.77E-07
Pm-147	9.2402E-04	1,559.25	2,949.75	0.00E+00	1.44E+00	2.73E+00
Pu-238	1.6217E-02	1,559.25	2,949.75	0.00E+00	2.53E+01	4.78E+01
Pu-239	4.2810E-04	1,559.25	2,949.75	0.00E+00	6.68E-01	1.26E+00
Pu-240	2.4333E-04	1,559.25	2,949.75	0.00E+00	3.79E-01	7.18E-01
Pu-241	1.6242E-02	1,559.25	2,949.75	0.00E+00	2.53E+01	4.79E+01
Pu-242	3.6329E-07	1,559.25	2,949.75	0.00E+00	5.66E-04	1.07E-03
Ra-226	9.0114E-10	1,559.25	2,949.75	0.00E+00	1.41E-06	2.66E-06
Ra-228	3.1019E-14	1,559.25	2,949.75	0.00E+00	4.84E-11	9.15E-11
Ru-106	2.1225E-10	1,559.25	2,949.75	0.00E+00	3.31E-07	6.26E-07
Se-79	1.2930E-05	1,559.25	2,949.75	0.00E+00	2.02E-02	3.81E-02
Sn-126	1.1571E-05	1,559.25	2,949.75	0.00E+00	1.80E-02	3.41E-02
Sr-90	1.3472E+00	1,559.25	2,949.75	0.00E+00	2.10E+03	3.97E+03
Tc-99	4.2239E-04	1,559.25	2,949.75	0.00E+00	6.59E-01	1.25E+00
Th-229	1.2407E-11	1,559.25	2,949.75	0.00E+00	1.93E-08	3.66E-08
Th-230	8.3497E-06	1,559.25	2,949.75	0.00E+00	1.30E-04	2.46E-04
Th-232	3.8371E-14	1,559.25	2,949.75	0.00E+00	5.98E-11	1.13E-10
Tl-208	4.0414E-06	1,559.25	2,949.75	0.00E+00	6.30E-05	1.19E-04
U-232	1.0948E-07	1,559.25	2,949.75	0.00E+00	1.71E-04	3.23E-04
U-233	3.6275E-09	1,559.25	2,949.75	0.00E+00	5.66E-06	1.07E-05
U-234	1.8562E-04	1,559.25	2,949.75	0.00E+00	2.89E-01	5.48E-01
U-235	-2.7235E-06	1,559.25	0.00	1.36E-02	9.33E-03	1.36E-02
U-236	1.5493E-05	1,559.25	2,949.75	0.00E+00	2.42E-02	4.57E-02
U-238	-4.2851E-09	1,559.25	0.00	1.58E-04	1.51E-04	1.58E-04
Y-90	1.3475E+00	1,559.25	2,949.75	0.00E+00	2.10E+03	3.97E+03
Other Radionuclides					2.13E+03	4.04E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.173E+14
0.0250	4.511E+13
0.0375	3.921E+13
0.0575	4.221E+13
0.0850	2.543E+13
0.1250	1.680E+13
0.2250	2.195E+13
0.3750	9.551E+12
0.5750	1.579E+14
0.8500	1.928E+12
1.2500	9.326E+11
1.7500	5.249E+10
2.2500	4.388E+08
2.7500	4.189E+06
3.5000	2.427E+03
5.0000	9.918E+02
7.0000	1.085E+02
11.0000	1.210E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.61E+01	4.94E+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 %:	93.048	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,559.25	1,467.69	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	2,949.75	2,935.38	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	0.94
Bounding:	1.39	1.00

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: 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

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.9739E-09	8,396.08	16,792.17	0.00E+00	2.50E-05	4.99E-05
Am-241	2.5986E-03	8,396.08	16,792.17	0.00E+00	2.18E+01	4.36E+01
Am-242m	3.7010E-07	8,396.08	16,792.17	0.00E+00	3.11E-03	6.21E-03
Am-243	1.4858E-06	8,396.08	16,792.17	0.00E+00	1.25E-02	2.50E-02
C-14	5.6944E-09	8,396.08	16,792.17	0.00E+00	4.78E-05	9.56E-05
Cl-36	1.3124E-32	8,396.08	16,792.17	0.00E+00	1.10E-28	2.20E-28
Cm-243	7.9303E-08	8,396.08	16,792.17	0.00E+00	6.66E-04	1.33E-03
Cm-244	9.3063E-06	8,396.08	16,792.17	0.00E+00	7.82E-02	1.56E-01
Co-60	1.0310E-07	8,396.08	16,792.17	0.00E+00	8.66E-04	1.73E-03
Cs-134	1.3254E-07	8,396.08	16,792.17	0.00E+00	1.11E-03	2.23E-03
Cs-135	3.4477E-06	8,396.08	16,792.17	0.00E+00	2.89E-02	5.79E-02
Cs-137	1.0161E+00	8,396.08	16,792.17	0.00E+00	8.53E+03	1.71E+04
Eu-154	2.1879E-03	8,396.08	16,792.17	0.00E+00	1.84E+01	3.67E+01
Eu-155	7.2930E-05	8,396.08	16,792.17	0.00E+00	6.12E-01	1.22E+00
Fe-55	4.1912E-08	8,396.08	16,792.17	0.00E+00	3.52E-04	7.04E-04
H-3	8.4913E-04	8,396.08	16,792.17	0.00E+00	7.13E+00	1.43E+01
I-129	7.5300E-07	8,396.08	16,792.17	0.00E+00	6.32E-03	1.26E-02
Kr-85	1.5615E-02	8,396.08	16,792.17	0.00E+00	1.31E+02	2.62E+02
Np-237	9.5861E-06	8,396.08	16,792.17	0.00E+00	8.05E-02	1.61E-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
Sn-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
Tl-208	3.4995E-08	8,396.08	16,792.17	0.00E+00	2.94E-04	5.88E-04
U-232	9.4798E-06	8,396.08	16,792.17	0.00E+00	7.96E-04	1.59E-03
U-233	4.2538E-09	8,396.08	16,792.17	0.00E+00	3.57E-05	7.14E-05
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
U-238	-4.2851E-09	8,396.08	0.00	6.82E-04	6.46E-04	6.82E-04
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.652E+14
0.0250	1.796E+14
0.0375	1.561E+14
0.0575	1.681E+14
0.0850	1.012E+14
0.1250	6.611E+13
0.2250	8.728E+13
0.3750	3.802E+13
0.5750	6.352E+14
0.8500	6.805E+12
1.2500	2.752E+12
1.7500	1.803E+11
2.2500	1.749E+07
2.7500	2.065E+07
3.5000	1.133E+04
5.0000	4.605E+03
7.0000	5.007E+02
11.0000	5.562E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.95E+01	1.99E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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	Basis for burnup used in estimate:
Nominal:		8,396.08	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		16,792.17	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

[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: ORR (U3O8 HEU)
SNF ID #: 753
Fuel Units & Descr: 4 - 19 CURVED PLATES
Heavy Metal Mass: BOL=0.716kg; EOL=0.308kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.9739E-09	386.76	678.07	0.00E+00	1.15E-06	2.02E-06
Am-241	2.5986E-03	386.76	678.07	0.00E+00	1.01E+00	1.76E+00
Am-242m	3.7010E-07	386.76	678.07	0.00E+00	1.43E-04	2.51E-04
Am-243	1.4858E-06	386.76	678.07	0.00E+00	5.75E-04	1.01E-03
C-14	5.6944E-09	386.76	678.07	0.00E+00	2.20E-06	3.86E-06
Cl-36	1.3124E-32	386.76	678.07	0.00E+00	5.08E-30	8.90E-30
Cm-243	7.9303E-06	386.76	678.07	0.00E+00	3.07E-05	5.38E-05
Cm-244	9.3083E-06	386.76	678.07	0.00E+00	3.60E-03	6.31E-03
Co-60	1.0310E-07	386.76	678.07	0.00E+00	3.99E-05	6.99E-05
Cs-134	1.3254E-07	386.76	678.07	0.00E+00	5.13E-05	8.99E-05
Cs-135	3.4477E-06	386.76	678.07	0.00E+00	1.33E-03	2.34E-03
Cs-137	1.0161E+00	386.76	678.07	0.00E+00	3.93E+02	6.89E+02
Eu-154	2.1879E-03	386.76	678.07	0.00E+00	8.46E-01	1.48E+00
Eu-155	7.2930E-05	386.76	678.07	0.00E+00	2.82E-02	4.95E-02
Fe-55	4.1912E-06	386.76	678.07	0.00E+00	1.62E-05	2.84E-05
H-3	8.4913E-04	386.76	678.07	0.00E+00	3.28E-01	5.76E-01
I-129	7.5300E-07	386.76	678.07	0.00E+00	2.91E-04	5.11E-04
Kr-85	1.5615E-02	386.76	678.07	0.00E+00	6.04E+00	1.06E+01
Np-237	9.5861E-06	386.76	678.07	0.00E+00	3.71E-03	6.50E-03
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	1.64E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.494E+13
0.0250	7.252E+12
0.0375	6.302E+12
0.0575	6.789E+12
0.0850	4.086E+12
0.1250	2.670E+12
0.2250	3.524E+12
0.3750	1.535E+12
0.5750	2.565E+13
0.8500	2.748E+11
1.2500	1.111E+11
1.7500	7.280E+09
2.2500	7.061E+05
2.7500	8.337E+05
3.5000	4.572E+02
5.0000	1.859E+02
7.0000	2.021E+01
11.0000	2.245E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.59E+09	8.04E+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 %:	93.29608939	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		386.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		678.07	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

[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: ORR (U3Si2 LEU)
SNF ID #: 165
Fuel Units & Descr: 52 - 19 CURVED PLATES
Heavy Metal Mass: BOL=87.953kg; EOL=83.294kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1967
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	4,412.35	8,824.71	0.00E+00	8.85E-06	1.77E-05
Am-241	2.5251E-03	4,412.35	8,824.71	0.00E+00	1.11E+01	2.23E+01
Am-242m	3.9624E-07	4,412.35	8,824.71	0.00E+00	1.75E-03	3.50E-03
Am-243	1.4880E-06	4,412.35	8,824.71	0.00E+00	6.57E-03	1.31E-02
C-14	5.7053E-09	4,412.35	8,824.71	0.00E+00	2.52E-05	5.03E-05
Cl-36	1.3124E-32	4,412.35	8,824.71	0.00E+00	5.79E-29	1.16E-28
Cm-243	1.1419E-07	4,412.35	8,824.71	0.00E+00	5.04E-04	1.01E-03
Cm-244	1.6522E-05	4,412.35	8,824.71	0.00E+00	7.29E-02	1.46E-01
Co-60	7.4047E-07	4,412.35	8,824.71	0.00E+00	3.27E-03	6.53E-03
Cs-134	2.0455E-05	4,412.35	8,824.71	0.00E+00	9.03E-02	1.81E-01
Cs-135	3.4477E-06	4,412.35	8,824.71	0.00E+00	1.52E-02	3.04E-02
Cs-137	1.4365E+00	4,412.35	8,824.71	0.00E+00	6.34E+03	1.27E+04
Eu-154	7.3230E-03	4,412.35	8,824.71	0.00E+00	3.23E+01	6.46E+01
Eu-155	5.9259E-04	4,412.35	8,824.71	0.00E+00	2.61E+00	5.23E+00
Fe-55	2.2791E-06	4,412.35	8,824.71	0.00E+00	1.01E-02	2.01E-02
H-3	1.9698E-03	4,412.35	8,824.71	0.00E+00	8.69E+00	1.74E+01
I-129	7.5300E-07	4,412.35	8,824.71	0.00E+00	3.32E-03	6.64E-03
Kr-85	4.1176E-02	4,412.35	8,824.71	0.00E+00	1.82E+02	3.63E+02
Np-237	9.5752E-06	4,412.35	8,824.71	0.00E+00	4.22E-02	8.45E-02
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	4.2239E-04	4,412.35	8,824.71	0.00E+00	1.86E+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	3.8371E-14	4,412.35	8,824.71	0.00E+00	1.69E-10	3.39E-10
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.499E+14
0.0250	1.350E+14
0.0375	1.173E+14
0.0575	1.263E+14
0.0850	7.608E+13
0.1250	5.025E+13
0.2250	6.568E+13
0.3750	2.857E+13
0.5750	4.722E+14
0.8500	5.768E+12
1.2500	2.790E+12
1.7500	1.570E+11
2.2500	1.313E+07
2.7500	1.253E+07
3.5000	7.384E+03
5.0000	3.020E+03
7.0000	3.308E+02
11.0000	3.690E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.38E+01	1.48E+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 %:	20.03831236	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:		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

[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: ORR (U3Si2 LEU)
SNF ID #: 850
Fuel Units & Descr: 11 - ASSEMBLY
Heavy Metal Mass: BOL=11.076kg; EOL=9.908kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.9739E-09	1,106.31	2,212.62	0.00E+00	3.29E-06	6.58E-06
Am-241	2.5986E-03	1,106.31	2,212.62	0.00E+00	2.87E+00	5.75E+00
Am-242m	3.7010E-07	1,106.31	2,212.62	0.00E+00	4.09E-04	8.19E-04
Am-243	1.4858E-06	1,106.31	2,212.62	0.00E+00	1.64E-03	3.29E-03
C-14	5.6944E-09	1,106.31	2,212.62	0.00E+00	6.30E-06	1.26E-05
Cl-36	1.3124E-32	1,106.31	2,212.62	0.00E+00	1.45E-29	2.90E-29
Cm-243	7.9303E-08	1,106.31	2,212.62	0.00E+00	8.77E-05	1.75E-04
Cm-244	9.3083E-06	1,106.31	2,212.62	0.00E+00	1.03E-02	2.06E-02
Co-60	1.0310E-07	1,106.31	2,212.62	0.00E+00	1.14E-04	2.28E-04
Cs-134	1.3254E-07	1,106.31	2,212.62	0.00E+00	1.47E-04	2.93E-04
Cs-135	3.4477E-06	1,106.31	2,212.62	0.00E+00	3.81E-03	7.63E-03
Cs-137	1.0161E+00	1,106.31	2,212.62	0.00E+00	1.12E+03	2.25E+03
Eu-154	2.1879E-03	1,106.31	2,212.62	0.00E+00	2.42E+00	4.84E+00
Eu-155	7.2930E-05	1,106.31	2,212.62	0.00E+00	8.07E-02	1.61E-01
Fe-55	4.1912E-08	1,106.31	2,212.62	0.00E+00	4.64E-05	9.27E-05
H-3	8.4913E-04	1,106.31	2,212.62	0.00E+00	9.39E-01	1.88E+00
I-129	7.5300E-07	1,106.31	2,212.62	0.00E+00	8.33E-04	1.67E-03
Kr-85	1.5615E-02	1,106.31	2,212.62	0.00E+00	1.73E+01	3.46E+01
Np-237	9.5861E-06	1,106.31	2,212.62	0.00E+00	1.06E-02	2.12E-02
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	1.4406E-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
Tl-208	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
U-233	4.2538E-09	1,106.31	2,212.62	0.00E+00	4.71E-06	9.41E-06
U-234	1.8617E-04	1,106.31	2,212.62	0.00E+00	2.06E-01	4.12E-01
U-235	-2.7235E-06	1,106.31	0.00	4.74E-03	1.73E-03	4.74E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.140E+14
0.0250	2.366E+13
0.0375	2.056E+13
0.0575	2.215E+13
0.0850	1.333E+13
0.1250	8.711E+12
0.2250	1.150E+13
0.3750	5.010E+12
0.5750	8.370E+13
0.8500	8.967E+11
1.2500	3.626E+11
1.7500	2.375E+10
2.2500	2.304E+06
2.7500	2.721E+06
3.5000	1.508E+03
5.0000	6.134E+02
7.0000	6.674E+01
11.0000	7.416E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.31E+01	2.62E+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 %:	19.81328831	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:		1,106.31
Bounding:		2,212.62

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:	0.32	
Bounding:	0.63	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3Si2 LEU)
SNF ID #: 944
Fuel Units & Descr: 33 - 19 CURVED PLATES
Heavy Metal Mass: BOL=56.539kg; EOL=53.655kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1987
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	2,731.39	5,462.79	0.00E+00	5.48E-06	1.10E-05
Am-241	2.5251E-03	2,731.39	5,462.79	0.00E+00	6.90E+00	1.38E+01
Am-242m	3.9624E-07	2,731.39	5,462.79	0.00E+00	1.08E-03	2.16E-03
Am-243	1.4880E-06	2,731.39	5,462.79	0.00E+00	4.06E-03	8.13E-03
C-14	5.7053E-09	2,731.39	5,462.79	0.00E+00	1.56E-05	3.12E-05
Cl-36	1.3124E-32	2,731.39	5,462.79	0.00E+00	3.58E-29	7.17E-29
Cm-243	1.1419E-07	2,731.39	5,462.79	0.00E+00	3.12E-04	6.24E-04
Cm-244	1.6522E-05	2,731.39	5,462.79	0.00E+00	4.51E-02	9.03E-02
Co-60	7.4047E-07	2,731.39	5,462.79	0.00E+00	2.02E-03	4.05E-03
Cs-134	2.0455E-05	2,731.39	5,462.79	0.00E+00	5.59E-02	1.12E-01
Cs-135	3.4477E-06	2,731.39	5,462.79	0.00E+00	9.42E-03	1.88E-02
Cs-137	1.4365E+00	2,731.39	5,462.79	0.00E+00	3.92E+03	7.85E+03
Eu-154	7.3230E-03	2,731.39	5,462.79	0.00E+00	2.00E+01	4.00E+01
Eu-155	5.9259E-04	2,731.39	5,462.79	0.00E+00	1.62E+00	3.24E+00
Fe-55	2.2791E-06	2,731.39	5,462.79	0.00E+00	6.23E-03	1.25E-02
H-3	1.9698E-03	2,731.39	5,462.79	0.00E+00	5.38E+00	1.08E+01
I-129	7.5300E-07	2,731.39	5,462.79	0.00E+00	2.06E-03	4.11E-03
Kr-85	4.1176E-02	2,731.39	5,462.79	0.00E+00	1.12E+02	2.25E+02
Np-237	9.5752E-06	2,731.39	5,462.79	0.00E+00	2.62E-02	5.23E-02
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	3.16E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.023E+14
0.0250	8.355E+13
0.0375	7.262E+13
0.0575	7.816E+13
0.0850	4.710E+13
0.1250	3.111E+13
0.2250	4.066E+13
0.3750	1.769E+13
0.5750	2.923E+14
0.8500	3.571E+12
1.2500	1.727E+12
1.7500	9.720E+10
2.2500	8.127E+08
2.7500	7.757E+06
3.5000	4.574E+03
5.0000	1.871E+03
7.0000	2.049E+02
11.0000	2.286E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.57E+01	9.14E+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 %:	19.818	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	Basis for burnup used in estimate:
Nominal:		2,731.39	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		5,462.79	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	0.31	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.9739E-09	3,376.22	6,752.44	0.00E+00	1.00E-05	2.01E-05
Am-241	2.5986E-03	3,376.22	6,752.44	0.00E+00	8.77E+00	1.75E+01
Am-242m	3.7010E-07	3,376.22	6,752.44	0.00E+00	1.25E-03	2.50E-03
Am-243	1.4858E-06	3,376.22	6,752.44	0.00E+00	5.02E-03	1.00E-02
C-14	5.6944E-09	3,376.22	6,752.44	0.00E+00	1.92E-05	3.85E-05
Cl-36	1.3124E-32	3,376.22	6,752.44	0.00E+00	4.43E-29	8.86E-29
Cm-243	7.9303E-08	3,376.22	6,752.44	0.00E+00	2.68E-04	5.35E-04
Cm-244	9.3083E-06	3,376.22	6,752.44	0.00E+00	3.14E-02	6.29E-02
Co-60	1.0310E-07	3,376.22	6,752.44	0.00E+00	3.48E-04	6.96E-04
Cs-134	1.3254E-07	3,376.22	6,752.44	0.00E+00	4.47E-04	8.95E-04
Cs-135	3.4477E-06	3,376.22	6,752.44	0.00E+00	1.16E-02	2.33E-02
Cs-137	1.0161E+00	3,376.22	6,752.44	0.00E+00	3.43E+03	6.86E+03
Eu-154	2.1879E-03	3,376.22	6,752.44	0.00E+00	7.39E+00	1.48E+01
Eu-155	7.2930E-05	3,376.22	6,752.44	0.00E+00	2.46E-01	4.92E-01
Fe-55	4.1912E-08	3,376.22	6,752.44	0.00E+00	1.42E-04	2.83E-04
H-3	8.4913E-04	3,376.22	6,752.44	0.00E+00	2.87E+00	5.73E+00
I-129	7.5300E-07	3,376.22	6,752.44	0.00E+00	2.54E-03	5.08E-03
Kr-85	1.5615E-02	3,376.22	6,752.44	0.00E+00	5.27E+01	1.05E+02
Np-237	9.5861E-06	3,376.22	6,752.44	0.00E+00	3.24E-02	6.47E-02
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-06	4.47E-06
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-06	1.02E-05
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.479E+14
0.0250	7.221E+13
0.0375	6.276E+13
0.0575	6.760E+13
0.0850	4.069E+13
0.1250	2.658E+13
0.2250	3.510E+13
0.3750	1.529E+13
0.5750	2.554E+14
0.8500	2.737E+12
1.2500	1.107E+12
1.7500	7.249E+10
2.2500	7.031E+08
2.7500	8.302E+08
3.5000	4.582E+03
5.0000	1.864E+03
7.0000	2.027E+02
11.0000	2.253E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.00E+01	8.01E+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 %:	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)[2]

	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

[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: ORR-BW-1 (MOX)
SNF ID #: 160
Fuel Units & Descr: 1 - 19 CURVED PLATES
Heavy Metal Mass: BOL= ; EOL=0.07kg
ROO Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.5200E-06	66.52	66.52	0.00E+00	1.68E-04	1.68E-04
Am-241	8.6432E+00	66.52	66.52	0.00E+00	5.75E+02	5.75E+02
Am-242m	1.5728E-02	66.52	66.52	0.00E+00	1.05E+00	1.05E+00
Am-243	1.6288E-02	66.52	66.52	0.00E+00	1.08E+00	1.08E+00
C-14	1.2068E-01	66.52	66.52	0.00E+00	8.03E+00	8.03E+00
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01
Cm-243	6.0144E-04	66.52	66.52	0.00E+00	4.00E-02	4.00E-02
Cm-244	9.4880E-02	66.52	66.52	0.00E+00	6.31E+00	6.31E+00
Co-60	3.9052E+00	66.52	66.52	0.00E+00	2.60E+02	2.60E+02
Cs-134	2.2139E-06	66.52	66.52	0.00E+00	1.47E-04	1.47E-04
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02
Cs-137	1.4887E+01	66.52	66.52	0.00E+00	9.90E+02	9.90E+02
Eu-154	3.7342E-01	66.52	66.52	0.00E+00	2.48E+01	2.48E+01
Eu-155	8.4893E-03	66.52	66.52	0.00E+00	5.65E-01	5.65E-01
Fe-55	5.3750E-03	66.52	66.52	0.00E+00	3.58E-01	3.58E-01
H-3	1.0472E-01	66.52	66.52	0.00E+00	6.97E+00	6.97E+00
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04
Kr-85	2.2717E-01	66.52	66.52	0.00E+00	1.51E+01	1.51E+01
Np-237	1.6400E-04	66.52	66.52	0.00E+00	1.09E-02	1.09E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.639E+13
0.0250	1.114E+13
0.0375	9.415E+12
0.0575	1.778E+13
0.0850	5.961E+12
0.1250	4.218E+12
0.2250	5.159E+12
0.3750	2.233E+12
0.5750	3.695E+13
0.8500	8.094E+11
1.2500	1.984E+13
1.7500	2.384E+10
2.2500	1.031E+08
2.7500	1.775E+08
3.5000	9.862E+04
5.0000	4.083E+04
7.0000	4.651E+03
11.0000	5.305E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.67E+01	3.65E+01
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:		66.52
Bounding:		66.52

