INFORMATION ONLY

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United States Department of Energy

National Spent Nuclear Fuel Program

Volume III

Source Term Estimates for DOE Spent Nuclear Fuels

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

Enclosure 1

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

Appendix D

Source Term Estimates for the Year 2030

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Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name	AMERICIUM TARGETS	[1]Fuel decay start date	1970
SNF ID #	776	Estimates as of	2030
Fuel Units & Descr	12 - SCRAP	Template	FFTF (FAST, SST, 10 to 30% Pu & U)
Heavy Metal Mass	BOL=0 078kg EOL=0 074kg	[2]Template Burnup(MWd):	5011.2
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 0329181
		Template Decay Time	50 years

Estimated Canister usage: HIC 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	4.52E-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-06	91,386 55	0 00	5 00E-02	0 00E+00	5.00E-02
U-236	7 5888E-06	91,386 55	182,773 11	0 00E+00	6.94E-01	1 39E+00
U-238	-2 6129E-07	91,386 55	0 00	2.52E-01	2.28E-01	2.52E-01
Y-90	6 4180E-01	91,386 55	182,773 11	0 00E+00	5 87E+04	1 17E+05
Other Radionuclides					8 71E+04	1 74E+05

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
Nominal	32,848 60	91,386 55
Bounding	33 041 60	182,773 11

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed

Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	3.38	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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents:	U	U	
BOL Enrichment %:	1 6	0 to 5	

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	Estimated EOL HM/Given EOL HM
Nominal	0 79	0 17	0 98
Bounding	0 80	0 33	

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

[2]Total burnup for all fuel associated with this worksheet must be 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
Nominal	635 816.10	638 157 18
Bounding	1,362 463 07	1,276,314 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 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_n: Nominal Fuel Burnup (MWd)[2]	x_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	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)	[1]Fuel decay start date	1992	Estimated Canister usage
SNF ID #	1046	Estimates as of:	2030	18"x15'
Fuel Units & Descr	72 - ROD	Template:	FFTF (FAST, SST, 10 to 30%, Pu & U)	1 09
Heavy Metal Mass	BOL= , EOL=8 878kg	[2]Template Burnup(MWd)	5011 2	
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT):	0.0329181	
		Template Decay Time	35 years	

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_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	8 97E+01	9 28E+01
Pu-241	-1 4799E+00	634 54	0 00	3 44E+03	2 50E+03	3 44E+03
Pu-242	1.1252E-05	634 54	787 70	2 04E-02	2 75E-02	2 93E-02
Ra-226	7 8524E-12	634 54	787.70	0 00E+00	4 98E-09	6 19E-09
Ra-228	2 4086E-16	634 54	787 70	0 00E+00	1.53E-13	1 90E-13
Ru-106	1.5066E-05	634 54	787 70	0 00E+00	9 56E-03	1 19E-02
Se-79	1 0127E-05	634 54	787 70	0.00E+00	6 43E-03	7 98E-03
Sn-126	4 3902E-05	634 54	787.70	0 00E+00	2 79E-02	3 46E-02
Sr-90	5 0088E-01	634 54	787 70	0 00E+00	3.18E+02	3 95E+02
Tc-99	3 9412E-04	634 54	787.70	0 00E+00	2 50E-01	3 10E-01
Th-229	2 7219E-12	634 54	787.70	0 00E+00	1 73E-09	2 14E-09
Th-230	1 0441E-09	634 54	787.70	0 00E+00	6 62E-07	8 22E-07
Th-232	3 1689E-16	634 54	787.70	0 00E+00	2 01E-13	2 50E-13
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	5.953E+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 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	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
18"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+06
2 7500	3 443E+07
3 5000	1 780E+05
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	[1]Fuel decay start date	1992
SNF ID #	865	Estimates as of	2030
Fuel Units & Descr	16 - ROD	Template	FFTF (FAST SST 10 to 30%, Pu & U)
Heavy Metal Mass	BOL= , EOL=2.558kg	[2]Template Burnup(MWd)	5011.2
ROD Storage Site:	HANFORD	Template BOL Heavy Metal Mass (MT)	0 0329181
		Template Decay Time	35 years