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

[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: PRR-1 (UALX-HEU) PHILIPPINES
SNF ID #: 638
Fuel Units & Descr: 21 - 18 FLAT PLATES
Heavy Metal Mass: BOL=3.286kg; EOL=3.286kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
0.88

II. Estimates

Radionuclide	m Ci/MWd From Tamplate	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	62.74	125.48	0.00E+00	2.40E-07	4.80E-07
Am-241	4.4195E-03	62.74	125.48	0.00E+00	2.77E-01	5.55E-01
Am-242m	1.8195E-06	62.74	125.48	0.00E+00	1.14E-04	2.28E-04
Am-243	2.3278E-07	62.74	125.48	0.00E+00	1.46E-05	2.92E-05
C-14	4.3203E-05	62.74	125.48	0.00E+00	2.71E-03	5.42E-03
Cl-36	4.3023E-06	62.74	125.48	0.00E+00	2.70E-06	5.40E-06
Cm-243	1.6872E-07	62.74	125.48	0.00E+00	1.06E-05	2.12E-05
Cm-244	1.4660E-06	62.74	125.48	0.00E+00	9.20E-05	1.84E-04
Co-60	2.2376E-03	62.74	125.48	0.00E+00	1.40E-01	2.81E-01
Cs-134	1.2525E-04	62.74	125.48	0.00E+00	7.86E-03	1.57E-02
Cs-135	3.1549E-05	62.74	125.48	0.00E+00	1.98E-03	3.96E-03
Cs-137	1.7368E+00	62.74	125.48	0.00E+00	1.09E+02	2.18E+02
Eu-154	2.6947E-01	62.74	125.48	0.00E+00	1.69E+01	3.38E+01
Eu-155	2.6857E-02	62.74	125.48	0.00E+00	1.69E+00	3.37E+00
Fe-55	4.2105E-05	62.74	125.48	0.00E+00	2.64E-03	5.28E-03
H-3	3.5173E-03	62.74	125.48	0.00E+00	2.21E-01	4.41E-01
I-129	7.3805E-07	62.74	125.48	0.00E+00	4.63E-05	9.26E-05
Kr-85	6.9263E-02	62.74	125.48	0.00E+00	4.35E+00	8.69E+00
Np-237	1.4752E-06	62.74	125.48	0.00E+00	9.26E-05	1.85E-04
Pa-231	8.3970E-09	62.74	125.48	0.00E+00	5.27E-07	1.05E-06
Pb-210	1.4995E-13	62.74	125.48	0.00E+00	9.41E-12	1.88E-11
Pm-147	1.0567E-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	5.6917E-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
Ra-226	5.1293E-13	62.74	125.48	0.00E+00	3.22E-11	6.44E-11
Ra-228	2.3323E-10	62.74	125.48	0.00E+00	1.46E-08	2.93E-08
Ru-106	1.0075E-07	62.74	125.48	0.00E+00	6.32E-06	1.26E-05
Se-79	1.2935E-05	62.74	125.48	0.00E+00	8.12E-04	1.62E-03
Sn-126	1.2238E-05	62.74	125.48	0.00E+00	7.68E-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	4.28E-09	8.57E-09
Th-232	2.3744E-10	62.74	125.48	0.00E+00	1.49E-08	2.98E-08
Tl-208	1.7368E-06	62.74	125.48	0.00E+00	1.09E-06	2.18E-06
U-232	4.6797E-06	62.74	125.48	0.00E+00	2.94E-06	5.87E-06
U-233	1.3146E-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	6.62E-03	6.45E-03	6.62E-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
Other Radionuclides					1.18E+02	2.36E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.134E+13
0.0250	2.343E+12
0.0375	2.346E+12
0.0575	2.250E+12
0.0850	1.353E+12
0.1250	1.376E+12
0.2250	1.225E+12
0.3750	5.093E+11
0.5750	8.237E+12
0.8500	6.798E+11
1.2500	7.134E+11
1.7500	2.184E+10
2.2500	3.350E+05
2.7500	7.716E+04
3.5000	1.809E+02
5.0000	7.058E+01
7.0000	7.960E+00
11.0000	9.048E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.40E+00	2.79E+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 %:	93.14680552	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)[2]

	From SFD	Estimated
Nominal:		62.74
Bounding:		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:	0.52	
Bounding:	1.03	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PRR-1 (UALX-LEU) PHILLIPPINES
SNF ID #: 558
Fuel Units & Descr: 30 - 17 FLAT PLATES
Heavy Metal Mass: BOL=20.328kg; EOL=19.713kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 1.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	587.03	1,174.06	0.00E+00	2.25E-06	4.49E-06
Am-241	4.4195E-03	587.03	1,174.06	0.00E+00	2.59E+00	5.19E+00
Am-242m	1.8195E-06	587.03	1,174.06	0.00E+00	1.07E-03	2.14E-03
Am-243	2.3278E-07	587.03	1,174.06	0.00E+00	1.37E-04	2.73E-04
C-14	4.3203E-05	587.03	1,174.06	0.00E+00	2.54E-02	5.07E-02
Cl-36	4.3023E-08	587.03	1,174.06	0.00E+00	2.53E-05	5.05E-05
Cm-243	1.6872E-07	587.03	1,174.06	0.00E+00	9.90E-05	1.98E-04
Cm-244	1.4660E-06	587.03	1,174.06	0.00E+00	8.61E-04	1.72E-03
Co-60	2.2376E-03	587.03	1,174.06	0.00E+00	1.31E+00	2.63E+00
Cs-134	1.2525E-04	587.03	1,174.06	0.00E+00	7.35E-02	1.47E-01
Cs-135	3.1549E-05	587.03	1,174.06	0.00E+00	1.85E-02	3.70E-02
Cs-137	1.7368E+00	587.03	1,174.06	0.00E+00	1.02E+03	2.04E+03
Eu-154	2.6947E-01	587.03	1,174.06	0.00E+00	1.58E+02	3.16E+02
Eu-155	2.6857E-02	587.03	1,174.06	0.00E+00	1.58E+01	3.15E+01
Fe-55	4.2105E-05	587.03	1,174.06	0.00E+00	2.47E-02	4.94E-02
H-3	3.5173E-03	587.03	1,174.06	0.00E+00	2.06E+00	4.13E+00
I-129	7.3805E-07	587.03	1,174.06	0.00E+00	4.33E-04	8.67E-04
Kr-85	6.9263E-02	587.03	1,174.06	0.00E+00	4.07E+01	8.13E+01
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	1.4995E-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	2.82E+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
Tl-208	1.7368E-08	587.03	1,174.06	0.00E+00	1.02E-05	2.04E-05
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.061E+14
0.0250	2.192E+13
0.0375	2.195E+13
0.0575	2.105E+13
0.0850	1.266E+13
0.1250	1.287E+13
0.2250	1.146E+13
0.3750	4.765E+12
0.5750	7.707E+13
0.8500	6.361E+12
1.2500	6.674E+12
1.7500	2.043E+11
2.2500	3.135E+06
2.7500	7.219E+05
3.5000	1.716E+03
5.0000	6.706E+02
7.0000	7.566E+01
11.0000	8.602E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.31E+01	2.61E+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 %:	19.87821382	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		587.03	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,174.06	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

[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: PURDUE UNIVERSITY (U-ALX HEU)
SNF ID #: 177
Fuel Units & Descr: 124 - ELEMENT
Heavy Metal Mass: BOL=2.22kg; EOL=2.22kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.4545E-10	42.04	84.08	0.00E+00	6.11E-09	1.22E-08
Am-241	1.1190E-03	42.04	84.08	0.00E+00	4.70E-02	9.41E-02
Am-242m	4.5425E-07	42.04	84.08	0.00E+00	1.91E-05	3.82E-05
Am-243	1.4921E-06	42.04	84.08	0.00E+00	6.27E-05	1.25E-04
C-14	5.7244E-09	42.04	84.08	0.00E+00	2.41E-07	4.81E-07
Cl-36	1.3124E-32	42.04	84.08	0.00E+00	5.52E-31	1.10E-30
Cm-243	2.3676E-07	42.04	84.08	0.00E+00	9.95E-06	1.99E-05
Cm-244	5.2042E-05	42.04	84.08	0.00E+00	2.19E-03	4.38E-03
Co-60	3.8208E-05	42.04	84.08	0.00E+00	1.61E-03	3.21E-03
Cs-134	4.8693E-01	42.04	84.08	0.00E+00	2.05E+01	4.09E+01
Cs-135	3.4477E-06	42.04	84.08	0.00E+00	1.45E-04	2.90E-04
Cs-137	2.8731E+00	42.04	84.08	0.00E+00	1.21E+02	2.42E+02
Eu-154	8.2053E-02	42.04	84.08	0.00E+00	3.45E+00	6.90E+00
Eu-155	3.9134E-02	42.04	84.08	0.00E+00	1.65E+00	3.29E+00
Fe-55	6.7429E-03	42.04	84.08	0.00E+00	2.83E-01	5.67E-01
H-3	1.0599E-02	42.04	84.08	0.00E+00	4.46E-01	8.91E-01
I-129	7.5300E-07	42.04	84.08	0.00E+00	3.17E-05	6.33E-05
Kr-85	2.8595E-01	42.04	84.08	0.00E+00	1.20E+01	2.40E+01
Np-237	9.5479E-06	42.04	84.08	0.00E+00	4.01E-04	8.03E-04
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	6.8764E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.622E+13
0.0250	3.495E+12
0.0375	3.225E+12
0.0575	3.171E+12
0.0850	2.022E+12
0.1250	1.751E+12
0.2250	1.713E+12
0.3750	8.293E+11
0.5750	1.139E+13
0.8500	1.595E+12
1.2500	2.968E+11
1.7500	1.245E+10
2.2500	2.611E+10
2.7500	1.502E+08
3.5000	1.666E+07
5.0000	4.999E+01
7.0000	5.573E+00
11.0000	6.282E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.13E+00	4.26E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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 estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[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: 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	344.38	688.76	0.00E+00	5.01E-08	1.00E-07
Am-241	1.1190E-03	344.38	688.76	0.00E+00	3.85E-01	7.71E-01
Am-242m	4.5425E-07	344.38	688.76	0.00E+00	1.56E-04	3.13E-04
Am-243	1.4921E-06	344.38	688.76	0.00E+00	5.14E-04	1.03E-03
C-14	5.7244E-09	344.38	688.76	0.00E+00	1.97E-06	3.94E-06
Cl-36	1.3124E-32	344.38	688.76	0.00E+00	4.52E-30	9.04E-30
Cm-243	2.3676E-07	344.38	688.76	0.00E+00	8.15E-05	1.63E-04
Cm-244	5.2042E-05	344.38	688.76	0.00E+00	1.79E-02	3.58E-02
Co-60	3.8208E-05	344.38	688.76	0.00E+00	1.32E-02	2.63E-02
Cs-134	4.8693E-01	344.38	688.76	0.00E+00	1.68E+02	3.35E+02
Cs-135	3.4477E-06	344.38	688.76	0.00E+00	1.19E-03	2.37E-03
Cs-137	2.8731E+00	344.38	688.76	0.00E+00	9.89E+02	1.98E+03
Eu-154	8.2053E-02	344.38	688.76	0.00E+00	2.83E+01	5.65E+01
Eu-155	3.9134E-02	344.38	688.76	0.00E+00	1.35E+01	2.70E+01
Fe-55	6.7429E-03	344.38	688.76	0.00E+00	2.32E+00	4.64E+00
H-3	1.0599E-02	344.38	688.76	0.00E+00	3.65E+00	7.30E+00
I-129	7.5300E-07	344.38	688.76	0.00E+00	2.59E-04	5.19E-04
Kr-85	2.8595E-01	344.38	688.76	0.00E+00	9.85E+01	1.97E+02
Np-237	9.5479E-06	344.38	688.76	0.00E+00	3.29E-03	6.58E-03
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	1.9055E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.329E+14
0.0250	2.863E+13
0.0375	2.642E+13
0.0575	2.598E+13
0.0850	1.656E+13
0.1250	1.434E+13
0.2250	1.404E+13
0.3750	6.794E+12
0.5750	9.332E+13
0.8500	1.307E+13
1.2500	2.431E+12
1.7500	1.020E+11
2.2500	2.139E+11
2.7500	1.230E+09
3.5000	1.365E+08
5.0000	4.193E+02
7.0000	4.679E+01
11.0000	5.277E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+01	3.49E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.0001402	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:		344.38
Bounding:		688.76

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[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: R-2 SVTR (U3Si2 LEU) SWEDEN
SNF ID #: 942
Fuel Units & Descr: 183 - MTR TYPE
Heavy Metal Mass: BOL=351.47kg; EOL=308.977kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.1465E-09	40,241.32	80,482.63	0.00E+00	4.61E-05	9.23E-05
Am-241	2.3056E-03	40,241.32	80,482.63	0.00E+00	9.28E+01	1.86E+02
Am-242m	4.1476E-07	40,241.32	80,482.63	0.00E+00	1.67E-02	3.34E-02
Am-243	1.4894E-06	40,241.32	80,482.63	0.00E+00	5.99E-02	1.20E-01
C-14	5.7108E-09	40,241.32	80,482.63	0.00E+00	2.30E-04	4.60E-04
Cl-36	1.3124E-32	40,241.32	80,482.63	0.00E+00	5.28E-28	1.06E-27
Cm-243	1.4562E-07	40,241.32	80,482.63	0.00E+00	5.86E-03	1.17E-02
Cm-244	2.4221E-05	40,241.32	80,482.63	0.00E+00	9.75E-01	1.95E+00
Co-60	2.7560E-06	40,241.32	80,482.63	0.00E+00	1.11E-01	2.22E-01
Cs-134	5.8851E-04	40,241.32	80,482.63	0.00E+00	2.37E+01	4.74E+01
Cs-135	3.4477E-06	40,241.32	80,482.63	0.00E+00	1.39E-01	2.77E-01
Cs-137	1.8099E+00	40,241.32	80,482.63	0.00E+00	7.28E+04	1.46E+05
Eu-154	1.6386E-02	40,241.32	80,482.63	0.00E+00	6.59E+02	1.32E+03
Eu-155	2.3957E-03	40,241.32	80,482.63	0.00E+00	9.64E+01	1.93E+02
Fe-55	3.2707E-05	40,241.32	80,482.63	0.00E+00	1.32E+00	2.63E+00
H-3	3.4504E-03	40,241.32	80,482.63	0.00E+00	1.39E+02	2.78E+02
I-129	7.5300E-07	40,241.32	80,482.63	0.00E+00	3.03E-02	6.06E-02
Kr-85	7.8540E-02	40,241.32	80,482.63	0.00E+00	3.16E+03	6.32E+03
Np-237	9.5615E-06	40,241.32	80,482.63	0.00E+00	3.85E-01	7.70E-01
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.531E+15
0.0250	1.565E+15
0.0375	1.363E+15
0.0575	1.463E+15
0.0850	8.828E+14
0.1250	5.913E+14
0.2250	7.622E+14
0.3750	3.314E+14
0.5750	5.432E+15
0.8500	7.828E+13
1.2500	4.353E+13
1.7500	2.151E+12
2.2500	1.533E+08
2.7500	1.255E+08
3.5000	9.520E+04
5.0000	3.207E+04
7.0000	3.529E+03
11.0000	3.949E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.51E+02	1.70E+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:	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

[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: R-2 SVTR (UALX HEU) SWEDEN
SNF ID #: 801
Fuel Units & Descr: 450 - MTR TYPE
Heavy Metal Mass: BOL=111.015kg; EOL=59.85kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage:
18"x10'
12.50

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	48,454.25	96,908.50	0.00E+00	5.56E-05	1.11E-04
Am-241	2.3056E-03	48,454.25	96,908.50	0.00E+00	1.12E+02	2.23E+02
Am-242m	4.1476E-07	48,454.25	96,908.50	0.00E+00	2.01E-02	4.02E-02
Am-243	1.4894E-06	48,454.25	96,908.50	0.00E+00	7.22E-02	1.44E-01
C-14	5.7108E-09	48,454.25	96,908.50	0.00E+00	2.77E-04	5.53E-04
Cl-36	1.3124E-32	48,454.25	96,908.50	0.00E+00	6.36E-28	1.27E-27
Cm-243	1.4562E-07	48,454.25	96,908.50	0.00E+00	7.06E-03	1.41E-02
Cm-244	2.4221E-05	48,454.25	96,908.50	0.00E+00	1.17E+00	2.35E+00
Co-60	2.7560E-06	48,454.25	96,908.50	0.00E+00	1.34E-01	2.67E-01
Cs-134	5.8851E-04	48,454.25	96,908.50	0.00E+00	2.85E+01	5.70E+01
Cs-135	3.4477E-06	48,454.25	96,908.50	0.00E+00	1.67E-01	3.34E-01
Cs-137	1.8099E+00	48,454.25	96,908.50	0.00E+00	8.77E+04	1.75E+05
Eu-154	1.6386E-02	48,454.25	96,908.50	0.00E+00	7.94E+02	1.59E+03
Eu-155	2.3957E-03	48,454.25	96,908.50	0.00E+00	1.16E+02	2.32E+02
Fe-55	3.2707E-05	48,454.25	96,908.50	0.00E+00	1.58E+00	3.17E+00
H-3	3.4504E-03	48,454.25	96,908.50	0.00E+00	1.67E+02	3.34E+02
I-129	7.5300E-07	48,454.25	96,908.50	0.00E+00	3.65E-02	7.30E-02
Kr-85	7.8540E-02	48,454.25	96,908.50	0.00E+00	3.81E+03	7.61E+03
Np-237	9.5615E-06	48,454.25	96,908.50	0.00E+00	4.63E-01	9.27E-01
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.068E+15
0.0250	1.884E+15
0.0375	1.641E+15
0.0575	1.762E+15
0.0850	1.063E+15
0.1250	7.120E+14
0.2250	9.177E+14
0.3750	3.990E+14
0.5750	6.541E+15
0.8500	9.425E+13
1.2500	5.242E+13
1.7500	2.590E+12
2.2500	1.846E+08
2.7500	1.511E+08
3.5000	1.140E+05
5.0000	3.836E+04
7.0000	4.220E+03
11.0000	4.721E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.62E+03	2.05E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.5168132	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		48,454.25	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		96,908.50	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: 1.06

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RA-3 (UALX-HEU) (ARGENTINA)
SNF ID #: 634
Fuel Units & Descr: 32 - 19 CURVED PLATES
Heavy Metal Mass: BOL=5.722kg; EOL=4.595kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1987
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 1.33

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1,066.72	2,133.45	0.00E+00	2.14E-06	4.28E-06
Am-241	2.5251E-03	1,066.72	2,133.45	0.00E+00	2.69E+00	5.39E+00
Am-242m	3.9624E-07	1,066.72	2,133.45	0.00E+00	4.23E-04	8.45E-04
Am-243	1.4880E-06	1,066.72	2,133.45	0.00E+00	1.59E-03	3.17E-03
C-14	5.7053E-09	1,066.72	2,133.45	0.00E+00	6.09E-06	1.22E-05
Cl-36	1.3124E-32	1,066.72	2,133.45	0.00E+00	1.40E-29	2.80E-29
Cm-243	1.1419E-07	1,066.72	2,133.45	0.00E+00	1.22E-04	2.44E-04
Cm-244	1.6522E-05	1,066.72	2,133.45	0.00E+00	1.76E-02	3.52E-02
Co-60	7.4047E-07	1,066.72	2,133.45	0.00E+00	7.90E-04	1.58E-03
Cs-134	2.0455E-05	1,066.72	2,133.45	0.00E+00	2.18E-02	4.36E-02
Cs-135	3.4477E-06	1,066.72	2,133.45	0.00E+00	3.68E-03	7.36E-03
Cs-137	1.4365E+00	1,066.72	2,133.45	0.00E+00	1.53E+03	3.06E+03
Eu-154	7.3230E-03	1,066.72	2,133.45	0.00E+00	7.81E+00	1.56E+01
Eu-155	5.9259E-04	1,066.72	2,133.45	0.00E+00	6.32E-01	1.26E+00
Fe-55	2.2791E-06	1,066.72	2,133.45	0.00E+00	2.43E-03	4.86E-03
H-3	1.9698E-03	1,066.72	2,133.45	0.00E+00	2.10E+00	4.20E+00
I-129	7.5300E-07	1,066.72	2,133.45	0.00E+00	8.03E-04	1.61E-03
Kr-85	4.1176E-02	1,066.72	2,133.45	0.00E+00	4.39E+01	8.78E+01
Np-237	9.5752E-06	1,066.72	2,133.45	0.00E+00	1.02E-02	2.04E-02
Pa-231	3.9379E-09	1,066.72	2,133.45	0.00E+00	4.20E-06	8.40E-06
Pb-210	3.3115E-10	1,066.72	2,133.45	0.00E+00	3.53E-07	7.07E-07
Pm-147	9.2402E-04	1,066.72	2,133.45	0.00E+00	9.86E-01	1.97E+00
Pu-238	1.6217E-02	1,066.72	2,133.45	0.00E+00	1.73E+01	3.46E+01
Pu-239	4.2810E-04	1,066.72	2,133.45	0.00E+00	4.57E-01	9.13E-01
Pu-240	2.4333E-04	1,066.72	2,133.45	0.00E+00	2.60E-01	5.19E-01
Pu-241	1.6242E-02	1,066.72	2,133.45	0.00E+00	1.73E+01	3.47E+01
Pu-242	3.6329E-07	1,066.72	2,133.45	0.00E+00	3.88E-04	7.75E-04
Ra-226	9.0114E-10	1,066.72	2,133.45	0.00E+00	9.61E-07	1.92E-06
Ra-228	3.1019E-14	1,066.72	2,133.45	0.00E+00	3.31E-11	6.62E-11
Ru-106	2.1225E-10	1,066.72	2,133.45	0.00E+00	2.26E-07	4.53E-07
Se-79	1.2930E-05	1,066.72	2,133.45	0.00E+00	1.38E-02	2.76E-02
Sn-126	1.1571E-05	1,066.72	2,133.45	0.00E+00	1.23E-02	2.47E-02
Sr-90	1.3472E+00	1,066.72	2,133.45	0.00E+00	1.44E+03	2.87E+03
Tc-99	4.2239E-04	1,066.72	2,133.45	0.00E+00	4.51E-01	9.01E-01
Th-229	1.2407E-11	1,066.72	2,133.45	0.00E+00	1.32E-08	2.65E-08
Th-230	8.3497E-08	1,066.72	2,133.45	0.00E+00	8.91E-05	1.78E-04
Th-232	3.8371E-14	1,066.72	2,133.45	0.00E+00	4.09E-11	8.19E-11
Tl-208	4.0414E-08	1,066.72	2,133.45	0.00E+00	4.31E-05	8.62E-05
U-232	1.0948E-07	1,066.72	2,133.45	0.00E+00	1.17E-04	2.34E-04
U-233	3.6275E-09	1,066.72	2,133.45	0.00E+00	3.87E-06	7.74E-06
U-234	1.8562E-04	1,066.72	2,133.45	0.00E+00	1.98E-01	3.96E-01
U-235	-2.7235E-06	1,066.72	0.00	1.11E-02	8.22E-03	1.11E-02
U-236	1.5493E-05	1,066.72	2,133.45	0.00E+00	1.65E-02	3.31E-02
U-238	-4.2851E-09	1,066.72	0.00	1.93E-04	1.88E-04	1.93E-04
Y-90	1.3475E+00	1,066.72	2,133.45	0.00E+00	1.44E+03	2.87E+03
Other Radionuclides					1.46E+03	2.92E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.571E+14
0.0250	3.263E+13
0.0375	2.836E+13
0.0575	3.053E+13
0.0850	1.839E+13
0.1250	1.215E+13
0.2250	1.588E+13
0.3750	6.906E+12
0.5750	1.142E+14
0.8500	1.395E+12
1.2500	6.745E+11
1.7500	3.796E+10
2.2500	3.174E+08
2.7500	3.030E+08
3.5000	1.756E+03
5.0000	7.175E+02
7.0000	7.852E+01
11.0000	8.754E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.79E+01	3.57E+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 %:	89.96321383	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,066.72
Bounding:		2,133.45