Estimated Canister usage
18"x15'
1 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	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	[1]Fuel decay start date	1992
SNF ID #	322	Estimates as of	2030
Fuel Units & Descr	2 - HEX ARRAY 217 ROD	Template	FFTF (FAST, SST, 10 to 30%, Pu & U)
Heavy Metal Mass	BOL= , EOL=69 402kg	[2]Template Burnup(MWd)	5011.2
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 0329181
		Template Decay Time	35 years

Estimated Canister usage: 18"x15' — 0 40

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 615E+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 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	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)
7.50E+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+08
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	[1]Fuel decay start date	1992
SNF ID #	333	Estimates as of	2030
Fuel Units & Descr	3 - HEX ARRAY 169 ROD	Template	FFTF (FAST, SST, 10 to 30%, Pu & U)
Heavy Metal Mass	BOL= ; EOL=131.25kg	[2]Template Burnup(MWd)	5011 2
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 0329181
		Template Decay Time	35 years

Estimated Canister usage 18"x15' 0 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	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	2.4086E-16	10,725.31	11,359 60	0 00E+00	2.58E-12	2 74E-12
Ru-106	1.5066E-05	10,725.31	11,359 60	0 00E+00	1 62E-01	1 71E-01
Se-79	1 0127E-05	10,725.31	11,359 60	0 00E+00	1.09E-01	1.15E-01
Sn-126	4 3902E-05	10,725.31	11,359 60	0 00E+00	4 71E-01	4 99E-01
Sr-90	5 0088E-01	10,725.31	11,359 60	0 00E+00	5 37E+03	5 69E+03
Tc-99	3 9412E-04	10,725.31	11,359 60	0 00E+00	4.23E+00	4 48E+00
Th-229	2 7219E-12	10,725.31	11,359 60	0 00E+00	2 92E-08	3.09E-08
Th-230	1 0441E-09	10,725.31	11,359 60	0 00E+00	1 12E-05	1.19E-05
Th-232	3 1689E-16	10,725.31	11,359 60	0 00E+00	3 40E-12	3 60E-12
Tl-208	4 6636E-07	10,725 31	11,359 60	0 00E+00	5 00E-03	5 30E-03
U-232	1 2638E-06	10,725 31	11,359 60	0 00E+00	1 36E-02	1 44E-02
U-233	5 7451E-10	10,725 31	11,359 60	0 00E+00	6 16E-06	6 53E-06
U-234	4 3044E-06	10,725 31	11,359 60	0 00E+00	4 62E-02	4 89E-02
U-235	-7.7765E-09	10,725 31	0.00	4 61E-04	3 78E-04	4 61E-04
U-236	1 8050E-07	10,725.31	11,359 60	0 00E+00	1 94E-03	2 05E-03
U-238	-1.7914E-07	10,725 31	0 00	3 36E-02	3 17E-02	3 36E-02
Y-90	5 0088E-01	10,725 31	11,359 60	0 00E+00	5 37E+03	5 69E+03
Other Radionuclides					1 52E+04	1 61E+04

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+08
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-05	3,631 59	3,953 60	0 00E+00	3 68E-02	4 00E-02
Sn-126	4.3902E-05	3,631 59	3,953 60	0 00E+00	1 59E-01	1 74E-01
Sr-90	5 0088E-01	3,631 59	3,953 60	0 00E+00	1 82E+03	1 98E+03
Tc-99	3 9412E-04	3,631 59	3,953 60	0 00E+00	1 43E+00	1 56E+00
Th-229	2.7219E-12	3,631 59	3,953 60	0 00E+00	9 88E-09	1 08E-08
Th-230	1 0441E-09	3,631 59	3,953 60	0 00E+00	3 79E-06	4 13E-06
Th-232	3.1689E-16	3,631 59	3,953 60	0 00E+00	1 15E-12	1.25E-12
Tl-208	4 6636E-07	3,631 59	3,953 60	0 00E+00	1 69E-03	1 84E-03
U-232	1.2638E-06	3,631 59	3,953 60	0 00E+00	4 59E-03	5 00E-03
U-233	5 7451E-10	3,631 59	3,953 60	0 00E+00	2 09E-06	2.27E-06
U-234	4.3044E-06	3,631 59	3,953 60	0 00E+00	1 56E-02	1.70E-02
U-235	-7.7765E-09	3,631 59	0 00	2 91E-04	2 62E-04	2.91E-04
U-236	1 8050E-07	3,631 59	3,953 60	0 00E+00	6 55E-04	7.14E-04
U-238	-1 7914E-07	3 631 59	0 00	2 12E-02	2 05E-02	2.12E-02
Y-90	5 0088E-01	3,631 59	3,953 60	0 00E+00	1 82E+03	1 98E+03
Other Radionuclides					5 15E+03	5 60E+03