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.59	
Bounding:	1.18	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1987
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 8.63

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	7,292.43	14,584.86	0.00E+00	1.46E-05	2.93E-05
Am-241	2.5251E-03	7,292.43	14,584.86	0.00E+00	1.84E+01	3.68E+01
Am-242m	3.9624E-07	7,292.43	14,584.86	0.00E+00	2.89E-03	5.78E-03
Am-243	1.4880E-06	7,292.43	14,584.86	0.00E+00	1.09E-02	2.17E-02
C-14	5.7053E-09	7,292.43	14,584.86	0.00E+00	4.16E-05	8.32E-05
Cl-36	1.3124E-32	7,292.43	14,584.86	0.00E+00	9.57E-29	1.91E-28
Cm-243	1.1419E-07	7,292.43	14,584.86	0.00E+00	8.33E-04	1.67E-03
Cm-244	1.6522E-05	7,292.43	14,584.86	0.00E+00	1.20E-01	2.41E-01
Co-60	7.4047E-07	7,292.43	14,584.86	0.00E+00	5.40E-03	1.08E-02
Cs-134	2.0455E-05	7,292.43	14,584.86	0.00E+00	1.49E-01	2.98E-01
Cs-135	3.4477E-06	7,292.43	14,584.86	0.00E+00	2.51E-02	5.03E-02
Cs-137	1.4365E+00	7,292.43	14,584.86	0.00E+00	1.05E+04	2.10E+04
Eu-154	7.3230E-03	7,292.43	14,584.86	0.00E+00	5.34E+01	1.07E+02
Eu-155	5.9259E-04	7,292.43	14,584.86	0.00E+00	4.32E+00	8.64E+00
Fe-55	2.2791E-06	7,292.43	14,584.86	0.00E+00	1.66E-02	3.32E-02
H-3	1.9698E-03	7,292.43	14,584.86	0.00E+00	1.44E+01	2.87E+01
I-129	7.5300E-07	7,292.43	14,584.86	0.00E+00	5.49E-03	1.10E-02
Kr-85	4.1176E-02	7,292.43	14,584.86	0.00E+00	3.00E+02	6.01E+02
Np-237	9.5752E-06	7,292.43	14,584.86	0.00E+00	6.98E-02	1.40E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.074E+15
0.0250	2.231E+14
0.0375	1.939E+14
0.0575	2.087E+14
0.0850	1.257E+14
0.1250	8.305E+13
0.2250	1.086E+14
0.3750	4.723E+13
0.5750	7.805E+14
0.8500	9.534E+12
1.2500	4.611E+12
1.7500	2.595E+11
2.2500	2.170E+07
2.7500	2.071E+07
3.5000	1.200E+04
5.0000	4.905E+03
7.0000	5.367E+02
11.0000	5.985E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E+02	2.44E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.97773401	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		7,292.43	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		14,584.86	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.61	
Bounding:	1.22	

Estimated EOL HM/Given EOL HM: 1.01

[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: 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

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	3,669.13	7,338.26	0.00E+00	4.21E-06	8.41E-06
Am-241	2.3056E-03	3,669.13	7,338.26	0.00E+00	8.46E+00	1.69E+01
Am-242m	4.1476E-07	3,669.13	7,338.26	0.00E+00	1.52E-03	3.04E-03
Am-243	1.4894E-06	3,669.13	7,338.26	0.00E+00	5.46E-03	1.09E-02
C-14	5.7108E-09	3,669.13	7,338.26	0.00E+00	2.10E-05	4.19E-05
Cl-36	1.3124E-32	3,669.13	7,338.26	0.00E+00	4.82E-29	9.63E-29
Cm-243	1.4562E-07	3,669.13	7,338.26	0.00E+00	5.34E-04	1.07E-03
Cm-244	2.4221E-05	3,669.13	7,338.26	0.00E+00	8.89E-02	1.78E-01
Co-60	2.7560E-06	3,669.13	7,338.26	0.00E+00	1.01E-02	2.02E-02
Cs-134	5.8851E-04	3,669.13	7,338.26	0.00E+00	2.16E+00	4.32E+00
Cs-135	3.4477E-06	3,669.13	7,338.26	0.00E+00	1.27E-02	2.53E-02
Cs-137	1.8099E+00	3,669.13	7,338.26	0.00E+00	6.64E+03	1.33E+04
Eu-154	1.6386E-02	3,669.13	7,338.26	0.00E+00	6.01E+01	1.20E+02
Eu-155	2.3957E-03	3,669.13	7,338.26	0.00E+00	8.79E+00	1.76E+01
Fe-55	3.2707E-05	3,669.13	7,338.26	0.00E+00	1.20E-01	2.40E-01
H-3	3.4504E-03	3,669.13	7,338.26	0.00E+00	1.27E+01	2.53E+01
I-129	7.5300E-07	3,669.13	7,338.26	0.00E+00	2.76E-03	5.53E-03
Kr-85	7.8540E-02	3,669.13	7,338.26	0.00E+00	2.88E+02	5.76E+02
Np-237	9.5615E-06	3,669.13	7,338.26	0.00E+00	3.51E-02	7.02E-02
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	6.27E+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	7.7260E-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
Tl-208	4.4336E-08	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.867E+14
0.0250	1.427E+14
0.0375	1.242E+14
0.0575	1.334E+14
0.0850	8.049E+13
0.1250	5.392E+13
0.2250	6.949E+13
0.3750	3.021E+13
0.5750	4.953E+14
0.8500	7.137E+12
1.2500	3.969E+12
1.7500	1.961E+11
2.2500	1.398E+07
2.7500	1.144E+07
3.5000	8.639E+03
5.0000	2.906E+03
7.0000	3.197E+02
11.0000	3.577E+01

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	79.9939132	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,669.13
Bounding:		7,338.26

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:	0.98	
Bounding:	1.98	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other data confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1989
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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_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	0.0850	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	5.0000	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
Pa-231	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		
Ru-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		
Tl-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	Thermal Power	
U-233	3.6275E-09	10,786.55	21,573.10	0.00E+00	3.91E-05	7.83E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	1.81E+02	3.61E+02
U-238	-4.2851E-09	10,786.55	0.00	8.72E-04	8.26E-04	8.72E-04	Total	Total
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	Basis for burnup used in estimate:
Nominal:		10,786.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		21,573.10	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 161
Fuel Units & Descr: 44 - 18 FLAT PLATES
Heavy Metal Mass: BOL=61.12kg; EOL=60.465kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	620.87	1,241.73	0.00E+00	9.03E-08	1.81E-07
Am-241	1.1190E-03	620.87	1,241.73	0.00E+00	6.95E-01	1.39E+00
Am-242m	4.5425E-07	620.87	1,241.73	0.00E+00	2.82E-04	5.64E-04
Am-243	1.4921E-06	620.87	1,241.73	0.00E+00	9.26E-04	1.85E-03
C-14	5.7244E-09	620.87	1,241.73	0.00E+00	3.55E-06	7.11E-06
Cl-36	1.3124E-32	620.87	1,241.73	0.00E+00	8.15E-30	1.63E-29
Cm-243	2.3676E-07	620.87	1,241.73	0.00E+00	1.47E-04	2.94E-04
Cm-244	5.2042E-05	620.87	1,241.73	0.00E+00	3.23E-02	6.46E-02
Co-60	3.8208E-05	620.87	1,241.73	0.00E+00	2.37E-02	4.74E-02
Cs-134	4.8693E-01	620.87	1,241.73	0.00E+00	3.02E+02	6.05E+02
Cs-135	3.4477E-06	620.87	1,241.73	0.00E+00	2.14E-03	4.28E-03
Cs-137	2.8731E+00	620.87	1,241.73	0.00E+00	1.78E+03	3.57E+03
Eu-154	8.2053E-02	620.87	1,241.73	0.00E+00	5.09E+01	1.02E+02
Eu-155	3.9134E-02	620.87	1,241.73	0.00E+00	2.43E+01	4.86E+01
Fe-55	6.7429E-03	620.87	1,241.73	0.00E+00	4.19E+00	8.37E+00
H-3	1.0599E-02	620.87	1,241.73	0.00E+00	6.58E+00	1.32E+01
I-129	7.5300E-07	620.87	1,241.73	0.00E+00	4.68E-04	9.35E-04
Kr-85	2.8595E-01	620.87	1,241.73	0.00E+00	1.78E+02	3.55E+02
Np-237	9.5479E-06	620.87	1,241.73	0.00E+00	5.93E-03	1.19E-02
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	1.2936E-05	620.87	1,241.73	0.00E+00	8.03E-03	1.61E-02
Sn-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
Tl-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-06	2.43E-06
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.396E+14
0.0250	5.161E+13
0.0375	4.763E+13
0.0575	4.683E+13
0.0850	2.985E+13
0.1250	2.585E+13
0.2250	2.530E+13
0.3750	1.225E+13
0.5750	1.682E+14
0.8500	2.356E+13
1.2500	4.383E+12
1.7500	1.838E+11
2.2500	3.855E+11
2.7500	2.218E+09
3.5000	2.460E+08
5.0000	7.735E+02
7.0000	8.636E+01
11.0000	9.745E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.15E+01	6.30E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7728395	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:		620.87
Bounding:		1,241.73

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:	0.03	
Bounding:	0.06	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 180
Fuel Units & Descr: 70 - 18 FLAT PLATES
Heavy Metal Mass: BOL=9.366kg; EOL=8.498kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	822.01	1,644.03	0.00E+00	1.65E-06	3.30E-06
Am-241	2.5251E-03	822.01	1,644.03	0.00E+00	2.08E+00	4.15E+00
Am-242m	3.9624E-07	822.01	1,644.03	0.00E+00	3.26E-04	6.51E-04
Am-243	1.4880E-06	822.01	1,644.03	0.00E+00	1.22E-03	2.45E-03
C-14	5.7053E-09	822.01	1,644.03	0.00E+00	4.69E-06	9.38E-06
Cl-36	1.3124E-32	822.01	1,644.03	0.00E+00	1.08E-29	2.16E-29
Cm-243	1.1419E-07	822.01	1,644.03	0.00E+00	9.39E-05	1.88E-04
Cm-244	1.6522E-05	822.01	1,644.03	0.00E+00	1.36E-02	2.72E-02
Co-60	7.4047E-07	822.01	1,644.03	0.00E+00	6.09E-04	1.22E-03
Cs-134	2.0455E-05	822.01	1,644.03	0.00E+00	1.68E-02	3.36E-02
Cs-135	3.4477E-06	822.01	1,644.03	0.00E+00	2.83E-03	5.67E-03
Cs-137	1.4365E+00	822.01	1,644.03	0.00E+00	1.18E+03	2.36E+03
Eu-154	7.3230E-03	822.01	1,644.03	0.00E+00	6.02E+00	1.20E+01
Eu-155	5.9259E-04	822.01	1,644.03	0.00E+00	4.87E-01	9.74E-01
Fe-55	2.2791E-06	822.01	1,644.03	0.00E+00	1.87E-03	3.75E-03
H-3	1.9698E-03	822.01	1,644.03	0.00E+00	1.62E+00	3.24E+00
I-129	7.5300E-07	822.01	1,644.03	0.00E+00	6.19E-04	1.24E-03
Kr-85	4.1176E-02	822.01	1,644.03	0.00E+00	3.38E+01	6.77E+01
Np-237	9.5752E-06	822.01	1,644.03	0.00E+00	7.87E-03	1.57E-02
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
Tl-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	1.66E-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	2.16E-04	2.13E-04	2.16E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.211E+14
0.0250	2.514E+13
0.0375	2.185E+13
0.0575	2.352E+13
0.0850	1.417E+13
0.1250	9.362E+12
0.2250	1.224E+13
0.3750	5.323E+12
0.5750	8.798E+13
0.8500	1.075E+12
1.2500	5.198E+11
1.7500	2.925E+10
2.2500	2.446E+06
2.7500	2.335E+06
3.5000	1.354E+03
5.0000	5.532E+02
7.0000	6.054E+01
11.0000	6.750E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.38E+01	2.75E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.13598185	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		822.01	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	37.46	1,644.03	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.28	
Bounding:	0.56	43.88

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	1,089.55	2,179.09	0.00E+00	1.25E-06	2.50E-06
Am-241	2.3056E-03	1,089.55	2,179.09	0.00E+00	2.51E+00	5.02E+00
Am-242m	4.1476E-07	1,089.55	2,179.09	0.00E+00	4.52E-04	9.04E-04
Am-243	1.4894E-06	1,089.55	2,179.09	0.00E+00	1.62E-03	3.25E-03
C-14	5.7108E-09	1,089.55	2,179.09	0.00E+00	6.22E-06	1.24E-05
Cl-36	1.3124E-32	1,089.55	2,179.09	0.00E+00	1.43E-29	2.86E-29
Cm-243	1.4562E-07	1,089.55	2,179.09	0.00E+00	1.59E-04	3.17E-04
Cm-244	2.4221E-05	1,089.55	2,179.09	0.00E+00	2.64E-02	5.28E-02
Co-60	2.7560E-06	1,089.55	2,179.09	0.00E+00	3.00E-03	6.01E-03
Cs-134	5.8851E-04	1,089.55	2,179.09	0.00E+00	6.41E-01	1.28E+00
Cs-135	3.4477E-06	1,089.55	2,179.09	0.00E+00	3.76E-03	7.51E-03
Cs-137	1.8099E+00	1,089.55	2,179.09	0.00E+00	1.97E+03	3.94E+03
Eu-154	1.6386E-02	1,089.55	2,179.09	0.00E+00	1.79E+01	3.57E+01
Eu-155	2.3957E-03	1,089.55	2,179.09	0.00E+00	2.61E+00	5.22E+00
Fe-55	3.2707E-05	1,089.55	2,179.09	0.00E+00	3.56E-02	7.13E-02
H-3	3.4504E-03	1,089.55	2,179.09	0.00E+00	3.76E+00	7.52E+00
I-129	7.5300E-07	1,089.55	2,179.09	0.00E+00	8.20E-04	1.64E-03
Kr-85	7.8540E-02	1,089.55	2,179.09	0.00E+00	8.56E+01	1.71E+02
Np-237	9.5615E-06	1,089.55	2,179.09	0.00E+00	1.04E-02	2.08E-02
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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.039E+14
0.0250	4.236E+13
0.0375	3.689E+13
0.0575	3.961E+13
0.0850	2.390E+13
0.1250	1.601E+13
0.2250	2.064E+13
0.3750	8.972E+12
0.5750	1.471E+14
0.8500	2.119E+12
1.2500	1.179E+12
1.7500	5.823E+10
2.2500	4.150E+06
2.7500	3.398E+06
3.5000	2.608E+03
5.0000	8.812E+02
7.0000	9.705E+01
11.0000	1.086E+01

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.83094182	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:		1,089.55
Bounding:		2,179.09

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:	0.11	
Bounding:	0.23	

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: 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

[1]Fuel decay start date: 1999
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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
Cl-36	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	5.8851E-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	8.676E+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	1.699E+07
Fe-55	3.2707E-05	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	5.16E-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-06	6.89E-06		
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		
Tl-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.43E+01	1.89E+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 %:	19.68299334	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	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
Nominal:	0.25	
Bounding:	0.50	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 0.11

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	1.89	3.79	0.00E+00	2.17E-09	4.34E-09
Am-241	2.3056E-03	1.89	3.79	0.00E+00	4.37E-03	8.73E-03
Am-242m	4.1476E-07	1.89	3.79	0.00E+00	7.86E-07	1.57E-06
Am-243	1.4894E-06	1.89	3.79	0.00E+00	2.82E-06	5.64E-06
C-14	5.7108E-09	1.89	3.79	0.00E+00	1.08E-08	2.16E-08
Cl-36	1.3124E-32	1.89	3.79	0.00E+00	2.49E-32	4.97E-32
Cm-243	1.4562E-07	1.89	3.79	0.00E+00	2.76E-07	5.52E-07
Cm-244	2.4221E-05	1.89	3.79	0.00E+00	4.59E-05	9.18E-05
Co-60	2.7560E-06	1.89	3.79	0.00E+00	5.22E-06	1.04E-05
Cs-134	5.8851E-04	1.89	3.79	0.00E+00	1.11E-03	2.23E-03
Cs-135	3.4477E-06	1.89	3.79	0.00E+00	6.53E-06	1.31E-05
Cs-137	1.8099E+00	1.89	3.79	0.00E+00	3.43E+00	6.86E+00
Eu-154	1.6386E-02	1.89	3.79	0.00E+00	3.10E-02	6.21E-02
Eu-155	2.3957E-03	1.89	3.79	0.00E+00	4.54E-03	9.08E-03
Fe-55	3.2707E-05	1.89	3.79	0.00E+00	6.19E-05	1.24E-04
H-3	3.4504E-03	1.89	3.79	0.00E+00	6.54E-03	1.31E-02
I-129	7.5300E-07	1.89	3.79	0.00E+00	1.43E-06	2.85E-06
Kr-85	7.8540E-02	1.89	3.79	0.00E+00	1.49E-01	2.98E-01
Np-237	9.5615E-06	1.89	3.79	0.00E+00	1.81E-05	3.62E-05
Pa-231	2.7968E-09	1.89	3.79	0.00E+00	5.30E-09	1.06E-08
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.545E+11
0.0250	7.364E+10
0.0375	6.413E+10
0.0575	6.886E+10
0.0850	4.155E+10
0.1250	2.784E+10
0.2250	3.589E+10
0.3750	1.560E+10
0.5750	2.557E+11
0.8500	3.684E+09
1.2500	2.049E+09
1.7500	1.012E+08
2.2500	7.221E+03
2.7500	5.911E+03
3.5000	7.520E+00
5.0000	2.815E+00
7.0000	3.164E-01
11.0000	3.587E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.01E-02	8.02E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81060606	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:	0.00	1.89
Bounding:		3.79

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	448.40
Bounding:	0.01	

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: RU-1 (UALX LEU) URAGUAY
SNF ID #: 1073
Fuel Units & Descr: 15 - ASSEMBLY
Heavy Metal Mass: BOL=7.92kg; EOL=7.912kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	7.10	14.21	0.00E+00	8.14E-09	1.63E-08
Am-241	2.3056E-03	7.10	14.21	0.00E+00	1.64E-02	3.28E-02
Am-242m	4.1476E-07	7.10	14.21	0.00E+00	2.95E-06	5.89E-06
Am-243	1.4894E-06	7.10	14.21	0.00E+00	1.06E-05	2.12E-05
C-14	5.7108E-09	7.10	14.21	0.00E+00	4.06E-08	8.11E-08
Cl-36	1.3124E-32	7.10	14.21	0.00E+00	9.32E-32	1.86E-31
Cm-243	1.4562E-07	7.10	14.21	0.00E+00	1.03E-06	2.07E-06
Cm-244	2.4221E-05	7.10	14.21	0.00E+00	1.72E-04	3.44E-04
Co-60	2.7560E-06	7.10	14.21	0.00E+00	1.96E-05	3.91E-05
Cs-134	5.8851E-04	7.10	14.21	0.00E+00	4.18E-03	8.36E-03
Cs-135	3.4477E-06	7.10	14.21	0.00E+00	2.45E-05	4.90E-05
Cs-137	1.8099E+00	7.10	14.21	0.00E+00	1.29E+01	2.57E+01
Eu-154	1.6386E-02	7.10	14.21	0.00E+00	1.16E-01	2.33E-01
Eu-155	2.3957E-03	7.10	14.21	0.00E+00	1.70E-02	3.40E-02
Fe-55	3.2707E-05	7.10	14.21	0.00E+00	2.32E-04	4.65E-04
H-3	3.4504E-03	7.10	14.21	0.00E+00	2.45E-02	4.90E-02
I-129	7.5300E-07	7.10	14.21	0.00E+00	5.35E-06	1.07E-05
Kr-85	7.8540E-02	7.10	14.21	0.00E+00	5.58E-01	1.12E+00
Np-237	9.5615E-06	7.10	14.21	0.00E+00	6.79E-05	1.36E-04
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	3.46E-03
Pu-241	2.6277E-02	7.10	14.21	0.00E+00	1.87E-01	3.73E-01
Pu-242	3.6329E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.329E+12
0.0250	2.761E+11
0.0375	2.405E+11
0.0575	2.582E+11
0.0850	1.558E+11
0.1250	1.044E+11
0.2250	1.346E+11
0.3750	5.849E+10
0.5750	9.588E+11
0.8500	1.382E+10
1.2500	7.683E+09
1.7500	3.796E+08
2.2500	2.708E+04
2.7500	2.217E+04
3.5000	2.820E+01
5.0000	1.056E+01
7.0000	1.187E+00
11.0000	1.345E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.60E-01	3.01E-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 %:	19.81060606	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:	0.02	7.10
Bounding:		14.21

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	448.40
Bounding:	0.01	

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: RV-1 (UALX LEU) VENEZUELA
SNF ID #: 816
Fuel Units & Descr: 56 - MTR TYPE
Heavy Metal Mass: BOL=39.698kg; EOL=38.713kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	933.38	1,866.76	0.00E+00	1.07E-06	2.14E-06
Am-241	2.3056E-03	933.38	1,866.76	0.00E+00	2.15E+00	4.30E+00
Am-242m	4.1476E-07	933.38	1,866.76	0.00E+00	3.87E-04	7.74E-04
Am-243	1.4894E-06	933.38	1,866.76	0.00E+00	1.39E-03	2.78E-03
C-14	5.7108E-09	933.38	1,866.76	0.00E+00	5.33E-06	1.07E-05
Cl-36	1.3124E-32	933.38	1,866.76	0.00E+00	1.22E-29	2.45E-29
Cm-243	1.4562E-07	933.38	1,866.76	0.00E+00	1.36E-04	2.72E-04
Cm-244	2.4221E-05	933.38	1,866.76	0.00E+00	2.26E-02	4.52E-02
Co-60	2.7560E-06	933.38	1,866.76	0.00E+00	2.57E-03	5.14E-03
Cs-134	5.8851E-04	933.38	1,866.76	0.00E+00	5.49E-01	1.10E+00
Cs-135	3.4477E-06	933.38	1,866.76	0.00E+00	3.22E-03	6.44E-03
Cs-137	1.8099E+00	933.38	1,866.76	0.00E+00	1.69E+03	3.38E+03
Eu-154	1.6386E-02	933.38	1,866.76	0.00E+00	1.53E+01	3.06E+01
Eu-155	2.3957E-03	933.38	1,866.76	0.00E+00	2.24E+00	4.47E+00
Fe-55	3.2707E-05	933.38	1,866.76	0.00E+00	3.05E-02	6.11E-02
H-3	3.4504E-03	933.38	1,866.76	0.00E+00	3.22E+00	6.44E+00
I-129	7.5300E-07	933.38	1,866.76	0.00E+00	7.03E-04	1.41E-03
Kr-85	7.8540E-02	933.38	1,866.76	0.00E+00	7.33E+01	1.47E+02
Np-237	9.5615E-06	933.38	1,866.76	0.00E+00	8.92E-03	1.78E-02
Pa-231	2.7968E-09	933.38	1,866.76	0.00E+00	2.61E-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
Tl-208	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-09	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.747E+14
0.0250	3.629E+13
0.0375	3.160E+13
0.0575	3.394E+13
0.0850	2.048E+13
0.1250	1.372E+13
0.2250	1.768E+13
0.3750	7.686E+12
0.5750	1.260E+14
0.8500	1.816E+12
1.2500	1.010E+12
1.7500	4.988E+10
2.2500	3.555E+06
2.7500	2.911E+06
3.5000	2.254E+03
5.0000	7.636E+02
7.0000	8.415E+01
11.0000	9.422E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.97E+01	3.95E+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 %:	19.1126847	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:		933.38
Bounding:		1,866.76

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:	0.07	
Bounding:	0.15	

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: 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

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.0068E-09	8,088.49	16,176.99	0.00E+00	1.62E-05	3.25E-05
Am-241	2.5251E-03	8,088.49	16,176.99	0.00E+00	2.04E+01	4.08E+01
Am-242m	3.9624E-07	8,088.49	16,176.99	0.00E+00	3.20E-03	6.41E-03
Am-243	1.4880E-06	8,088.49	16,176.99	0.00E+00	1.20E-02	2.41E-02
C-14	5.7053E-09	8,088.49	16,176.99	0.00E+00	4.61E-05	9.23E-05
Cl-36	1.3124E-32	8,088.49	16,176.99	0.00E+00	1.06E-28	2.12E-28
Cm-243	1.1419E-07	8,088.49	16,176.99	0.00E+00	9.24E-04	1.85E-03
Cm-244	1.6522E-05	8,088.49	16,176.99	0.00E+00	1.34E-01	2.67E-01
Co-60	7.4047E-07	8,088.49	16,176.99	0.00E+00	5.99E-03	1.20E-02
Cs-134	2.0455E-05	8,088.49	16,176.99	0.00E+00	1.65E-01	3.31E-01
Cs-135	3.4477E-06	8,088.49	16,176.99	0.00E+00	2.79E-02	5.58E-02
Cs-137	1.4365E+00	8,088.49	16,176.99	0.00E+00	1.16E+04	2.32E+04
Eu-154	7.3230E-03	8,088.49	16,176.99	0.00E+00	5.92E+01	1.18E+02
Eu-155	5.9259E-04	8,088.49	16,176.99	0.00E+00	4.79E+00	9.59E+00
Fe-55	2.2791E-06	8,088.49	16,176.99	0.00E+00	1.84E-02	3.69E-02
H-3	1.9698E-03	8,088.49	16,176.99	0.00E+00	1.59E+01	3.19E+01
I-129	7.5300E-07	8,088.49	16,176.99	0.00E+00	6.09E-03	1.22E-02
Kr-85	4.1176E-02	8,088.49	16,176.99	0.00E+00	3.33E+02	6.66E+02
Np-237	9.5752E-06	8,088.49	16,176.99	0.00E+00	7.74E-02	1.55E-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	3.8371E-14	8,088.49	16,176.99	0.00E+00	3.10E-10	6.21E-10
Tl-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	-4.2851E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.191E+15
0.0250	2.474E+14
0.0375	2.150E+14
0.0575	2.315E+14
0.0850	1.395E+14
0.1250	9.212E+13
0.2250	1.204E+14
0.3750	5.238E+13
0.5750	8.657E+14
0.8500	1.057E+13
1.2500	5.114E+12
1.7500	2.878E+11
2.2500	2.407E+07
2.7500	2.297E+07
3.5000	1.342E+04
5.0000	5.486E+03
7.0000	6.006E+02
11.0000	6.698E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.35E+02	2.71E+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 %:	19.83740991	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:		8,088.49
Bounding:		16,176.99

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:	0.32	
Bounding:	0.64	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	8,946.30	17,892.61	0.00E+00	1.80E-05	3.59E-05
Am-241	2.5251E-03	8,946.30	17,892.61	0.00E+00	2.26E+01	4.52E+01
Am-242m	3.9624E-07	8,946.30	17,892.61	0.00E+00	3.54E-03	7.09E-03
Am-243	1.4880E-06	8,946.30	17,892.61	0.00E+00	1.33E-02	2.66E-02
C-14	5.7053E-09	8,946.30	17,892.61	0.00E+00	5.10E-05	1.02E-04
Cl-36	1.3124E-32	8,946.30	17,892.61	0.00E+00	1.17E-28	2.35E-28
Cm-243	1.1419E-07	8,946.30	17,892.61	0.00E+00	1.02E-03	2.04E-03
Cm-244	1.6522E-05	8,946.30	17,892.61	0.00E+00	1.48E-01	2.96E-01
Co-60	7.4047E-07	8,946.30	17,892.61	0.00E+00	6.62E-03	1.32E-02
Cs-134	2.0455E-05	8,946.30	17,892.61	0.00E+00	1.83E-01	3.66E-01
Cs-135	3.4477E-06	8,946.30	17,892.61	0.00E+00	3.08E-02	6.17E-02
Cs-137	1.4365E+00	8,946.30	17,892.61	0.00E+00	1.29E+04	2.57E+04
Eu-154	7.3230E-03	8,946.30	17,892.61	0.00E+00	6.55E+01	1.31E+02
Eu-155	5.9259E-04	8,946.30	17,892.61	0.00E+00	5.30E+00	1.06E+01
Fe-55	2.2791E-06	8,946.30	17,892.61	0.00E+00	2.04E-02	4.08E-02
H-3	1.9698E-03	8,946.30	17,892.61	0.00E+00	1.76E+01	3.52E+01
I-129	7.5300E-07	8,946.30	17,892.61	0.00E+00	6.74E-03	1.35E-02
Kr-85	4.1176E-02	8,946.30	17,892.61	0.00E+00	3.68E+02	7.37E+02
Np-237	9.5752E-06	8,946.30	17,892.61	0.00E+00	8.57E-02	1.71E-01
Pa-231	3.9379E-09	8,946.30	17,892.61	0.00E+00	3.52E-05	7.05E-05
Pb-210	3.3115E-10	8,946.30	17,892.61	0.00E+00	2.96E-06	5.93E-06
Pm-147	9.2402E-04	8,946.30	17,892.61	0.00E+00	8.27E+00	1.65E+01
Pu-238	1.6217E-02	8,946.30	17,892.61	0.00E+00	1.45E+02	2.90E+02
Pu-239	4.2810E-04	8,946.30	17,892.61	0.00E+00	3.83E+00	7.66E+00
Pu-240	2.4333E-04	8,946.30	17,892.61	0.00E+00	2.18E+00	4.35E+00
Pu-241	1.6242E-02	8,946.30	17,892.61	0.00E+00	1.45E+02	2.91E+02
Pu-242	3.6329E-07	8,946.30	17,892.61	0.00E+00	3.25E-03	6.50E-03
Ra-226	9.0114E-10	8,946.30	17,892.61	0.00E+00	8.06E-06	1.61E-05
Ra-228	3.1019E-14	8,946.30	17,892.61	0.00E+00	2.78E-10	5.55E-10
Ru-106	2.1225E-10	8,946.30	17,892.61	0.00E+00	1.90E-06	3.80E-06
Se-79	1.2930E-05	8,946.30	17,892.61	0.00E+00	1.16E-01	2.31E-01
Sn-126	1.1571E-05	8,946.30	17,892.61	0.00E+00	1.04E-01	2.07E-01
Sr-90	1.3472E+00	8,946.30	17,892.61	0.00E+00	1.21E+04	2.41E+04
Tc-99	4.2239E-04	8,946.30	17,892.61	0.00E+00	3.78E+00	7.56E+00
Th-229	1.2407E-11	8,946.30	17,892.61	0.00E+00	1.11E-07	2.22E-07
Th-230	8.3497E-08	8,946.30	17,892.61	0.00E+00	7.47E-04	1.49E-03
Th-232	3.8371E-14	8,946.30	17,892.61	0.00E+00	3.43E-10	6.87E-10
Tl-208	4.0414E-08	8,946.30	17,892.61	0.00E+00	3.62E-04	7.23E-04
U-232	1.0948E-07	8,946.30	17,892.61	0.00E+00	9.79E-04	1.96E-03
U-233	3.6275E-09	8,946.30	17,892.61	0.00E+00	3.25E-06	6.49E-05
U-234	1.8562E-04	8,946.30	17,892.61	0.00E+00	1.66E+00	3.32E+00
U-235	-2.7235E-06	8,946.30	0.00	4.20E-02	1.76E-02	4.20E-02
U-236	1.5493E-05	8,946.30	17,892.61	0.00E+00	1.39E-01	2.77E-01
U-238	-4.2851E-09	8,946.30	0.00	6.76E-04	6.38E-04	6.76E-04
Y-90	1.3475E+00	8,946.30	17,892.61	0.00E+00	1.21E+04	2.41E+04
Other Radionuclides					1.22E+04	2.45E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.318E+15
0.0250	2.736E+14
0.0375	2.379E+14
0.0575	2.580E+14
0.0850	1.543E+14
0.1250	1.019E+14
0.2250	1.332E+14
0.3750	5.794E+13
0.5750	9.575E+14
0.8500	1.170E+13
1.2500	5.657E+12
1.7500	3.184E+11
2.2500	2.662E+07
2.7500	2.541E+07
3.5000	1.472E+04
5.0000	6.015E+03
7.0000	6.582E+02
11.0000	7.338E+01

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	90.62318257	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,946.30
Bounding:		17,892.61

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:	1.33	
Bounding:	2.65	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR ULAX MEU (SWITZERLAND)
BNF ID #: 945
Fuel Units & Descr: 52 - MTR TYPE
Heavy Metal Mass: BOL=35.984kg; EOL=28.808kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	6,795.81	13,591.62	0.00E+00	1.36E-05	2.73E-05
Am-241	2.5251E-03	6,795.81	13,591.62	0.00E+00	1.72E+01	3.43E+01
Am-242m	3.9624E-07	6,795.81	13,591.62	0.00E+00	2.69E-03	5.39E-03
Am-243	1.4880E-06	6,795.81	13,591.62	0.00E+00	1.01E-02	2.02E-02
C-14	5.7053E-09	6,795.81	13,591.62	0.00E+00	3.88E-05	7.75E-05
Cl-36	1.3124E-32	6,795.81	13,591.62	0.00E+00	8.92E-29	1.78E-28
Cm-243	1.1419E-07	6,795.81	13,591.62	0.00E+00	7.76E-04	1.55E-03
Cm-244	1.6522E-05	6,795.81	13,591.62	0.00E+00	1.12E-01	2.25E-01
Co-60	7.4047E-07	6,795.81	13,591.62	0.00E+00	5.03E-03	1.01E-02
Cs-134	2.0455E-05	6,795.81	13,591.62	0.00E+00	1.39E-01	2.78E-01
Cs-135	3.4477E-06	6,795.81	13,591.62	0.00E+00	2.34E-02	4.69E-02
Cs-137	1.4365E+00	6,795.81	13,591.62	0.00E+00	9.76E+03	1.95E+04
Eu-154	7.3230E-03	6,795.81	13,591.62	0.00E+00	4.98E+01	9.95E+01
Eu-155	5.9259E-04	6,795.81	13,591.62	0.00E+00	4.03E+00	8.05E+00
Fe-55	2.2791E-06	6,795.81	13,591.62	0.00E+00	1.55E-02	3.10E-02
H-3	1.9698E-03	6,795.81	13,591.62	0.00E+00	1.34E+01	2.68E+01
I-129	7.5300E-07	6,795.81	13,591.62	0.00E+00	5.12E-03	1.02E-02
Kr-85	4.1176E-02	6,795.81	13,591.62	0.00E+00	2.80E+02	5.60E+02
Np-237	9.5752E-06	6,795.81	13,591.62	0.00E+00	6.51E-02	1.30E-01
Pa-231	3.9379E-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	2.87E+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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.001E+15
0.0250	2.079E+14
0.0375	1.807E+14
0.0575	1.945E+14
0.0850	1.172E+14
0.1250	7.740E+13
0.2250	1.012E+14
0.3750	4.401E+13
0.5750	7.273E+14
0.8500	8.884E+12
1.2500	4.297E+12
1.7500	2.418E+11
2.2500	2.022E+07
2.7500	1.930E+07
3.5000	1.121E+04
5.0000	4.583E+03
7.0000	5.016E+02
11.0000	5.593E+01

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

	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

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:		6,795.81
Bounding:		13,591.62

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:	0.60	
Bounding:	1.20	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (MOX SST)
SNF ID #: 883
Fuel Units & Descr: 25 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=95.588kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00188865
Template Decay Time: 50 years

Estimated Canister usage: 18"x10'
0.78

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	95.69	95.69	0.00E+00	2.41E-04	2.41E-04
Am-241	8.6432E+00	95.69	95.69	0.00E+00	8.27E+02	8.27E+02
Am-242m	1.5728E-02	95.69	95.69	0.00E+00	1.50E+00	1.50E+00
Am-243	1.6288E-02	95.69	95.69	0.00E+00	1.56E+00	1.56E+00
C-14	1.2068E-01	95.69	95.69	0.00E+00	1.15E+01	1.15E+01
Cl-36	2.2849E-03	95.69	95.69	0.00E+00	2.19E-01	2.19E-01
Cm-243	6.0144E-04	95.69	95.69	0.00E+00	5.76E-02	5.76E-02
Cm-244	9.4880E-02	95.69	95.69	0.00E+00	9.08E+00	9.08E+00
Co-60	3.9052E+00	95.69	95.69	0.00E+00	3.74E+02	3.74E+02
Cs-134	2.2139E-06	95.69	95.69	0.00E+00	2.12E-04	2.12E-04
Cs-135	4.3976E-04	95.69	95.69	0.00E+00	4.21E-02	4.21E-02
Cs-137	1.4887E+01	95.69	95.69	0.00E+00	1.42E+03	1.42E+03
Eu-154	3.7342E-01	95.69	95.69	0.00E+00	3.57E+01	3.57E+01
Eu-155	8.4893E-03	95.69	95.69	0.00E+00	8.12E-01	8.12E-01
Fe-55	5.3750E-03	95.69	95.69	0.00E+00	5.14E-01	5.14E-01
H-3	1.0472E-01	95.69	95.69	0.00E+00	1.00E+01	1.00E+01
I-129	1.0618E-05	95.69	95.69	0.00E+00	1.02E-03	1.02E-03
Kr-85	2.2717E-01	95.69	95.69	0.00E+00	2.17E+01	2.17E+01
Np-237	1.6400E-04	95.69	95.69	0.00E+00	1.57E-02	1.57E-02
Pa-231	2.8688E-06	95.69	95.69	0.00E+00	2.75E-04	2.75E-04
Pb-210	4.7312E-06	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
Tl-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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.798E+14
0.0250	1.602E+13
0.0375	1.375E+13
0.0575	2.562E+13
0.0850	8.615E+12
0.1250	6.076E+12
0.2250	7.426E+12
0.3750	3.216E+12
0.5750	5.315E+13
0.8500	1.164E+12
1.2500	2.854E+13
1.7500	3.430E+10
2.2500	1.518E+08
2.7500	2.573E+08
3.5000	1.945E+08
5.0000	8.206E+05
7.0000	9.287E+04
11.0000	1.058E+04

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 estimate:

Nominal burnup set equal to bounding burnup

Bounding burnup taken from SFD and converted to MWd using BOL=95.588kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.40

[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: SAXTON (MOX ZR)
SNF ID #: 787
Fuel Units & Descr: 43 - ELEMENT
Heavy Metal Mass: BOL= : EOL=239.88kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: (Worst Case)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.5200E-06	240.13	240.13	0.00E+00	6.05E-04	6.05E-04
Am-241	8.6432E+00	240.13	240.13	0.00E+00	2.08E+03	2.08E+03
Am-242m	1.5728E-02	240.13	240.13	0.00E+00	3.78E+00	3.78E+00
Am-243	1.6288E-02	240.13	240.13	0.00E+00	3.91E+00	3.91E+00
C-14	1.2068E-01	240.13	240.13	0.00E+00	2.90E+01	2.90E+01
Cl-36	2.2849E-03	240.13	240.13	0.00E+00	5.49E-01	5.49E-01
Cm-243	6.0144E-04	240.13	240.13	0.00E+00	1.44E-01	1.44E-01
Cm-244	9.4880E-02	240.13	240.13	0.00E+00	2.28E+01	2.28E+01
Co-60	3.9052E+00	240.13	240.13	0.00E+00	9.38E+02	9.38E+02
Cs-134	2.2139E-06	240.13	240.13	0.00E+00	5.32E-04	5.32E-04
Cs-135	4.3976E-04	240.13	240.13	0.00E+00	1.06E-01	1.06E-01
Cs-137	1.4887E+01	240.13	240.13	0.00E+00	3.57E+03	3.57E+03
Eu-154	3.7342E-01	240.13	240.13	0.00E+00	8.97E+01	8.97E+01
Eu-155	8.4893E-03	240.13	240.13	0.00E+00	2.04E+00	2.04E+00
Fe-55	5.3750E-03	240.13	240.13	0.00E+00	1.29E+00	1.29E+00
H-3	1.0472E-01	240.13	240.13	0.00E+00	2.51E+01	2.51E+01
I-129	1.0618E-05	240.13	240.13	0.00E+00	2.55E-03	2.55E-03
Kr-85	2.2717E-01	240.13	240.13	0.00E+00	5.46E+01	5.46E+01
Np-237	1.6400E-04	240.13	240.13	0.00E+00	3.94E-02	3.94E-02
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
Tl-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	5.64E-02	5.64E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.512E+14
0.0250	4.020E+13
0.0375	3.451E+13
0.0575	6.429E+13
0.0850	2.162E+13
0.1250	1.525E+13
0.2250	1.864E+13
0.3750	8.070E+12
0.5750	1.334E+14
0.8500	2.922E+12
1.2500	7.161E+13
1.7500	8.608E+10
2.2500	3.810E+08
2.7500	6.457E+08
3.5000	4.880E+06
5.0000	2.059E+06
7.0000	2.331E+05
11.0000	2.654E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.44E+03	1.45E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	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:		240.13
Bounding:		240.13

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup

Bounding burnup taken from SFD and converted to MWd using BOL=240.132kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.40

[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: SAXTON (UO2 SST)
SNF ID #: 882
Fuel Units & Descr: 20 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=10.402kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	16.67	16.67	0.00E+00	5.71E-07	5.71E-07
Am-241	1.1458E-04	16.67	16.67	0.00E+00	1.91E-03	1.91E-03
Am-242m	7.9468E-09	16.67	16.67	0.00E+00	1.32E-07	1.32E-07
Am-243	9.8386E-10	16.67	16.67	0.00E+00	1.64E-08	1.64E-08
C-14	2.2978E-04	16.67	16.67	0.00E+00	3.83E-03	3.83E-03
Cl-36	1.2261E-06	16.67	16.67	0.00E+00	2.04E-05	2.04E-05
Cm-243	1.7271E-10	16.67	16.67	0.00E+00	2.88E-09	2.88E-09
Cm-244	1.3058E-09	16.67	16.67	0.00E+00	2.18E-08	2.18E-08
Co-60	9.8636E-03	16.67	16.67	0.00E+00	1.64E-01	1.64E-01
Cs-134	1.9617E-08	16.67	16.67	0.00E+00	3.27E-07	3.27E-07
Cs-135	3.0316E-05	16.67	16.67	0.00E+00	5.05E-04	5.05E-04
Cs-137	1.0263E+00	16.67	16.67	0.00E+00	1.71E+01	1.71E+01
Eu-154	2.0017E-04	16.67	16.67	0.00E+00	3.34E-03	3.34E-03
Eu-155	8.5957E-05	16.67	16.67	0.00E+00	1.43E-03	1.43E-03
Fe-55	2.2646E-05	16.67	16.67	0.00E+00	3.78E-04	3.78E-04
H-3	1.0835E-03	16.67	16.67	0.00E+00	1.81E-02	1.81E-02
I-129	7.3195E-07	16.67	16.67	0.00E+00	1.22E-05	1.22E-05
Kr-85	1.5661E-02	16.67	16.67	0.00E+00	2.61E-01	2.61E-01
Np-237	1.1494E-06	16.67	16.67	0.00E+00	1.92E-05	1.92E-05
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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.698E+11
0.0250	1.807E+11
0.0375	1.566E+11
0.0575	1.685E+11
0.0850	1.018E+11
0.1250	6.614E+10
0.2250	8.812E+10
0.3750	3.825E+10
0.5750	6.369E+11
0.8500	6.288E+09
1.2500	1.432E+10
1.7500	1.619E+08
2.2500	8.206E+04
2.7500	1.118E+04
3.5000	2.892E+00
5.0000	1.208E+00
7.0000	1.352E-01
11.0000	1.529E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.95E-01	1.95E-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:	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)[2]

	From SFD	Estimated
Nominal:		16.67
Bounding:		16.67

Basis for burnup used in estimate:
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
Nominal:	0.03	
Bounding:	0.03	