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 61E+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 018774
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+06
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)
5.39E+02	5.85E+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: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	Basis for burnup used in estimate
Nominal	2,143.51	1,182 79	Nominal burnup taken directly from SFD (converted to MWd)
Bounding:	2 449 72	2,365.59	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	[1]Fuel decay start date	1981
SNF ID #	311	Estimates as of	2030
Fuel Units & Descr:	3 - 14 X 14 ROD ARRAY	Template	PWR (Light Water Zirc, 0 to 5%, U)
Heavy Metal Mass:	BOL=1167kg EOL=1161.5kg	[2]Template Burnup(MWd)	61.92
ROD Storage Site:	HANFORD	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	35 years

Estimated Canister usage 18"x15'
1.50

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	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	Basis for burnup used in estimate:
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)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 93	0 14	0 97
Bounding	0 93	0 27	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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-08	433,632 15	867,264 30	0 00E+00	1 21E-02	2 43E-02
Th-232	5 3036E-12	433,632 15	867,264.30	0 00E+00	2 30E-06	4 60E-06
Tl-208	1 5136E-07	433,632 15	867,264 30	0 00E+00	6 56E-02	1.31E-01
U-232	4 1005E-07	433,632 15	867,264 30	0 00E+00	1 78E-01	3.56E-01
U-233	2.5856E-08	433,632 15	867,264.30	0 00E+00	1 12E-02	2.24E-02
U-234	5.2665E-05	433,632 15	867,264 30	0 00E+00	2 28E+01	4.57E+01
U-235	-1 4487E-06	433,632 15	0 00	2 49E-01	0 00E+00	2.49E-01
U-236	7 5888E-06	433,632 15	867,264 30	0 00E+00	3 29E+00	6 58E+00
U-238	-2 6129E-07	433,632 15	0 00	5 42E+00	5 30E+00	5 42E+00
Y-90	6 4180E-01	433,632 15	867,264 30	0 00E+00	2 78E+05	5 57E+05
Other Radionuclides					4 13E+05	8 26E+05

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+06

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	[1]Fuel decay start date	1971
SNF ID #	198	Estimates as of.	2030
Fuel Units & Descr	835 - TUBE	Template	N-Reactor (Graphite Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=2891 605kg, EOL=2885.844kg	[2]Template Burnup(MWd)	69600
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT):	11.6
		Template Decay Time	50 years