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: SAXTON (UO2 ZR)
SNF ID #: 788
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=41.482kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 50 years

Estimated Canister usage: 16"x10' 0.31

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.0733E-09	66.48	66.48	0.00E+00	7.14E-08	7.14E-08
Am-241	1.4751E-01	66.48	66.48	0.00E+00	9.81E+00	9.81E+00
Am-242m	2.6809E-04	66.48	66.48	0.00E+00	1.78E-02	1.78E-02
Am-243	6.2484E-04	66.48	66.48	0.00E+00	4.15E-02	4.15E-02
C-14	4.7820E-05	66.48	66.48	0.00E+00	3.18E-03	3.18E-03
Cl-36	8.0297E-07	66.48	66.48	0.00E+00	5.34E-05	5.34E-05
Cm-243	1.7426E-04	66.48	66.48	0.00E+00	1.16E-02	1.16E-02
Cm-244	2.7616E-02	66.48	66.48	0.00E+00	1.84E+00	1.84E+00
Co-60	3.5610E-04	66.48	66.48	0.00E+00	2.37E-02	2.37E-02
Cs-134	2.6260E-07	66.48	66.48	0.00E+00	1.75E-05	1.75E-05
Cs-135	1.4433E-05	66.48	66.48	0.00E+00	9.60E-04	9.60E-04
Cs-137	9.8870E-01	66.48	66.48	0.00E+00	6.57E+01	6.57E+01
Eu-154	6.0320E-03	66.48	66.48	0.00E+00	4.01E-01	4.01E-01
Eu-155	2.1770E-04	66.48	66.48	0.00E+00	1.45E-02	1.45E-02
Fe-55	7.9296E-07	66.48	66.48	0.00E+00	5.27E-05	5.27E-05
H-3	8.9486E-03	66.48	66.48	0.00E+00	5.95E-01	5.95E-01
I-129	9.8288E-07	66.48	66.48	0.00E+00	6.53E-05	6.53E-05
Kr-85	1.0707E-02	66.48	66.48	0.00E+00	7.12E-01	7.12E-01
Np-237	1.1927E-05	66.48	66.48	0.00E+00	7.93E-04	7.93E-04
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.530E+12
0.0250	5.070E+11
0.0375	4.777E+11
0.0575	5.978E+11
0.0850	2.793E+11
0.1250	1.858E+11
0.2250	2.385E+11
0.3750	1.030E+11
0.5750	2.425E+12
0.8500	2.368E+10
1.2500	1.507E+10
1.7500	6.625E+08
2.2500	1.090E+05
2.7500	3.839E+05
3.5000	2.745E+04
5.0000	1.173E+04
7.0000	1.352E+03
11.0000	1.552E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.20E+00	1.20E+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:	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:		66.48
Bounding:		66.48

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=41.552kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.05	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT 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

[1]Fuel decay start date: 1959
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.2581E-09	744.60	1,489.19	0.00E+00	9.37E-07	1.87E-06
Am-241	1.4761E-01	744.60	1,489.19	0.00E+00	1.10E+02	2.20E+02
Am-242m	2.5032E-04	744.60	1,489.19	0.00E+00	1.86E-01	3.73E-01
Am-243	6.2387E-04	744.60	1,489.19	0.00E+00	4.65E-01	9.29E-01
C-14	4.7739E-05	744.60	1,489.19	0.00E+00	3.55E-02	7.11E-02
Cl-36	8.0297E-07	744.60	1,489.19	0.00E+00	5.98E-04	1.20E-03
Cm-243	1.2099E-04	744.60	1,489.19	0.00E+00	9.01E-02	1.80E-01
Cm-244	1.5560E-02	744.60	1,489.19	0.00E+00	1.16E+01	2.32E+01
Co-60	4.9580E-05	744.60	1,489.19	0.00E+00	3.69E-02	7.38E-02
Cs-134	1.7022E-09	744.60	1,489.19	0.00E+00	1.27E-06	2.53E-06
Cs-135	1.4433E-05	744.60	1,489.19	0.00E+00	1.07E-02	2.15E-02
Cs-137	6.9929E-01	744.60	1,489.19	0.00E+00	5.21E+02	1.04E+03
Eu-154	1.8023E-03	744.60	1,489.19	0.00E+00	1.34E+00	2.68E+00
Eu-155	2.6793E-05	744.60	1,489.19	0.00E+00	1.99E-02	3.99E-02
Fe-55	1.4580E-08	744.60	1,489.19	0.00E+00	1.09E-05	2.17E-05
H-3	3.8566E-03	744.60	1,489.19	0.00E+00	2.87E+00	5.74E+00
I-129	9.8288E-07	744.60	1,489.19	0.00E+00	7.32E-04	1.46E-03
Kr-85	4.0617E-03	744.60	1,489.19	0.00E+00	3.02E+00	6.05E+00
Np-237	1.2645E-05	744.60	1,489.19	0.00E+00	9.42E-03	1.88E-02
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	1.3264E-07	744.60	1,489.19	0.00E+00	9.88E-05	1.98E-04
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
Tl-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-236	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.032E+13
0.0250	8.008E+12
0.0375	7.486E+12
0.0575	1.027E+13
0.0850	4.382E+12
0.1250	2.859E+12
0.2250	3.727E+12
0.3750	1.613E+12
0.5750	3.840E+13
0.8500	3.078E+11
1.2500	1.439E+11
1.7500	8.279E+09
2.2500	1.458E+08
2.7500	7.252E+08
3.5000	3.599E+05
5.0000	1.537E+05
7.0000	1.769E+04
11.0000	2.031E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.09E+01	2.19E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.710999907	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

[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: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	6.6313E-10	12.53	25.06	0.00E+00	8.31E-09	1.66E-08
Am-241	2.0060E-03	12.53	25.06	0.00E+00	2.51E-02	5.03E-02
Am-242m	4.2429E-07	12.53	25.06	0.00E+00	5.32E-06	1.06E-05
Am-243	1.4899E-06	12.53	25.06	0.00E+00	1.87E-05	3.73E-05
C-14	5.7135E-09	12.53	25.06	0.00E+00	7.16E-08	1.43E-07
Cl-36	1.3124E-32	12.53	25.06	0.00E+00	1.64E-31	3.29E-31
Cm-243	1.6443E-07	12.53	25.06	0.00E+00	2.06E-06	4.12E-06
Cm-244	2.9330E-05	12.53	25.06	0.00E+00	3.67E-04	7.35E-04
Co-60	5.3186E-06	12.53	25.06	0.00E+00	6.66E-05	1.33E-04
Cs-134	3.1563E-03	12.53	25.06	0.00E+00	3.95E-02	7.91E-02
Cs-135	3.4477E-06	12.53	25.06	0.00E+00	4.32E-05	8.64E-05
Cs-137	2.0313E+00	12.53	25.06	0.00E+00	2.54E+01	5.09E+01
Eu-154	2.4513E-02	12.53	25.06	0.00E+00	3.07E-01	6.14E-01
Eu-155	4.8175E-03	12.53	25.06	0.00E+00	6.04E-02	1.21E-01
Fe-55	1.2397E-04	12.53	25.06	0.00E+00	1.55E-03	3.11E-03
H-3	4.5697E-03	12.53	25.06	0.00E+00	5.73E-02	1.15E-01
I-129	7.5300E-07	12.53	25.06	0.00E+00	9.43E-06	1.89E-05
Kr-85	1.0850E-01	12.53	25.06	0.00E+00	1.36E+00	2.72E+00
Np-237	9.5561E-06	12.53	25.06	0.00E+00	1.20E-04	2.39E-04
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	4.1685E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.645E+12
0.0250	5.500E+11
0.0375	4.797E+11
0.0575	5.138E+11
0.0850	3.105E+11
0.1250	2.101E+11
0.2250	2.679E+11
0.3750	1.166E+11
0.5750	1.902E+12
0.8500	3.216E+10
1.2500	1.836E+10
1.7500	8.429E+08
2.2500	7.394E+04
2.7500	4.180E+04
3.5000	1.922E+02
5.0000	1.092E+01
7.0000	1.205E+00
11.0000	1.351E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.99E-01	5.97E-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 %:	94.28571429	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	12.53	4.74	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		25.06	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

[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: 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

[1]Fuel decay start date: 2010
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	12.53	25.06	0.00E+00	8.31E-09	1.66E-08
Am-241	2.0060E-03	12.53	25.06	0.00E+00	2.51E-02	5.03E-02
Am-242m	4.2429E-07	12.53	25.06	0.00E+00	5.32E-06	1.06E-05
Am-243	1.4899E-06	12.53	25.06	0.00E+00	1.87E-05	3.73E-05
C-14	5.7135E-09	12.53	25.06	0.00E+00	7.16E-08	1.43E-07
Cl-36	1.3124E-32	12.53	25.06	0.00E+00	1.64E-31	3.29E-31
Cm-243	1.6443E-07	12.53	25.06	0.00E+00	2.06E-06	4.12E-06
Cm-244	2.9330E-05	12.53	25.06	0.00E+00	3.67E-04	7.35E-04
Co-60	5.3186E-06	12.53	25.06	0.00E+00	6.66E-05	1.33E-04
Cs-134	3.1563E-03	12.53	25.06	0.00E+00	3.95E-02	7.91E-02
Cs-135	3.4477E-06	12.53	25.06	0.00E+00	4.32E-05	8.64E-05
Cs-137	2.0313E+00	12.53	25.06	0.00E+00	2.54E+01	5.09E+01
Eu-154	2.4513E-02	12.53	25.06	0.00E+00	3.07E-01	6.14E-01
Eu-155	4.8175E-03	12.53	25.06	0.00E+00	6.04E-02	1.21E-01
Fe-55	1.2397E-04	12.53	25.06	0.00E+00	1.55E-03	3.11E-03
H-3	4.5697E-03	12.53	25.06	0.00E+00	5.73E-02	1.15E-01
I-129	7.5300E-07	12.53	25.06	0.00E+00	9.43E-06	1.89E-05
Kr-85	1.0850E-01	12.53	25.06	0.00E+00	1.36E+00	2.72E+00
Np-237	9.5561E-06	12.53	25.06	0.00E+00	1.20E-04	2.39E-04
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.645E+12
0.0250	5.500E+11
0.0375	4.797E+11
0.0575	5.138E+11
0.0850	3.105E+11
0.1250	2.101E+11
0.2250	2.679E+11
0.3750	1.166E+11
0.5750	1.902E+12
0.8500	3.216E+10
1.2500	1.836E+10
1.7500	8.429E+08
2.2500	7.394E+04
2.7500	4.180E+04
3.5000	1.922E+02
5.0000	1.092E+01
7.0000	1.205E+00
11.0000	1.351E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.99E-01	5.97E-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 %:	94.28571429	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	12.53	4.74	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		25.06	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

[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: SPERT-III
SNF ID #: 209
Fuel Units & Descr: 3 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=9.74kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]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_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	9,262.37	9,262.37	0.00E+00	9.94E-06	9.94E-06
Am-241	1.4751E-01	9,262.37	9,262.37	0.00E+00	1.37E+03	1.37E+03
Am-242m	2.6809E-04	9,262.37	9,262.37	0.00E+00	2.48E+00	2.48E+00
Am-243	6.2484E-04	9,262.37	9,262.37	0.00E+00	5.79E+00	5.79E+00
C-14	4.7820E-05	9,262.37	9,262.37	0.00E+00	4.43E-01	4.43E-01
Cl-36	8.0297E-07	9,262.37	9,262.37	0.00E+00	7.44E-03	7.44E-03
Cm-243	1.7426E-04	9,262.37	9,262.37	0.00E+00	1.61E+00	1.61E+00
Cm-244	2.7616E-02	9,262.37	9,262.37	0.00E+00	2.56E+02	2.56E+02
Co-60	3.5610E-04	9,262.37	9,262.37	0.00E+00	3.30E+00	3.30E+00
Cs-134	2.6260E-07	9,262.37	9,262.37	0.00E+00	2.43E-03	2.43E-03
Cs-135	1.4433E-05	9,262.37	9,262.37	0.00E+00	1.34E-01	1.34E-01
Cs-137	9.8870E-01	9,262.37	9,262.37	0.00E+00	9.16E+03	9.16E+03
Eu-154	6.0320E-03	9,262.37	9,262.37	0.00E+00	5.59E+01	5.59E+01
Eu-155	2.1770E-04	9,262.37	9,262.37	0.00E+00	2.02E+00	2.02E+00
Fe-55	7.9296E-07	9,262.37	9,262.37	0.00E+00	7.34E-03	7.34E-03
H-3	8.9486E-03	9,262.37	9,262.37	0.00E+00	8.29E+01	8.29E+01
I-129	9.8288E-07	9,262.37	9,262.37	0.00E+00	9.10E-03	9.10E-03
Kr-85	1.0707E-02	9,262.37	9,262.37	0.00E+00	9.92E+01	9.92E+01
Np-237	1.1927E-05	9,262.37	9,262.37	0.00E+00	1.10E-01	1.10E-01
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
Tl-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
U-233	2.5856E-08	9,262.37	9,262.37	0.00E+00	2.39E-04	2.39E-04
U-234	5.2665E-05	9,262.37	9,262.37	0.00E+00	4.88E-01	4.88E-01
U-235	-1.4487E-06	9,262.37	0.00	1.35E-03	0.00E+00	1.35E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.524E+14
0.0250	7.063E+13
0.0375	6.655E+13
0.0575	8.328E+13
0.0850	3.891E+13
0.1250	2.589E+13
0.2250	3.322E+13
0.3750	1.435E+13
0.5750	3.379E+14
0.8500	3.299E+12
1.2500	2.099E+12
1.7500	9.230E+10
2.2500	1.517E+07
2.7500	5.347E+07
3.5000	3.815E+06
5.0000	1.630E+06
7.0000	1.878E+05
11.0000	2.157E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E+02	1.68E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	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:		9,262.37
Bounding:		9,262.37

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:	13.58	
Bounding:	13.58	

Estimated EOL HM/Given EOL HM: 1.58

[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: 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

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
1.46

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	918.72	1,837.45	0.00E+00	3.52E-06	7.03E-06
Am-241	4.4195E-03	918.72	1,837.45	0.00E+00	4.06E+00	8.12E+00
Am-242m	1.8195E-06	918.72	1,837.45	0.00E+00	1.67E-03	3.34E-03
Am-243	2.3278E-07	918.72	1,837.45	0.00E+00	2.14E-04	4.28E-04
C-14	4.3203E-05	918.72	1,837.45	0.00E+00	3.97E-02	7.94E-02
Cl-36	4.3023E-08	918.72	1,837.45	0.00E+00	3.95E-05	7.91E-05
Cm-243	1.6872E-07	918.72	1,837.45	0.00E+00	1.55E-04	3.10E-04
Cm-244	1.4660E-06	918.72	1,837.45	0.00E+00	1.35E-03	2.69E-03
Co-60	2.2376E-03	918.72	1,837.45	0.00E+00	2.06E+00	4.11E+00
Cs-134	1.2525E-04	918.72	1,837.45	0.00E+00	1.15E-01	2.30E-01
Cs-135	3.1549E-05	918.72	1,837.45	0.00E+00	2.90E-02	5.80E-02
Cs-137	1.7368E+00	918.72	1,837.45	0.00E+00	1.60E+03	3.19E+03
Eu-154	2.6947E-01	918.72	1,837.45	0.00E+00	2.48E+02	4.95E+02
Eu-155	2.6857E-02	918.72	1,837.45	0.00E+00	2.47E+01	4.93E+01
Fe-55	4.2105E-05	918.72	1,837.45	0.00E+00	3.87E-02	7.74E-02
H-3	3.5173E-03	918.72	1,837.45	0.00E+00	3.23E+00	6.46E+00
I-129	7.3805E-07	918.72	1,837.45	0.00E+00	6.78E-04	1.36E-03
Kr-85	6.9263E-02	918.72	1,837.45	0.00E+00	6.36E+01	1.27E+02
Np-237	1.4752E-06	918.72	1,837.45	0.00E+00	1.36E-03	2.71E-03
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
Ru-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.661E+14
0.0250	3.431E+13
0.0375	3.436E+13
0.0575	3.295E+13
0.0850	1.982E+13
0.1250	2.015E+13
0.2250	1.793E+13
0.3750	7.458E+12
0.5750	1.206E+14
0.8500	9.955E+12
1.2500	1.045E+13
1.7500	3.198E+11
2.2500	4.906E+06
2.7500	1.130E+06
3.5000	2.640E+03
5.0000	1.030E+03
7.0000	1.162E+02
11.0000	1.321E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.05E+01	4.09E+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 %:	93.16330606	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)[2]

	From SFD	Estimated
Nominal:		918.72
Bounding:		1,837.45

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.91	
Bounding:	9.83	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 1998
Estimates as of: 2030
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 25 years

Estimated Canister usage: 18"x10" 1.29

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	3.8271E-09	500.07	1,000.14	0.00E+00	1.91E-06	3.83E-06
Am-241	4.4195E-03	500.07	1,000.14	0.00E+00	2.21E+00	4.42E+00
Am-242m	1.8195E-06	500.07	1,000.14	0.00E+00	9.10E-04	1.82E-03
Am-243	2.3278E-07	500.07	1,000.14	0.00E+00	1.16E-04	2.33E-04
C-14	4.3203E-05	500.07	1,000.14	0.00E+00	2.16E-02	4.32E-02
Cl-36	4.3023E-08	500.07	1,000.14	0.00E+00	2.15E-05	4.30E-05
Cm-243	1.6872E-07	500.07	1,000.14	0.00E+00	8.44E-05	1.69E-04
Cm-244	1.4660E-06	500.07	1,000.14	0.00E+00	7.33E-04	1.47E-03
Co-60	2.2376E-03	500.07	1,000.14	0.00E+00	1.12E+00	2.24E+00
Cs-134	1.2525E-04	500.07	1,000.14	0.00E+00	6.26E-02	1.25E-01
Cs-135	3.1549E-05	500.07	1,000.14	0.00E+00	1.58E-02	3.16E-02
Cs-137	1.7368E+00	500.07	1,000.14	0.00E+00	8.69E+02	1.74E+03
Eu-154	2.6947E-01	500.07	1,000.14	0.00E+00	1.35E+02	2.70E+02
Eu-155	2.6857E-02	500.07	1,000.14	0.00E+00	1.34E+01	2.69E+01
Fe-55	4.2105E-05	500.07	1,000.14	0.00E+00	2.11E-02	4.21E-02
H-3	3.5173E-03	500.07	1,000.14	0.00E+00	1.76E+00	3.52E+00
I-129	7.3805E-07	500.07	1,000.14	0.00E+00	3.69E-04	7.38E-04
Kr-85	6.9263E-02	500.07	1,000.14	0.00E+00	3.46E+01	6.93E+01
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
Tl-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	1.60E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.039E+13
0.0250	1.867E+13
0.0375	1.870E+13
0.0575	1.793E+13
0.0850	1.079E+13
0.1250	1.097E+13
0.2250	9.760E+12
0.3750	4.059E+12
0.5750	6.565E+13
0.8500	5.419E+12
1.2500	5.686E+12
1.7500	1.741E+11
2.2500	2.670E+06
2.7500	6.150E+05
3.5000	1.438E+03
5.0000	5.610E+02
7.0000	6.327E+01
11.0000	7.192E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.11E+01	2.23E+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 %:	89.90758798	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)[2]

	From SFD	Estimated
Nominal:		500.07
Bounding:		1,000.14

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:	2.56	
Bounding:	5.11	

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: UMRR (HEU) ROLLA
SNF ID #: 881
Fuel Units & Descr: 28 - 24 CURVED PLATES
Heavy Metal Mass: BOL=5.096kg; EOL=4.771kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	307.59	615.18	0.00E+00	3.53E-07	7.05E-07
Am-241	2.3056E-03	307.59	615.18	0.00E+00	7.09E-01	1.42E+00
Am-242m	4.1476E-07	307.59	615.18	0.00E+00	1.28E-04	2.55E-04
Am-243	1.4894E-06	307.59	615.18	0.00E+00	4.58E-04	9.16E-04
C-14	5.7108E-09	307.59	615.18	0.00E+00	1.76E-06	3.51E-06
Cl-36	1.3124E-32	307.59	615.18	0.00E+00	4.04E-30	8.07E-30
Cm-243	1.4562E-07	307.59	615.18	0.00E+00	4.48E-05	8.96E-05
Cm-244	2.4221E-05	307.59	615.18	0.00E+00	7.45E-03	1.49E-02
Co-60	2.7560E-06	307.59	615.18	0.00E+00	8.48E-04	1.70E-03
Cs-134	5.8851E-04	307.59	615.18	0.00E+00	1.81E-01	3.62E-01
Cs-135	3.4477E-06	307.59	615.18	0.00E+00	1.06E-03	2.12E-03
Cs-137	1.8099E+00	307.59	615.18	0.00E+00	5.57E+02	1.11E+03
Eu-154	1.6386E-02	307.59	615.18	0.00E+00	5.04E+00	1.01E+01
Eu-155	2.3957E-03	307.59	615.18	0.00E+00	7.37E-01	1.47E+00
Fe-55	3.2707E-05	307.59	615.18	0.00E+00	1.01E-02	2.01E-02
H-3	3.4504E-03	307.59	615.18	0.00E+00	1.06E+00	2.12E+00
I-129	7.5300E-07	307.59	615.18	0.00E+00	2.32E-04	4.63E-04
Kr-85	7.8540E-02	307.59	615.18	0.00E+00	2.42E+01	4.83E+01
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	1.2952E-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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.756E+13
0.0250	1.196E+13
0.0375	1.041E+13
0.0575	1.118E+13
0.0850	6.748E+12
0.1250	4.520E+12
0.2250	5.826E+12
0.3750	2.533E+12
0.5750	4.152E+13
0.8500	5.983E+11
1.2500	3.327E+11
1.7500	1.644E+10
2.2500	1.172E+08
2.7500	9.594E+05
3.5000	7.247E+02
5.0000	2.438E+02
7.0000	2.683E+01
11.0000	3.001E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.51E+00	1.30E+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 %:	93.40659341	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		307.59
Bounding:		615.18

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	
Bounding:	0.38	

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: 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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	m: CI/MWd From Template	x_a: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_a: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.4545E-10	5,149.51	10,299.02	0.00E+00	7.49E-07	1.50E-06
Am-241	1.1190E-03	5,149.51	10,299.02	0.00E+00	5.76E+00	1.15E+01
Am-242m	4.5425E-07	5,149.51	10,299.02	0.00E+00	2.34E-03	4.68E-03
Am-243	1.4921E-06	5,149.51	10,299.02	0.00E+00	7.68E-03	1.54E-02
C-14	5.7244E-09	5,149.51	10,299.02	0.00E+00	2.95E-05	5.90E-05
Cl-36	1.3124E-32	5,149.51	10,299.02	0.00E+00	6.76E-29	1.35E-28
Cm-243	2.3676E-07	5,149.51	10,299.02	0.00E+00	1.22E-03	2.44E-03
Cm-244	5.2042E-05	5,149.51	10,299.02	0.00E+00	2.68E-01	5.36E-01
Co-60	3.8208E-05	5,149.51	10,299.02	0.00E+00	1.97E-01	3.94E-01
Cs-134	4.8693E-01	5,149.51	10,299.02	0.00E+00	2.51E+03	5.01E+03
Cs-135	3.4477E-06	5,149.51	10,299.02	0.00E+00	1.78E-02	3.55E-02
Cs-137	2.8731E+00	5,149.51	10,299.02	0.00E+00	1.48E+04	2.96E+04
Eu-154	8.2053E-02	5,149.51	10,299.02	0.00E+00	4.23E+02	8.45E+02
Eu-155	3.9134E-02	5,149.51	10,299.02	0.00E+00	2.02E+02	4.03E+02
Fe-55	6.7429E-03	5,149.51	10,299.02	0.00E+00	3.47E+01	6.94E+01
H-3	1.0599E-02	5,149.51	10,299.02	0.00E+00	5.46E+01	1.09E+02
I-129	7.5300E-07	5,149.51	10,299.02	0.00E+00	3.88E-03	7.76E-03
Kr-85	2.8595E-01	5,149.51	10,299.02	0.00E+00	1.47E+03	2.94E+03
Np-237	9.5479E-06	5,149.51	10,299.02	0.00E+00	4.92E-02	9.83E-02
Pa-231	8.9297E-10	5,149.51	10,299.02	0.00E+00	4.60E-06	9.20E-06
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.987E+15
0.0250	4.281E+14
0.0375	3.950E+14
0.0575	3.884E+14
0.0850	2.476E+14
0.1250	2.144E+14
0.2250	2.099E+14
0.3750	1.016E+14
0.5750	1.395E+15
0.8500	1.954E+14
1.2500	3.636E+13
1.7500	1.525E+12
2.2500	3.198E+12
2.7500	1.840E+10
3.5000	2.040E+09
5.0000	6.119E+03
7.0000	6.822E+02
11.0000	7.690E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.61E+02	5.22E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7500078	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:		5,149.51
Bounding:		10,299.02

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:	0.51	
Bounding:	1.03	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%. U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	49.06	98.11	0.00E+00	7.14E-09	1.43E-08
Am-241	1.1190E-03	49.06	98.11	0.00E+00	5.49E-02	1.10E-01
Am-242m	4.5425E-07	49.06	98.11	0.00E+00	2.23E-05	4.46E-05
Am-243	1.4921E-06	49.06	98.11	0.00E+00	7.32E-05	1.46E-04
C-14	5.7244E-09	49.06	98.11	0.00E+00	2.81E-07	5.62E-07
Cl-36	1.3124E-32	49.06	98.11	0.00E+00	6.44E-31	1.29E-30
Cm-243	2.3676E-07	49.06	98.11	0.00E+00	1.16E-05	2.32E-05
Cm-244	5.2042E-05	49.06	98.11	0.00E+00	2.55E-03	5.11E-03
Co-60	3.8208E-05	49.06	98.11	0.00E+00	1.87E-03	3.75E-03
Cs-134	4.8693E-01	49.06	98.11	0.00E+00	2.39E+01	4.78E+01
Cs-135	3.4477E-06	49.06	98.11	0.00E+00	1.69E-04	3.38E-04
Cs-137	2.8731E+00	49.06	98.11	0.00E+00	1.41E+02	2.82E+02
Eu-154	8.2053E-02	49.06	98.11	0.00E+00	4.03E+00	8.05E+00
Eu-155	3.9134E-02	49.06	98.11	0.00E+00	1.92E+00	3.84E+00
Fe-55	6.7429E-03	49.06	98.11	0.00E+00	3.31E-01	6.62E-01
H-3	1.0599E-02	49.06	98.11	0.00E+00	5.20E-01	1.04E+00
I-129	7.5300E-07	49.06	98.11	0.00E+00	3.69E-05	7.39E-05
Kr-85	2.8595E-01	49.06	98.11	0.00E+00	1.40E+01	2.81E+01
Np-237	9.5479E-06	49.06	98.11	0.00E+00	4.68E-04	9.37E-04
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-08	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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.893E+13
0.0250	4.078E+12
0.0375	3.763E+12
0.0575	3.700E+12
0.0850	2.359E+12
0.1250	2.043E+12
0.2250	1.999E+12
0.3750	9.577E+11
0.5750	1.329E+13
0.8500	1.862E+12
1.2500	3.463E+11
1.7500	1.452E+10
2.2500	3.046E+10
2.7500	1.753E+08
3.5000	1.944E+07
5.0000	5.844E+01
7.0000	6.515E+00
11.0000	7.344E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.49E+00	4.97E+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 %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	28.18	49.06	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		98.11	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF FLORIDA (ARGONAUT) LEU
SNF ID #: 273
Fuel Units & Descr: 14 - ELEMENT
Heavy Metal Mass: BOL=0.995kg; EOL=0.995kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.58

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	0.60	1.19	0.00E+00	8.69E-11	1.74E-10
Am-241	1.1190E-03	0.60	1.19	0.00E+00	6.68E-04	1.34E-03
Am-242m	4.5426E-07	0.60	1.19	0.00E+00	2.71E-07	5.43E-07
Am-243	1.4921E-06	0.60	1.19	0.00E+00	8.91E-07	1.78E-06
C-14	5.7244E-09	0.60	1.19	0.00E+00	3.42E-09	6.84E-09
Cl-36	1.3124E-32	0.60	1.19	0.00E+00	7.84E-33	1.57E-32
Cm-243	2.3676E-07	0.60	1.19	0.00E+00	1.41E-07	2.83E-07
Cm-244	5.2042E-05	0.60	1.19	0.00E+00	3.11E-05	6.22E-05
Co-60	3.8208E-05	0.60	1.19	0.00E+00	2.28E-05	4.56E-05
Cs-134	4.8693E-01	0.60	1.19	0.00E+00	2.91E-01	5.82E-01
Cs-135	3.4477E-06	0.60	1.19	0.00E+00	2.06E-06	4.12E-06
Cs-137	2.8731E+00	0.60	1.19	0.00E+00	1.72E+00	3.43E+00
Eu-154	8.2053E-02	0.60	1.19	0.00E+00	4.90E-02	9.80E-02
Eu-155	3.9134E-02	0.60	1.19	0.00E+00	2.34E-02	4.67E-02
Fe-55	6.7429E-03	0.60	1.19	0.00E+00	4.03E-03	8.05E-03
H-3	1.0599E-02	0.60	1.19	0.00E+00	6.33E-03	1.27E-02
I-129	7.5300E-07	0.60	1.19	0.00E+00	4.50E-07	8.99E-07
Kr-85	2.8595E-01	0.60	1.19	0.00E+00	1.71E-01	3.42E-01
Np-237	9.5479E-06	0.60	1.19	0.00E+00	5.70E-06	1.14E-05
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.305E+11
0.0250	4.965E+10
0.0375	4.581E+10
0.0575	4.505E+10
0.0850	2.872E+10
0.1250	2.487E+10
0.2250	2.435E+10
0.3750	1.178E+10
0.5750	1.618E+11
0.8500	2.266E+10
1.2500	4.217E+09
1.7500	1.768E+08
2.2500	3.709E+08
2.7500	2.134E+06
3.5000	2.366E+05
5.0000	1.327E+00
7.0000	1.502E-01
11.0000	1.710E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.03E-02	6.05E-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 %:	19.8359342	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:	0.60	
Bounding:		1.19

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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MASS-LOWELL (HEU)
SNF ID #: 274
Fuel Units & Descr: 34 - 18 FLAT PLATES
Heavy Metal Mass: BOL=4.784kg; EOL=4.498kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	270.47	540.94	0.00E+00	3.93E-08	7.87E-08
Am-241	1.1190E-03	270.47	540.94	0.00E+00	3.03E-01	6.05E-01
Am-242m	4.5425E-07	270.47	540.94	0.00E+00	1.23E-04	2.46E-04
Am-243	1.4921E-06	270.47	540.94	0.00E+00	4.04E-04	8.07E-04
C-14	5.7244E-09	270.47	540.94	0.00E+00	1.55E-06	3.10E-06
Cl-36	1.3124E-32	270.47	540.94	0.00E+00	3.55E-30	7.10E-30
Cm-243	2.3676E-07	270.47	540.94	0.00E+00	6.40E-05	1.28E-04
Cm-244	5.2042E-05	270.47	540.94	0.00E+00	1.41E-02	2.82E-02
Co-60	3.8208E-05	270.47	540.94	0.00E+00	1.03E-02	2.07E-02
Cs-134	4.8693E-01	270.47	540.94	0.00E+00	1.32E+02	2.63E+02
Cs-135	3.4477E-06	270.47	540.94	0.00E+00	9.32E-04	1.86E-03
Cs-137	2.8731E+00	270.47	540.94	0.00E+00	7.77E+02	1.55E+03
Eu-154	8.2053E-02	270.47	540.94	0.00E+00	2.22E+01	4.44E+01
Eu-155	3.9134E-02	270.47	540.94	0.00E+00	1.06E+01	2.12E+01
Fe-55	6.7429E-03	270.47	540.94	0.00E+00	1.82E+00	3.65E+00
H-3	1.0599E-02	270.47	540.94	0.00E+00	2.87E+00	5.73E+00
I-129	7.5300E-07	270.47	540.94	0.00E+00	2.04E-04	4.07E-04
Kr-85	2.8595E-01	270.47	540.94	0.00E+00	7.73E+01	1.55E+02
Np-237	9.5479E-06	270.47	540.94	0.00E+00	2.58E-03	5.16E-03
Pa-231	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-01	270.47	540.94	0.00E+00	5.15E+01	1.03E+02
Se-79	1.2936E-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-06	270.47	540.94	0.00E+00	4.61E-06	9.22E-06
Th-232	7.8132E-15	270.47	540.94	0.00E+00	2.11E-12	4.23E-12
Tl-208	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	3.56E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.044E+14
0.0250	2.248E+13
0.0375	2.075E+13
0.0575	2.040E+13
0.0850	1.301E+13
0.1250	1.126E+13
0.2250	1.102E+13
0.3750	5.336E+12
0.5750	7.329E+13
0.8500	1.026E+13
1.2500	1.910E+12
1.7500	8.008E+10
2.2500	1.680E+11
2.7500	9.663E+08
3.5000	1.072E+08
5.0000	3.207E+02
7.0000	3.576E+01
11.0000	4.030E+00

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.16325044	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		270.47	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		540.94	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	271.25	542.50	0.00E+00	3.95E-08	7.89E-08
Am-241	1.1190E-03	271.25	542.50	0.00E+00	3.04E-01	6.07E-01
Am-242m	4.5425E-07	271.25	542.50	0.00E+00	1.23E-04	2.46E-04
Am-243	1.4921E-06	271.25	542.50	0.00E+00	4.05E-04	8.09E-04
C-14	5.7244E-09	271.25	542.50	0.00E+00	1.55E-06	3.11E-06
Cl-36	1.3124E-32	271.25	542.50	0.00E+00	3.56E-30	7.12E-30
Cm-243	2.3676E-07	271.25	542.50	0.00E+00	6.42E-05	1.28E-04
Cm-244	5.2042E-05	271.25	542.50	0.00E+00	1.41E-02	2.82E-02
Co-60	3.8208E-05	271.25	542.50	0.00E+00	1.04E-02	2.07E-02
Cs-134	4.8693E-01	271.25	542.50	0.00E+00	1.32E+02	2.64E+02
Cs-135	3.4477E-06	271.25	542.50	0.00E+00	9.35E-04	1.87E-03
Cs-137	2.8731E+00	271.25	542.50	0.00E+00	7.79E+02	1.56E+03
Eu-154	8.2053E-02	271.25	542.50	0.00E+00	2.23E+01	4.45E+01
Eu-155	3.9134E-02	271.25	542.50	0.00E+00	1.06E+01	2.12E+01
Fe-55	6.7429E-03	271.25	542.50	0.00E+00	1.83E+00	3.66E+00
H-3	1.0599E-02	271.25	542.50	0.00E+00	2.88E+00	5.75E+00
I-129	7.5300E-07	271.25	542.50	0.00E+00	2.04E-04	4.09E-04
Kr-85	2.8595E-01	271.25	542.50	0.00E+00	7.76E+01	1.55E+02
Np-237	9.5479E-06	271.25	542.50	0.00E+00	2.59E-03	5.18E-03
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	6.62E-02	1.32E-01
Pu-241	6.8764E-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
Tl-208	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.047E+14
0.0250	2.255E+13
0.0375	2.061E+13
0.0575	2.046E+13
0.0850	1.304E+13
0.1250	1.130E+13
0.2250	1.105E+13
0.3750	5.351E+12
0.5750	7.350E+13
0.8500	1.029E+13
1.2500	1.915E+12
1.7500	8.031E+10
2.2500	1.684E+11
2.7500	9.691E+08
3.5000	1.075E+08
5.0000	3.302E+02
7.0000	3.684E+01
11.0000	4.155E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.38E+01	2.75E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.71401492	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:		271.25
Bounding:		542.50

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN
SNF ID #: 276
Fuel Units & Descr: 130 - 18 CURVED PLATES
Heavy Metal Mass: BOL=100.854kg; EOL=89.882kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_a Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_a Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	10,390.70	20,781.39	0.00E+00	2.09E-05	4.17E-05
Am-241	2.5251E-03	10,390.70	20,781.39	0.00E+00	2.62E+01	5.25E+01
Am-242m	3.9624E-07	10,390.70	20,781.39	0.00E+00	4.12E-03	8.23E-03
Am-243	1.4880E-06	10,390.70	20,781.39	0.00E+00	1.55E-02	3.09E-02
C-14	5.7053E-09	10,390.70	20,781.39	0.00E+00	5.93E-05	1.19E-04
Cl-36	1.3124E-32	10,390.70	20,781.39	0.00E+00	1.36E-28	2.73E-28
Cm-243	1.1419E-07	10,390.70	20,781.39	0.00E+00	1.19E-03	2.37E-03
Cm-244	1.6522E-05	10,390.70	20,781.39	0.00E+00	1.72E-01	3.43E-01
Co-60	7.4047E-07	10,390.70	20,781.39	0.00E+00	7.69E-03	1.54E-02
Cs-134	2.0455E-05	10,390.70	20,781.39	0.00E+00	2.13E-01	4.25E-01
Cs-135	3.4477E-06	10,390.70	20,781.39	0.00E+00	3.58E-02	7.16E-02
Cs-137	1.4365E+00	10,390.70	20,781.39	0.00E+00	1.49E+04	2.99E+04
Eu-154	7.3230E-03	10,390.70	20,781.39	0.00E+00	7.61E+01	1.52E+02
Eu-155	5.9259E-04	10,390.70	20,781.39	0.00E+00	6.16E+00	1.23E+01
Fe-55	2.2791E-06	10,390.70	20,781.39	0.00E+00	2.37E-02	4.74E-02
H-3	1.9698E-03	10,390.70	20,781.39	0.00E+00	2.05E+01	4.09E+01
I-129	7.5300E-07	10,390.70	20,781.39	0.00E+00	7.82E-03	1.56E-02
Kr-85	4.1176E-02	10,390.70	20,781.39	0.00E+00	4.28E+02	8.56E+02
Np-237	9.5752E-06	10,390.70	20,781.39	0.00E+00	9.95E-02	1.99E-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-06	6.88E-06
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-06	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-06	4.41E-06
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-06	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
U-233	3.6275E-09	10,390.70	20,781.39	0.00E+00	3.77E-05	7.54E-05
U-234	1.8562E-04	10,390.70	20,781.39	0.00E+00	1.93E+00	3.86E+00
U-235	-2.7235E-06	10,390.70	0.00	4.31E-02	1.48E-02	4.31E-02
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.531E+15
0.0250	3.178E+14
0.0375	2.763E+14
0.0575	2.973E+14
0.0850	1.792E+14
0.1250	1.183E+14
0.2250	1.547E+14
0.3750	6.729E+13
0.5750	1.112E+15
0.8500	1.358E+13
1.2500	6.570E+12
1.7500	3.698E+11
2.2500	3.092E+07
2.7500	2.951E+07
3.5000	1.724E+04
5.0000	7.046E+03
7.0000	7.714E+02
11.0000	8.603E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.74E+02	3.48E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7909823	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:		10,390.70
Bounding:		20,781.39

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.33	
Bounding:	0.65	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	1,708.42	3,416.85	0.00E+00	2.48E-07	4.97E-07
Am-241	1.1190E-03	1,708.42	3,416.85	0.00E+00	1.91E+00	3.82E+00
Am-242m	4.5425E-07	1,708.42	3,416.85	0.00E+00	7.76E-04	1.55E-03
Am-243	1.4921E-06	1,708.42	3,416.85	0.00E+00	2.55E-03	5.10E-03
C-14	5.7244E-09	1,708.42	3,416.85	0.00E+00	9.78E-06	1.96E-05
Cl-36	1.3124E-32	1,708.42	3,416.85	0.00E+00	2.24E-29	4.48E-29
Cm-243	2.3676E-07	1,708.42	3,416.85	0.00E+00	4.04E-04	8.09E-04
Cm-244	5.2042E-05	1,708.42	3,416.85	0.00E+00	8.89E-02	1.78E-01
Co-60	3.8208E-05	1,708.42	3,416.85	0.00E+00	6.53E-02	1.31E-01
Cs-134	4.8693E-01	1,708.42	3,416.85	0.00E+00	8.32E+02	1.66E+03
Cs-135	3.4477E-06	1,708.42	3,416.85	0.00E+00	5.89E-03	1.18E-02
Cs-137	2.8731E+00	1,708.42	3,416.85	0.00E+00	4.91E+03	9.82E+03
Eu-154	8.2053E-02	1,708.42	3,416.85	0.00E+00	1.40E+02	2.80E+02
Eu-155	3.9134E-02	1,708.42	3,416.85	0.00E+00	6.69E+01	1.34E+02
Fe-55	6.7429E-03	1,708.42	3,416.85	0.00E+00	1.15E+01	2.30E+01
H-3	1.0599E-02	1,708.42	3,416.85	0.00E+00	1.81E+01	3.62E+01
I-129	7.5300E-07	1,708.42	3,416.85	0.00E+00	1.29E-03	2.57E-03
Kr-85	2.8595E-01	1,708.42	3,416.85	0.00E+00	4.89E+02	9.77E+02
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-08	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
Tl-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	2.65E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.592E+14
0.0250	1.420E+14
0.0375	1.311E+14
0.0575	1.289E+14
0.0850	8.215E+13
0.1250	7.114E+13
0.2250	6.963E+13
0.3750	3.370E+13
0.5750	4.629E+14
0.8500	6.483E+13
1.2500	1.206E+13
1.7500	5.058E+11
2.2500	1.061E+12
2.7500	6.104E+09
3.5000	6.769E+08
5.0000	2.045E+03
7.0000	2.281E+02
11.0000	2.571E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.66E+01	1.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74999113	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:		1,708.42
Bounding:		3,416.85

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:	0.16	
Bounding:	0.31	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF 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

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.4545E-10	15,320.41	30,640.81	0.00E+00	2.23E-06	4.46E-06
Am-241	1.1190E-03	15,320.41	30,640.81	0.00E+00	1.71E+01	3.43E+01
Am-242m	4.5425E-07	15,320.41	30,640.81	0.00E+00	6.96E-03	1.39E-02
Am-243	1.4921E-06	15,320.41	30,640.81	0.00E+00	2.29E-02	4.57E-02
C-14	5.7244E-09	15,320.41	30,640.81	0.00E+00	8.77E-05	1.75E-04
Cl-36	1.3124E-32	15,320.41	30,640.81	0.00E+00	2.01E-28	4.02E-28
Cm-243	2.3676E-07	15,320.41	30,640.81	0.00E+00	3.63E-03	7.25E-03
Cm-244	5.2042E-05	15,320.41	30,640.81	0.00E+00	7.97E-01	1.59E+00
Co-60	3.8208E-05	15,320.41	30,640.81	0.00E+00	5.85E-01	1.17E+00
Cs-134	4.8693E-01	15,320.41	30,640.81	0.00E+00	7.46E+03	1.49E+04
Cs-135	3.4477E-06	15,320.41	30,640.81	0.00E+00	5.28E-02	1.06E-01
Cs-137	2.8731E+00	15,320.41	30,640.81	0.00E+00	4.40E+04	8.80E+04
Eu-154	8.2053E-02	15,320.41	30,640.81	0.00E+00	1.26E+03	2.51E+03
Eu-155	3.9134E-02	15,320.41	30,640.81	0.00E+00	6.00E+02	1.20E+03
Fe-55	6.7429E-03	15,320.41	30,640.81	0.00E+00	1.03E+02	2.07E+02
H-3	1.0599E-02	15,320.41	30,640.81	0.00E+00	1.62E+02	3.25E+02
I-129	7.5300E-07	15,320.41	30,640.81	0.00E+00	1.15E-02	2.31E-02
Kr-85	2.8595E-01	15,320.41	30,640.81	0.00E+00	4.38E+03	8.76E+03
Np-237	9.5479E-06	15,320.41	30,640.81	0.00E+00	1.46E-01	2.93E-01
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-06	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
Tl-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	8.12E-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.911E+15
0.0250	1.274E+15
0.0375	1.175E+15
0.0575	1.156E+15
0.0850	7.367E+14
0.1250	6.380E+14
0.2250	6.244E+14
0.3750	3.022E+14
0.5750	4.151E+15
0.8500	5.814E+14
1.2500	1.082E+14
1.7500	4.536E+12
2.2500	9.514E+12
2.7500	5.474E+10
3.5000	6.070E+09
5.0000	1.826E+04
7.0000	2.037E+03
11.0000	2.296E+02

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

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74999113	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:		15,320.41
Bounding:		30,640.81

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	
Bounding:	0.51	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF VIRGINIA (U3Si2 LEU)
SNF ID #: 952
Fuel Units & Descr: 20 - 22 FLAT PLATES
Heavy Metal Mass: BOL=24.31kg; EOL=23.964kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	327.67	655.34	0.00E+00	6.58E-07	1.32E-06
Am-241	2.5251E-03	327.67	655.34	0.00E+00	8.27E-01	1.65E+00
Am-242m	3.9624E-07	327.67	655.34	0.00E+00	1.30E-04	2.60E-04
Am-243	1.4880E-06	327.67	655.34	0.00E+00	4.88E-04	9.75E-04
C-14	5.7053E-09	327.67	655.34	0.00E+00	1.87E-06	3.74E-06
Cl-36	1.3124E-32	327.67	655.34	0.00E+00	4.30E-30	8.60E-30
Cm-243	1.1419E-07	327.67	655.34	0.00E+00	3.74E-05	7.48E-05
Cm-244	1.6522E-05	327.67	655.34	0.00E+00	5.41E-03	1.08E-02
Co-60	7.4047E-07	327.67	655.34	0.00E+00	2.43E-04	4.85E-04
Cs-134	2.0455E-05	327.67	655.34	0.00E+00	6.70E-03	1.34E-02
Cs-135	3.4477E-06	327.67	655.34	0.00E+00	1.13E-03	2.26E-03
Cs-137	1.4365E+00	327.67	655.34	0.00E+00	4.71E+02	9.41E+02
Eu-154	7.3230E-03	327.67	655.34	0.00E+00	2.40E+00	4.80E+00
Eu-155	5.9259E-04	327.67	655.34	0.00E+00	1.94E-01	3.88E-01
Fe-55	2.2791E-06	327.67	655.34	0.00E+00	7.47E-04	1.49E-03
H-3	1.9698E-03	327.67	655.34	0.00E+00	6.45E-01	1.29E+00
I-129	7.5300E-07	327.67	655.34	0.00E+00	2.47E-04	4.93E-04
Kr-85	4.1176E-02	327.67	655.34	0.00E+00	1.35E+01	2.70E+01
Np-237	9.5752E-06	327.67	655.34	0.00E+00	3.14E-03	6.27E-03
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	1.6217E-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.827E+13
0.0250	1.002E+13
0.0375	8.712E+12
0.0575	9.377E+12
0.0850	5.650E+12
0.1250	3.732E+12
0.2250	4.878E+12
0.3750	2.122E+12
0.5750	3.507E+13
0.8500	4.284E+11
1.2500	2.072E+11
1.7500	1.166E+10
2.2500	9.750E+05
2.7500	9.306E+05
3.5000	5.742E+02
5.0000	2.354E+02
7.0000	2.584E+01
11.0000	2.887E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.48E+00	1.10E+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 %:	19.77478682	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:		327.67
Bounding:		655.34

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:	0.04	
Bounding:	0.09	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF VIRGINIA (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

[1]Fuel decay start date: 1966
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 1.83

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	2.9739E-09	1,012.55	2,025.11	0.00E+00	3.01E-06	6.02E-06
Am-241	2.5986E-03	1,012.55	2,025.11	0.00E+00	2.63E+00	5.26E+00
Am-242m	3.7010E-07	1,012.55	2,025.11	0.00E+00	3.75E-04	7.49E-04
Am-243	1.4858E-06	1,012.55	2,025.11	0.00E+00	1.50E-03	3.01E-03
C-14	5.6944E-09	1,012.55	2,025.11	0.00E+00	5.77E-06	1.15E-05
Cl-36	1.3124E-32	1,012.55	2,025.11	0.00E+00	1.33E-29	2.66E-29
Cm-243	7.9303E-08	1,012.55	2,025.11	0.00E+00	8.03E-05	1.61E-04
Cm-244	9.3083E-06	1,012.55	2,025.11	0.00E+00	9.43E-03	1.89E-02
Co-60	1.0310E-07	1,012.55	2,025.11	0.00E+00	1.04E-04	2.09E-04
Cs-134	1.3254E-07	1,012.55	2,025.11	0.00E+00	1.34E-04	2.68E-04
Cs-135	3.4477E-06	1,012.55	2,025.11	0.00E+00	3.49E-03	6.98E-03
Cs-137	1.0161E+00	1,012.55	2,025.11	0.00E+00	1.03E+03	2.06E+03
Eu-154	2.1879E-03	1,012.55	2,025.11	0.00E+00	2.22E+00	4.43E+00
Eu-155	7.2930E-05	1,012.55	2,025.11	0.00E+00	7.38E-02	1.48E-01
Fe-55	4.1912E-08	1,012.55	2,025.11	0.00E+00	4.24E-05	8.49E-05
H-3	8.4913E-04	1,012.55	2,025.11	0.00E+00	8.60E-01	1.72E+00
I-129	7.5300E-07	1,012.55	2,025.11	0.00E+00	7.62E-04	1.52E-03
Kr-85	1.5615E-02	1,012.55	2,025.11	0.00E+00	1.58E+01	3.16E+01
Np-237	9.5861E-06	1,012.55	2,025.11	0.00E+00	9.71E-03	1.94E-02
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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.043E+14
0.0250	2.166E+13
0.0375	1.882E+13
0.0575	2.027E+13
0.0850	1.220E+13
0.1250	7.973E+12
0.2250	1.053E+13
0.3750	4.585E+12
0.5750	7.661E+13
0.8500	8.207E+11
1.2500	3.319E+11
1.7500	2.174E+10
2.2500	2.109E+06
2.7500	2.490E+06
3.5000	1.367E+03
5.0000	5.557E+02
7.0000	6.043E+01
11.0000	6.712E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.20E+01	2.40E+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 %:	92.93756073	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	230.24	1,012.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	280.84	2,025.11	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

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VBWR (UO2)
SNF ID #: 855
Fuel Units & Descr: 7 - ROD
Heavy Metal Mass: BOL=6.578kg; EOL=4.04kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1962
Estimates as of: 2030
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 65 years

Estimated Canister usage: 18"x10' 0.19

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.2581E-09	2,413.71	4,827.42	0.00E+00	3.04E-06	6.07E-06
Am-241	1.4761E-01	2,413.71	4,827.42	0.00E+00	3.56E+02	7.13E+02
Am-242m	2.5032E-04	2,413.71	4,827.42	0.00E+00	6.04E-01	1.21E+00
Am-243	6.2387E-04	2,413.71	4,827.42	0.00E+00	1.51E+00	3.01E+00
C-14	4.7739E-05	2,413.71	4,827.42	0.00E+00	1.15E-01	2.30E-01
Cl-36	8.0297E-07	2,413.71	4,827.42	0.00E+00	1.94E-03	3.88E-03
Cm-243	1.2099E-04	2,413.71	4,827.42	0.00E+00	2.92E-01	5.84E-01
Cm-244	1.5560E-02	2,413.71	4,827.42	0.00E+00	3.76E+01	7.51E+01
Co-60	4.9580E-05	2,413.71	4,827.42	0.00E+00	1.20E-01	2.39E-01
Cs-134	1.7022E-09	2,413.71	4,827.42	0.00E+00	4.11E-06	8.22E-06
Cs-135	1.4433E-05	2,413.71	4,827.42	0.00E+00	3.48E-02	6.97E-02
Cs-137	6.9929E-01	2,413.71	4,827.42	0.00E+00	1.69E+03	3.38E+03
Eu-154	1.8023E-03	2,413.71	4,827.42	0.00E+00	4.35E+00	8.70E+00
Eu-155	2.6793E-05	2,413.71	4,827.42	0.00E+00	6.47E-02	1.29E-01
Fe-55	1.4580E-08	2,413.71	4,827.42	0.00E+00	3.52E-05	7.04E-05
H-3	3.8566E-03	2,413.71	4,827.42	0.00E+00	9.31E+00	1.86E+01
I-129	9.8288E-07	2,413.71	4,827.42	0.00E+00	2.37E-03	4.74E-03
Kr-85	4.0617E-03	2,413.71	4,827.42	0.00E+00	9.80E+00	1.96E+01
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
Tl-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.307E+14
0.0250	2.596E+13
0.0375	2.427E+13
0.0575	3.330E+13
0.0850	1.421E+13
0.1250	9.266E+12
0.2250	1.208E+13
0.3750	5.229E+12
0.5750	1.245E+14
0.8500	9.978E+11
1.2500	4.664E+11
1.7500	2.684E+10
2.2500	4.726E+06
2.7500	2.351E+07
3.5000	1.167E+06
5.0000	4.983E+05
7.0000	5.735E+04
11.0000	6.583E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.84E+01	7.68E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	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

[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: WORCESTER POLY INSTITUTE
SNF ID #: 287
Fuel Units & Descr: 26 - 18 FLAT PLATES
Heavy Metal Mass: BOL=22.776kg; EOL=22.753kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116589
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.72

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (CI)	y_n: Nominal Fuel Inventories(CI)	y_b: Bounding Fuel Inventories(CI)
Ac-227	1.4545E-10	22.16	44.32	0.00E+00	3.22E-09	6.45E-09
Am-241	1.1190E-03	22.16	44.32	0.00E+00	2.48E-02	4.96E-02
Am-242m	4.5425E-07	22.16	44.32	0.00E+00	1.01E-05	2.01E-05
Am-243	1.4921E-06	22.16	44.32	0.00E+00	3.31E-05	6.61E-05
C-14	5.7244E-09	22.16	44.32	0.00E+00	1.27E-07	2.54E-07
Cl-36	1.3124E-32	22.16	44.32	0.00E+00	2.91E-31	5.82E-31
Cm-243	2.3676E-07	22.16	44.32	0.00E+00	5.25E-06	1.05E-05
Cm-244	5.2042E-05	22.16	44.32	0.00E+00	1.15E-03	2.31E-03
Co-60	3.8208E-05	22.16	44.32	0.00E+00	8.47E-04	1.69E-03
Cs-134	4.8693E-01	22.16	44.32	0.00E+00	1.08E+01	2.16E+01
Cs-135	3.4477E-06	22.16	44.32	0.00E+00	7.64E-05	1.53E-04
Cs-137	2.8731E+00	22.16	44.32	0.00E+00	6.37E+01	1.27E+02
Eu-154	8.2053E-02	22.16	44.32	0.00E+00	1.82E+00	3.64E+00
Eu-155	3.9134E-02	22.16	44.32	0.00E+00	8.67E-01	1.73E+00
Fe-55	6.7429E-03	22.16	44.32	0.00E+00	1.49E-01	2.99E-01
H-3	1.0599E-02	22.16	44.32	0.00E+00	2.35E-01	4.70E-01
I-129	7.5300E-07	22.16	44.32	0.00E+00	1.67E-05	3.34E-05
Kr-85	2.8595E-01	22.16	44.32	0.00E+00	6.34E+00	1.27E+01
Np-237	9.5479E-06	22.16	44.32	0.00E+00	2.12E-04	4.23E-04
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	2.56E-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
Tl-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	1.9564E-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-06	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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.551E+12
0.0250	1.842E+12
0.0375	1.700E+12
0.0575	1.671E+12
0.0850	1.066E+12
0.1250	9.228E+11
0.2250	9.033E+11
0.3750	4.372E+11
0.5750	6.005E+12
0.8500	8.409E+11
1.2500	1.565E+11
1.7500	6.561E+09
2.2500	1.376E+10
2.7500	7.917E+07
3.5000	8.781E+06
5.0000	4.043E+01
7.0000	4.559E+00
11.0000	5.175E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+00	2.25E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8630137	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		22.16
Bounding:		44.32

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

[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: 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

[1]Fuel decay start date: 1997
Estimates as of: 2030
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	377.86	755.72	0.00E+00	4.33E-07	8.66E-07
Am-241	2.3056E-03	377.86	755.72	0.00E+00	8.71E-01	1.74E+00
Am-242m	4.1476E-07	377.86	755.72	0.00E+00	1.57E-04	3.13E-04
Am-243	1.4894E-06	377.86	755.72	0.00E+00	5.63E-04	1.13E-03
C-14	5.7108E-09	377.86	755.72	0.00E+00	2.16E-06	4.32E-06
Cl-36	1.3124E-32	377.86	755.72	0.00E+00	4.96E-30	9.92E-30
Cm-243	1.4562E-07	377.86	755.72	0.00E+00	5.50E-05	1.10E-04
Cm-244	2.4221E-05	377.86	755.72	0.00E+00	9.15E-03	1.83E-02
Co-60	2.7560E-06	377.86	755.72	0.00E+00	1.04E-03	2.08E-03
Cs-134	5.8851E-04	377.86	755.72	0.00E+00	2.22E-01	4.45E-01
Cs-135	3.4477E-06	377.86	755.72	0.00E+00	1.30E-03	2.61E-03
Cs-137	1.8099E+00	377.86	755.72	0.00E+00	6.84E+02	1.37E+03
Eu-154	1.6386E-02	377.86	755.72	0.00E+00	6.19E+00	1.24E+01
Eu-155	2.3957E-03	377.86	755.72	0.00E+00	9.05E-01	1.81E+00
Fe-55	3.2707E-05	377.86	755.72	0.00E+00	1.24E-02	2.47E-02
H-3	3.4504E-03	377.86	755.72	0.00E+00	1.30E+00	2.61E+00
I-129	7.5300E-07	377.86	755.72	0.00E+00	2.85E-04	5.69E-04
Kr-85	7.8540E-02	377.86	755.72	0.00E+00	2.97E+01	5.94E+01
Np-237	9.5615E-06	377.86	755.72	0.00E+00	3.61E-03	7.23E-03
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.072E+13
0.0250	1.469E+13
0.0375	1.279E+13
0.0575	1.374E+13
0.0850	8.290E+12
0.1250	5.552E+12
0.2250	7.157E+12
0.3750	3.111E+12
0.5750	5.101E+13
0.8500	7.350E+11
1.2500	4.088E+11
1.7500	2.019E+10
2.2500	1.439E+06
2.7500	1.179E+06
3.5000	9.236E+02
5.0000	3.138E+02
7.0000	3.461E+01
11.0000	3.877E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.99E+00	1.60E+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 %:	19.74996117	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:		377.86
Bounding:		755.72

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:	0.05	
Bounding:	0.10	

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).

2030 Summary, Totals for all Spent Fuels

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.96E+02	3.52E+02
Am-241	2.81E+06	4.01E+06
Am-242m	6.08E+03	9.59E+03
Am-243	5.44E+03	8.47E+03
C-14	2.92E+04	3.85E+04
Cl-36	5.09E+02	6.82E+02
Cm-243	1.19E+03	2.12E+03
Cm-244	1.44E+05	2.52E+05
Co-60	4.51E+06	8.25E+06
Cs-134	6.41E+05	1.28E+06
Cs-135	4.00E+02	5.77E+02
Cs-137	2.98E+07	4.77E+07
Eu-154	3.97E+05	6.96E+05
Eu-155	9.86E+04	1.88E+05
Fe-55	2.04E+06	4.07E+06
H-3	1.18E+05	1.97E+05
I-129	2.23E+01	3.28E+01
Kr-85	9.96E+05	1.77E+06
Np-237	2.08E+02	3.22E+02
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
Tl-208	3.51E+04	4.29E+04
U-232	9.52E+04	1.16E+05
U-233	1.74E+04	2.16E+04
U-234	1.01E+04	1.26E+04
U-235	1.93E+02	2.66E+02
U-236	2.83E+02	4.19E+02
U-238	7.89E+02	8.00E+02
Y-90	2.52E+07	4.04E+07
Other Radionuclides	4.06E+07	6.38E+07

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.404E+18
0.0250	4.961E+17
0.0375	4.459E+17
0.0575	5.107E+17
0.0850	2.801E+17
0.1250	2.005E+17
0.2250	2.407E+17
0.3750	1.062E+17
0.5750	1.847E+18
0.8500	7.223E+16
1.2500	6.333E+17
1.7500	1.149E+15
2.2500	7.981E+14
2.7500	1.512E+15
3.5000	5.204E+11
5.0000	1.695E+09
7.0000	1.947E+08
11.0000	2.233E+07

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.92E+05	9.40E+05
Total	Total

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)
Ac-227	3.31E+00	7.53E+00
Am-241	1.40E+06	1.91E+06
Am-242m	2.51E+03	3.49E+03
Am-243	2.60E+03	3.61E+03
C-14	2.26E+04	2.91E+04
Cl-36	4.18E+02	5.42E+02
Cm-243	1.42E+02	2.21E+02
Cm-244	2.18E+04	3.29E+04
Co-60	9.36E+05	1.29E+06
Cs-134	6.16E+05	1.23E+06
Cs-135	9.74E+01	1.47E+02
Cs-137	1.07E+07	1.93E+07
Eu-154	2.29E+05	4.12E+05
Eu-155	6.25E+04	1.23E+05
Fe-55	4.73E+04	9.18E+04
H-3	4.30E+04	7.10E+04
I-129	5.20E+00	8.83E+00
Kr-85	5.60E+05	1.09E+06
Np-237	7.64E+01	1.29E+02
Pa-231	3.77E+00	8.57E+00
Pb-210	1.65E-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
Sn-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
Tl-208	3.43E+02	8.12E+02
U-232	9.30E+02	2.20E+03
U-233	1.85E+03	1.96E+03
U-234	3.90E+03	5.19E+03
U-235	1.09E+02	1.51E+02
U-236	1.11E+02	1.82E+02
U-238	2.69E+01	3.34E+01
Y-90	9.96E+06	1.80E+07
Other Radionuclides	1.99E+07	3.32E+07

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.117E+18
0.0250	2.334E+17
0.0375	2.087E+17
0.0575	2.396E+17
0.0850	1.321E+17
0.1250	1.017E+17
0.2250	1.131E+17
0.3750	5.167E+16
0.5750	7.924E+17
0.8500	5.598E+16
1.2500	1.097E+17
1.7500	6.064E+14
2.2500	7.769E+14
2.7500	3.302E+13
3.5000	4.994E+11
5.0000	2.349E+08
7.0000	2.683E+07
11.0000	3.066E+06

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.21E+05	3.73E+05
Total	Total

Total Canister Usage Summary	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	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)
Ac-227	2.64E+02	2.78E+02
Am-241	5.08E+05	7.93E+05
Am-242m	2.30E+03	4.16E+03
Am-243	1.31E+03	2.20E+03
C-14	3.97E+03	4.44E+03
Cl-36	5.00E+01	5.77E+01
Cm-243	6.71E+02	1.24E+03
Cm-244	6.42E+04	1.13E+05
Co-60	3.50E+06	6.82E+06
Cs-134	2.48E+04	4.72E+04
Cs-135	1.96E+02	2.76E+02
Cs-137	1.06E+07	1.55E+07
Eu-154	1.23E+05	2.06E+05
Eu-155	3.22E+04	5.88E+04
Fe-55	1.99E+06	3.97E+06
H-3	4.52E+04	7.29E+04
I-129	9.51E+00	1.30E+01
Kr-85	2.89E+05	4.40E+05
Np-237	5.40E+01	8.29E+01
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
Tl-208	3.07E+04	3.26E+04
U-232	8.31E+04	8.84E+04
U-233	3.18E+03	6.22E+03
U-234	5.18E+03	5.52E+03
U-235	2.20E+01	3.15E+01
U-236	7.84E+01	1.06E+02
U-238	4.20E+01	4.30E+01
Y-90	8.90E+06	1.25E+07
Other Radionuclides	1.18E+07	1.68E+07

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.232E+17
0.0250	1.478E+17
0.0375	1.333E+17
0.0575	1.472E+17
0.0850	8.369E+16
0.1250	5.640E+16
0.2250	7.211E+16
0.3750	3.067E+16
0.5750	5.807E+17
0.8500	1.083E+16
1.2500	5.103E+17
1.7500	3.646E+14
2.2500	2.104E+13
2.7500	1.146E+15
3.5000	1.920E+10
5.0000	7.482E+08
7.0000	8.606E+07
11.0000	9.874E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.31E+05	3.56E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	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)
Ac-227	1.95E-03	3.89E-03
Am-241	2.45E+03	4.90E+03
Am-242m	3.84E-01	7.68E-01
Am-243	1.44E+00	2.88E+00
C-14	5.53E-03	1.11E-02
Cl-36	1.27E-26	2.54E-26
Cm-243	1.11E-01	2.21E-01
Cm-244	1.60E+01	3.20E+01
Co-60	7.18E-01	1.44E+00
Cs-134	1.98E+01	3.97E+01
Cs-135	3.34E+00	6.68E+00
Cs-137	1.39E+06	2.79E+06
Eu-154	7.10E+03	1.42E+04
Eu-155	5.74E+02	1.15E+03
Fe-55	2.21E+00	4.42E+00
H-3	1.91E+03	3.82E+03
I-129	7.30E-01	1.46E+00
Kr-85	3.99E+04	7.98E+04
Np-237	9.28E+00	1.86E+01
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-06	6.01E-06
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
U-234	1.80E+02	3.60E+02
U-235	4.64E+00	7.28E+00
U-236	1.50E+01	3.00E+01
U-238	8.14E-02	8.55E-02
Y-90	1.31E+06	2.61E+06
Other Radionuclides	1.33E+06	2.65E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.428E+17
0.0250	2.965E+16
0.0375	2.577E+16
0.0575	2.774E+16
0.0850	1.671E+16
0.1250	1.104E+16
0.2250	1.443E+16
0.3750	6.278E+15
0.5750	1.037E+17
0.8500	1.267E+15
1.2500	6.129E+14
1.7500	3.450E+13
2.2500	2.884E+09
2.7500	2.753E+09
3.5000	1.595E+06
5.0000	6.518E+05
7.0000	7.132E+04
11.0000	7.952E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.62E+04	3.24E+04
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	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)
Ac-227	2.74E+01	4.84E+01
Am-241	6.85E+01	1.21E+02
Am-242m	4.17E-01	7.37E-01
Am-243	8.77E-02	1.55E-01
C-14	2.60E+01	4.60E+01
Cl-36	5.10E-01	9.01E-01
Cm-243	8.61E-02	1.52E-01
Cm-244	3.98E+00	7.04E+00
Co-60	2.46E+02	4.35E+02
Cs-134	7.21E+00	1.27E+01
Cs-135	8.06E+00	1.42E+01
Cs-137	4.16E+05	7.35E+05
Eu-154	2.42E+03	4.28E+03
Eu-155	1.86E+02	3.29E+02
Fe-55	6.48E-01	1.14E+00
H-3	5.99E+02	1.06E+03
I-129	4.46E-01	7.89E-01
Kr-85	1.76E+04	3.12E+04
Np-237	3.55E-02	6.28E-02
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
Tl-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

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.104E+16
0.0250	8.451E+15
0.0375	7.223E+15
0.0575	7.895E+15
0.0850	5.043E+15
0.1250	3.160E+15
0.2250	4.522E+15
0.3750	1.816E+15
0.5750	2.773E+16
0.8500	4.955E+14
1.2500	2.189E+14
1.7500	3.413E+13
2.2500	9.919E+08
2.7500	2.439E+14
3.5000	9.483E+05
5.0000	2.968E+05
7.0000	2.163E+04
11.0000	1.648E+03

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.83E+03	1.36E+04
Total	Total

Total Canister Usage Summary	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	27.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2030 Summary, Totals for High Integrity Canister (HIC)

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.18E+00	1.75E+01
Am-241	3.26E+04	3.68E+04
Am-242m	3.15E+02	3.23E+02
Am-243	8.98E+01	1.08E+02
C-14	2.40E+01	4.10E+01
Cl-36	3.43E-01	6.73E-01
Cm-243	7.92E+01	8.55E+01
Cm-244	4.62E+03	5.76E+03
Co-60	2.09E+03	3.24E+03
Cs-134	2.36E+02	3.09E+02
Cs-135	1.42E+01	1.95E+01
Cs-137	4.93E+05	7.80E+05
Eu-154	3.69E+03	5.56E+03
Eu-155	1.79E+03	1.95E+03
Fe-55	6.21E+02	1.20E+03
H-3	2.65E+03	3.47E+03
I-129	4.44E-01	7.40E-01
Kr-85	1.05E+04	2.18E+04
Np-237	2.13E+00	2.52E+00
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	3.16E+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
Tl-208	1.67E+02	2.51E+03
U-232	4.53E+02	6.81E+03
U-233	1.16E+03	1.20E+03
U-234	1.70E+01	1.56E+02
U-235	1.77E-01	3.83E-01
U-236	2.40E+00	2.67E+00
U-238	4.32E-01	4.95E-01
Y-90	3.07E+05	5.84E+05
Other Radionuclides	4.96E+05	8.14E+05

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.328E+16
0.0250	6.815E+15
0.0375	6.252E+15
0.0575	6.814E+15
0.0850	3.919E+15
0.1250	2.554E+15
0.2250	3.410E+15
0.3750	1.427E+15
0.5750	2.899E+16
0.8500	3.842E+14
1.2500	4.276E+14
1.7500	1.791E+13
2.2500	1.551E+11
2.7500	6.829E+13
3.5000	2.316E+08
5.0000	3.757E+07
7.0000	4.322E+06
11.0000	4.959E+05

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.56E+03	1.19E+04
Total	Total

Total Canister Usage Summary	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	162.4	0.0

Bare Fuel Transfers	
0	Assemblies

2030 Summary, Totals for MCO

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.89E-03	5.94E-03
Am-241	5.66E+05	6.96E+05
Am-242m	3.93E+02	5.45E+02
Am-243	5.05E+02	8.07E+02
C-14	4.86E+02	5.68E+02
Cl-36	3.48E-01	6.96E-01
Cm-243	7.56E+01	1.51E+02
Cm-244	1.33E+04	2.54E+04
Co-60	1.99E+02	3.60E+02
Cs-134	5.73E-01	7.47E-01
Cs-135	5.73E+01	7.02E+01
Cs-137	4.71E+06	5.70E+06
Eu-154	1.27E+04	1.66E+04
Eu-155	2.75E+02	3.93E+02
Fe-55	6.11E-01	9.90E-01
H-3	8.48E+03	1.30E+04
I-129	4.78E+00	5.78E+00
Kr-85	5.60E+04	6.74E+04
Np-237	5.09E+01	6.21E+01
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
Tl-208	6.56E-02	1.31E-01
U-232	1.78E-01	3.56E-01
U-233	1.92E-02	3.14E-02
U-234	3.59E+02	4.26E+02
U-235	4.57E+01	5.25E+01
U-236	6.39E+01	7.51E+01
U-238	7.03E+02	7.05E+02
Y-90	3.29E+06	3.96E+06
Other Radionuclides	4.54E+06	5.49E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.296E+17
0.0250	4.657E+16
0.0375	4.304E+16
0.0575	5.228E+16
0.0850	2.573E+16
0.1250	1.687E+16
0.2250	2.203E+16
0.3750	9.543E+15
0.5750	2.105E+17
0.8500	1.836E+15
1.2500	8.630E+14
1.7500	4.947E+13
2.2500	5.404E+09
2.7500	5.126E+09
3.5000	4.631E+08
5.0000	1.973E+08
7.0000	2.263E+07
11.0000	2.593E+06

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.67E+04	9.36E+04
Total	Total

Total Canister Usage Summary	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	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)
Ac-227	4.49E-02	8.96E-02
Am-241	3.00E+05	5.72E+05
Am-242m	5.58E+02	1.07E+03
Am-243	9.29E+02	1.74E+03
C-14	2.13E+03	4.26E+03
Cl-36	4.02E+01	8.03E+01
Cm-243	2.27E+02	4.21E+02
Cm-244	4.02E+04	7.53E+04
Co-60	6.88E+04	1.38E+05
Cs-134	1.91E+01	3.82E+01
Cs-135	2.29E+01	4.32E+01
Cs-137	1.49E+06	2.79E+06
Eu-154	1.93E+04	3.75E+04
Eu-155	1.10E+03	2.15E+03
Fe-55	1.14E+02	2.27E+02
H-3	1.66E+04	3.15E+04
I-129	1.21E+00	2.24E+00
Kr-85	2.34E+04	4.48E+04
Np-237	1.49E+01	2.75E+01
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
U-234	2.74E+02	5.38E+02
U-235	1.17E+01	2.31E+01
U-236	1.21E+01	2.28E+01
U-238	1.62E+01	1.85E+01
Y-90	1.05E+06	1.97E+06
Other Radionuclides	2.07E+06	3.96E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.173E+17
0.0250	2.344E+16
0.0375	2.162E+16
0.0575	2.920E+16
0.0850	1.287E+16
0.1250	8.849E+15
0.2250	1.104E+16
0.3750	4.764E+15
0.5750	1.031E+17
0.8500	1.435E+15
1.2500	1.117E+16
1.7500	4.170E+13
2.2500	5.828E+10
2.7500	1.040E+11
3.5000	1.114E+09
5.0000	4.758E+08
7.0000	5.480E+07
11.0000	6.291E+06

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.16E+04	5.95E+04
Total	Total

Total Canister Usage Summary	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers		BWR	PWR
166	Assemblies	87	79

2030 Summary, TSPA Category 2: Pu/U Alloy

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.81E-02	3.13E-02
Am-241	1.73E+04	1.96E+04
Am-242m	5.98E+00	1.00E+01
Am-243	1.53E+01	1.98E+01
C-14	7.45E+02	7.80E+02
Cl-36	6.31E-01	1.26E+00
Cm-243	2.69E-01	3.84E-01
Cm-244	1.67E+01	3.14E+01
Co-60	9.63E+02	1.14E+03
Cs-134	5.65E-04	9.21E-04
Cs-135	9.06E+00	1.31E+01
Cs-137	5.41E+05	6.29E+05
Eu-154	4.18E+02	4.54E+02
Eu-155	2.14E+01	3.68E+01
Fe-55	6.22E-02	1.12E-01
H-3	2.94E+03	3.08E+03
I-129	5.77E-01	6.80E-01
Kr-85	4.78E+03	6.08E+03
Np-237	4.02E+00	4.36E+00
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
Sn-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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.010E+16
0.0250	6.220E+15
0.0375	5.474E+15
0.0575	6.050E+15
0.0850	3.490E+15
0.1250	2.267E+15
0.2250	3.003E+15
0.3750	1.308E+15
0.5750	2.337E+16
0.8500	2.216E+14
1.2500	1.631E+14
1.7500	5.728E+12
2.2500	1.055E+09
2.7500	2.070E+09
3.5000	3.849E+06
5.0000	1.613E+06
7.0000	1.812E+05
11.0000	2.054E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.11E+03	8.22E+03
Total	Total

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

2030 Summary, TSPA Category 3: U/Pu Carbide

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.99E-03	3.98E-03
Am-241	1.08E+04	2.13E+04
Am-242m	5.94E+01	1.17E+02
Am-243	3.81E+01	7.62E+01
C-14	2.76E+02	5.53E+02
Cl-36	5.20E+00	1.04E+01
Cm-243	7.36E+00	1.44E+01
Cm-244	1.22E+03	2.44E+03
Co-60	3.31E+06	6.62E+06
Cs-134	1.85E+04	3.71E+04
Cs-135	1.38E+00	2.73E+00
Cs-137	1.07E+05	2.13E+05
Eu-154	3.20E+04	6.40E+04
Eu-155	1.05E+04	2.10E+04
Fe-55	1.99E+06	3.97E+06
H-3	3.01E+03	6.02E+03
I-129	3.45E-02	6.79E-02
Kr-85	9.70E+03	1.94E+04
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
Tl-208	2.54E-01	5.08E-01
U-232	7.31E-01	1.46E+00
U-233	8.23E-01	1.65E+00
U-234	2.91E+01	5.83E+01
U-235	1.55E+00	2.86E+00
U-236	5.36E-01	1.07E+00
U-238	2.84E-01	5.49E-01
Y-90	9.61E+04	1.92E+05
Other Radionuclides	2.99E+05	5.97E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.713E+16
0.0250	5.306E+15
0.0375	4.631E+15
0.0575	4.516E+15
0.0850	2.451E+15
0.1250	2.599E+15
0.2250	1.657E+15
0.3750	7.841E+14
0.5750	1.035E+16
0.8500	2.584E+15
1.2500	4.911E+17
1.7500	4.464E+13
2.2500	2.094E+13
2.7500	1.747E+11
3.5000	1.744E+10
5.0000	1.582E+07
7.0000	1.820E+06
11.0000	2.089E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.67E+04	1.13E+05
Total	Total

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)
Ac-227	2.31E-01	4.03E-01
Am-241	9.30E+05	1.61E+06
Am-242m	3.37E+03	5.96E+03
Am-243	1.61E+03	2.81E+03
C-14	1.12E+04	1.95E+04
Cl-36	2.12E+02	3.68E+02
Cm-243	4.55E+02	8.16E+02
Cm-244	1.12E+04	1.90E+04
Co-60	6.53E+05	9.29E+05
Cs-134	1.47E+03	2.70E+03
Cs-135	8.79E+01	1.55E+02
Cs-137	2.82E+06	4.94E+06
Eu-154	6.04E+04	9.89E+04
Eu-155	1.45E+04	2.60E+04
Fe-55	4.28E+03	5.03E+03
H-3	1.50E+04	2.52E+04
I-129	2.26E+00	4.00E+00
Kr-85	5.21E+04	8.96E+04
Np-237	1.88E+01	3.30E+01
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
Tl-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

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.002E+17
0.0250	3.932E+16
0.0375	3.694E+16
0.0575	5.717E+16
0.0850	2.129E+16
0.1250	1.515E+16
0.2250	1.808E+16
0.3750	7.811E+15
0.5750	1.825E+17
0.8500	3.112E+15
1.2500	7.112E+16
1.7500	8.998E+13
2.2500	3.701E+11
2.7500	4.641E+11
3.5000	4.173E+08
5.0000	1.852E+08
7.0000	1.883E+07
11.0000	2.150E+06

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	MCO
Number of Canisters	13.3	127.5	0.0	0.0	4.0	0.0

Bare Fuel Transfers	
3	Assemblies

2030 Summary, TSPA Category 5: U/Th Carbide

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.56E+00	5.21E+00
Am-241	2.83E+03	4.11E+03
Am-242m	2.10E+00	3.01E+00
Am-243	4.11E+01	5.96E+01
C-14	2.06E+01	2.99E+01
Cl-36	9.53E-01	1.38E+00
Cm-243	2.04E+01	2.84E+01
Cm-244	4.95E+03	6.73E+03
Co-60	2.91E+02	3.61E+02
Cs-134	2.32E+01	2.78E+01
Cs-135	2.21E+01	3.20E+01
Cs-137	1.07E+06	1.50E+06
Eu-154	1.09E+04	1.40E+04
Eu-155	6.68E+02	8.26E+02
Fe-55	2.74E-02	3.29E-02
H-3	2.85E+03	3.79E+03
I-129	9.01E-01	1.31E+00
Kr-85	2.83E+04	3.71E+04
Np-237	1.12E+01	1.62E+01
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.885E+16
0.0250	1.613E+16
0.0375	1.404E+16
0.0575	1.513E+16
0.0850	9.130E+15
0.1250	6.105E+15
0.2250	7.915E+15
0.3750	3.424E+15
0.5750	5.580E+16
0.8500	8.157E+14
1.2500	4.853E+14
1.7500	2.499E+13
2.2500	1.914E+09
2.7500	2.545E+13
3.5000	1.063E+08
5.0000	4.529E+07
7.0000	5.201E+06
11.0000	5.962E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+04	2.45E+04
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	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)
Ac-227	2.92E+02	3.46E+02
Am-241	2.66E+04	5.27E+04
Am-242m	5.57E+01	1.08E+02
Am-243	5.10E+01	1.01E+02
C-14	6.29E+02	1.05E+03
Cl-36	1.21E+01	2.01E+01
Cm-243	3.30E+00	6.12E+00
Cm-244	5.43E+02	1.07E+03
Co-60	8.69E+04	1.74E+05
Cs-134	1.29E+01	2.70E+01
Cs-135	8.14E+01	9.84E+01
Cs-137	3.18E+06	4.03E+06
Eu-154	1.37E+04	2.20E+04
Eu-155	6.99E+02	1.25E+03
Fe-55	9.01E+02	1.80E+03
H-3	3.85E+03	5.71E+03
I-129	4.46E+00	5.36E+00
Kr-85	8.57E+04	1.20E+05
Np-237	8.37E-01	1.39E+00
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
Tl-208	3.46E+04	4.22E+04
U-232	9.38E+04	1.14E+05
U-233	1.55E+04	1.88E+04
U-234	2.32E+03	2.81E+03
U-235	1.94E+00	3.73E+00
U-236	1.09E+00	1.89E+00
U-238	3.58E-01	7.14E-01
Y-90	3.18E+06	4.04E+06
Other Radionuclides	3.81E+06	4.89E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.244E+17
0.0250	4.609E+16
0.0375	3.941E+16
0.0575	4.371E+16
0.0850	2.763E+16
0.1250	1.718E+16
0.2250	2.486E+16
0.3750	9.899E+15
0.5750	1.523E+17
0.8500	2.757E+15
1.2500	1.385E+16
1.7500	2.002E+14
2.2500	7.261E+10
2.7500	1.481E+15
3.5000	2.263E+07
5.0000	9.005E+06
7.0000	9.599E+05
11.0000	1.051E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.32E+04	8.10E+04
Total	Total

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)
Ac-227	1.77E-02	1.84E-02
Am-241	5.41E+05	6.16E+05
Am-242m	3.03E+02	3.56E+02
Am-243	2.80E+02	3.49E+02
C-14	2.89E+03	2.96E+03
Cl-36	3.72E+01	3.73E+01
Cm-243	1.21E+01	2.29E+01
Cm-244	3.11E+03	4.98E+03
Co-60	1.02E+04	1.02E+04
Cs-134	6.25E-01	7.02E-01
Cs-135	6.05E+01	6.81E+01
Cs-137	4.86E+06	5.49E+06
Eu-154	1.08E+04	1.25E+04
Eu-155	3.43E+02	3.80E+02
Fe-55	9.32E+00	9.40E+00
H-3	8.12E+03	9.27E+03
I-129	4.94E+00	5.57E+00
Kr-85	5.92E+04	6.66E+04
Np-237	5.12E+01	5.80E+01
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
U-233	4.29E-01	4.32E-01
U-234	1.50E+03	1.55E+03
U-235	4.59E+01	5.28E+01
U-236	7.59E+01	8.43E+01
U-238	7.00E+02	7.02E+02
Y-90	3.50E+06	3.93E+06
Other Radionuclides	5.20E+06	5.80E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.262E+17
0.0250	4.602E+16
0.0375	4.221E+16
0.0575	5.074E+16
0.0850	2.547E+16
0.1250	1.665E+16
0.2250	2.182E+16
0.3750	9.461E+15
0.5750	2.028E+17
0.8500	1.754E+15
1.2500	1.507E+15
1.7500	4.675E+13
2.2500	8.650E+09
2.7500	1.757E+09
3.5000	1.619E+08
5.0000	6.854E+07
7.0000	7.795E+06
11.0000	8.894E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.78E+04	8.79E+04
Total	Total

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)
Ac-227	3.11E-02	4.32E-02
Am-241	4.76E+05	8.53E+05
Am-242m	8.53E+02	1.56E+03
Am-243	1.92E+03	3.53E+03
C-14	2.74E+03	2.93E+03
Cl-36	3.92E+01	4.16E+01
Cm-243	6.30E+02	1.16E+03
Cm-244	1.11E+05	2.04E+05
Co-60	5.62E+04	7.59E+04
Cs-134	1.11E+03	2.21E+03
Cs-135	7.26E+01	1.19E+02
Cs-137	4.93E+06	8.20E+06
Eu-154	3.73E+04	6.75E+04
Eu-155	3.21E+03	5.65E+03
Fe-55	9.59E+03	1.87E+04
H-3	4.66E+04	8.21E+04
I-129	4.03E+00	6.78E+00
Kr-85	8.15E+04	1.33E+05
Np-237	4.12E+01	7.17E+01
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
Tl-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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.360E+17
0.0250	6.806E+16
0.0375	6.313E+16
0.0575	7.435E+16
0.0850	3.779E+16
0.1250	2.540E+16
0.2250	3.238E+16
0.3750	1.401E+16
0.5750	3.034E+17
0.8500	3.533E+15
1.2500	7.691E+15
1.7500	9.811E+13
2.2500	1.534E+12
2.7500	5.222E+10
3.5000	4.846E+09
5.0000	1.287E+09
7.0000	1.483E+08
11.0000	1.703E+07

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat 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: Al-Based Fuel

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.27E-03	1.24E-02
Am-241	3.22E+04	6.20E+04
Am-242m	9.41E+00	1.84E+01
Am-243	3.86E+01	6.81E+01
C-14	1.53E+00	3.03E+00
Cl-36	1.45E-03	2.89E-03
Cm-243	6.11E+00	1.08E+01
Cm-244	3.17E+03	5.23E+03
Co-60	2.29E+02	4.46E+02
Cs-134	6.09E+05	1.22E+06
Cs-135	2.17E+01	4.21E+01
Cs-137	1.08E+07	2.09E+07
Eu-154	1.88E+05	3.62E+05
Eu-155	6.38E+04	1.24E+05
Fe-55	9.98E+03	1.97E+04
H-3	2.62E+04	5.10E+04
I-129	4.08E+00	7.94E+00
Kr-85	6.41E+05	1.25E+06
Np-237	6.48E+01	1.21E+02
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-79	7.09E+01	1.38E+02
Sn-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
Tl-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

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.183E+18
0.0250	2.491E+17
0.0375	2.230E+17
0.0575	2.307E+17
0.0850	1.421E+17
0.1250	1.073E+17
0.2250	1.217E+17
0.3750	5.538E+16
0.5750	8.494E+17
0.8500	5.509E+16
1.2500	1.353E+16
1.7500	5.877E+14
2.2500	7.673E+14
2.7500	4.425E+12
3.5000	4.897E+11
5.0000	3.818E+07
7.0000	4.360E+06
11.0000	4.982E+05

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.51E+05	2.93E+05
Total	Total

Total Canister Usage Summary	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1017.2	235.8	165.3	0.0	1.0	0.0

Bare Fuel Transfers	
0	Assemblies

2030 Summary, TSPA Category 10: Miscellaneous SNF

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.23E-01	2.23E-01
Am-241	7.75E+05	7.77E+05
Am-242m	1.42E+03	1.45E+03
Am-243	1.44E+03	1.45E+03
C-14	1.07E+04	1.07E+04
Cl-36	2.02E+02	2.02E+02
Cm-243	5.87E+01	6.56E+01
Cm-244	8.42E+03	8.45E+03
Co-60	3.46E+05	3.46E+05
Cs-134	2.10E+01	4.77E+01
Cs-135	3.96E+01	4.04E+01
Cs-137	1.34E+06	1.36E+06
Eu-154	3.33E+04	3.36E+04
Eu-155	9.35E+02	1.17E+03
Fe-55	4.81E+02	4.87E+02
H-3	9.32E+03	9.39E+03
I-129	9.57E-01	9.79E-01
Kr-85	2.05E+04	2.10E+04
Np-237	1.46E+01	1.46E+01
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-236	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

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.646E+16
0.0250	1.502E+16
0.0375	1.276E+16
0.0575	2.400E+16
0.0850	8.043E+15
0.1250	5.691E+15
0.2250	6.955E+15
0.3750	3.010E+15
0.5750	5.074E+16
0.8500	1.093E+15
1.2500	2.642E+16
1.7500	3.217E+13
2.2500	1.373E+11
2.7500	2.367E+11
3.5000	1.490E+08
5.0000	6.281E+07
7.0000	7.153E+06
11.0000	8.161E+05

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)
Ac-227	5.49E-04	7.42E-04
Am-241	7.30E+02	1.33E+03
Am-242m	8.92E-01	1.74E+00
Am-243	1.09E+00	2.16E+00
C-14	1.47E+01	2.57E+01
Cl-36	3.10E-01	5.39E-01
Cm-243	8.89E-01	1.76E+00
Cm-244	8.06E+01	1.60E+02
Co-60	4.67E+04	9.33E+04
Cs-134	1.10E+04	2.19E+04
Cs-135	3.49E+00	6.06E+00
Cs-137	2.12E+05	4.03E+05
Eu-154	1.06E+04	2.13E+04
Eu-155	3.92E+03	7.84E+03
Fe-55	2.60E+04	5.20E+04
H-3	6.00E+02	1.19E+03
I-129	8.93E-02	1.57E-01
Kr-85	1.32E+04	2.61E+04
Np-237	5.41E-01	1.04E+00
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
Tl-208	5.80E-03	1.12E-02
U-232	1.62E-02	3.13E-02
U-233	1.32E-02	2.29E-02
U-234	2.07E-01	4.00E-01
U-235	8.49E-01	1.12E+00
U-236	1.58E+00	2.79E+00
U-238	5.20E-01	5.24E-01
Y-90	1.98E+05	3.77E+05
Other Radionuclides	2.46E+05	4.70E+05

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.225E+16
0.0250	4.767E+15
0.0375	4.305E+15
0.0575	4.341E+15
0.0850	2.686E+15
0.1250	2.145E+15
0.2250	2.292E+15
0.3750	1.074E+15
0.5750	1.637E+16
0.8500	1.274E+15
1.2500	7.432E+15
1.7500	1.848E+13
2.2500	7.824E+12
2.7500	6.552E+10
3.5000	7.634E+09
5.0000	1.108E+06
7.0000	1.271E+05
11.0000	1.457E+04

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.62E+03	7.00E+03
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	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

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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 ±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 ± 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. ±1–5% for U-235, U-238, Pu-239, Th-232 concentrations

2. ±10–30% for U-233, U-234, U-236, Np-237, Pu-240 concentrations

3. ±30–50% for other significant concentration higher-order actinides (Pu-238, Pu-241, Pu-242, etc.)

4. ±50–400% for other insignificant concentration higher order actinides and daughter decay products

5. ±1–5% for direct yield fission products

6. ±5–50% for indirect yield and transmutation fission products

7. ±5–50% for major constituent activation products

8. ± factor of 2–3 for activation product impurities (Co-60, C-14, etc.)

9. ±5–10% for decay heat

10. ± 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±X/4, where ±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±Y/10, where ±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:
     - ±5% for U-235, U-238, Pu-239, Th-232
     - ±50% for U-233, U-234, U-236, Pu-240, Np-237
     - ±100% for other significant concentration higher order actinides (Pu-238, Pu-241, Pu-242, etc.)
     - ±200–400% for other insignificant concentration higher order actinides and daughter decay products
   - For fission products:
     - ±1% for all direct yield fission products
     - ±5–50% for all indirect/transmutation fission products
   - For activation products:
     - ±5% for high energy threshold particle reactions (n,p), (n,α)
     - ±5–10% for high energy threshold particle reactions (n,2n)
     - ±>10% for high energy threshold particle reactions (n,3n)
     - ±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:
  - ±<2% for U-233, U-235, U-238, Pu-239, Th-232
  - ±10% for U-234, U-236, Pu-240
- For activation products:
  - ±2–10% for major structural constituents
  - ±10–200% for impurity generated activation products.