Estimated Canister usage

MCO
0 86

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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-06	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-06	454 58	909 16	0 00E+00	4 11E-03	8.21E-03
Pa-231	1 9210E-09	454 58	909 16	0 00E+00	8 73E-07	1.75E-06
Pb-210	7 5862E-11	454 58	909 16	0 00E+00	3 45E-08	6 90E-08
Pm-147	1 1372E-05	454 58	909 16	0 00E+00	5 17E-03	1.03E-02
Pu-238	1 7802E-02	454 58	909 16	0 00E+00	8 09E+00	1 62E+01
Pu-239	2 8822E-02	454 58	909 16	0 00E+00	1 31E+01	2 62E+01
Pu-240	2 2759E-02	454 58	909 16	0 00E+00	1 03E+01	2 07E+01
Pu-241	2 9641E-01	454 58	909 16	0 00E+00	1 35E+02	2 69E+02
Pu-242	1 4526E-05	454 58	909 16	0 00E+00	6 60E-03	1.32E-02
Ra-226	2 3132E-10	454 58	909 16	0 00E+00	1 05E-07	2.10E-07
Ra-228	1 9655E-14	454 58	909 16	0 00E+00	8 93E-12	1.79E-11
Ru-106	1 9612E-14	454 58	909 16	0 00E+00	8 92E-12	1.78E-11
Se-79	1 0897E-05	454 58	909 16	0 00E+00	4 95E-03	9 91E-03
Sn-126	0 0000E+00	454 58	909 16	0 00E+00	0 00E+00	0 00E+00
Sr-90	5 9411E-01	454 58	909 16	0 00E+00	2.70E+02	5 40E+02
Tc-99	3 6494E-04	454 58	909 16	0 00E+00	1 66E-01	3.32E-01
Th-229	3.1063E-12	454 58	909 16	0 00E+00	1 41E-09	2.82E-09
Th-230	2 5187E-08	454 58	909 16	0 00E+00	1 14E-05	2.29E-05
Th-232	2 5287E-14	454 58	909 16	0 00E+00	1 15E-11	2.30E-11
Tl-208	6 4885E-15	454 58	909 16	0 00E+00	2 95E-12	5 90E-12
U-232	0 0000E+00	454 58	909 16	0 00E+00	0 00E+00	0 00E+00
U-233	1 5704E-09	454 58	909 16	0 00E+00	7 14E-07	1 43E-06
U-234	6 6293E-05	454 58	909 16	0 00E+00	3 01E-02	6.03E-02
U-235	-1.2930E-06	454 58	0 00	1.10E-02	1 04E-02	1.10E-02
U-236	1 1961E-05	454 58	909 16	0 00E+00	5 44E-03	1.09E-02
U-238	-3.0619E-07	454 58	0 00	1.35E-01	1 35E-01	1.35E-01
Y-90	5 9425E-01	454 58	909 16	0 00E+00	2 70E+02	5 40E+02
Other Radionuclides					3 70E+02	7 40E+02

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
Nominal	407 44	454 58
Bounding		909 16

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 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	[1]Fuel decay start date	1992
SNF ID #	777	Estimates as of	2030
Fuel Units & Descr	2 - SCRAP	Template	FERMI (Fast Zirc 10 to 40% U)
Heavy Metal Mass	BOL=2 711kg, EOL=2 628kg	[2]Template Burnup(MWd)	58 6725048
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 018774
		Template Decay Time	35 years

Estimated Canister usage
HIC
2 00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_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
5 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-06	3 74	0 00	1 64E-04	1.54E-04	1 64E-04
U-236	1.2695E-05	3 74	7.48	0 00E+00	4.75E-05	9 50E-05
U-238	-3 6331E-08	3 74	0 00	1 04E-04	1 03E-04	1 04E-04
Y-90	1.2765E+00	3 74	7 48	0 00E+00	4 78E+00	9 55E+00
Other Radionuclides					5 15E+00	1 03E+01

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	[1]Fuel decay start date	1987
SNF ID #.	314	Estimates as of	2030
Fuel Units & Descr	66 - ELEMENT	Template	TRIGA-Al (LW/U-Zr Alum , 10 to 20%, U)
Heavy Metal Mass	BOL=12.342kg EOL=12.203kg	[2]Template Burnup(MWd)	6.65
ROD Storage Site	HANFORD	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 181E+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	Basis for Parameter Differences
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	

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	[1]Fuel decay start date:	1989
SNF ID #:	233	Estimates as of:	2030
Fuel Units & Descr:	90 - ELEMENT	Template:	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass:	BOL=17 55kg, EOL=17 19kg	[2]Template Burnup(MWd):	6 65
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT):	0 000195
		Template Decay Time:	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+06
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)
5.53E+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)	[1]Fuel decay start date	1989
SNF ID #	316	Estimates as of	2030
Fuel Units & Descr	33 - ELEMENT	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=6.336kg, EOL=6 316kg	[2]Template Burnup(MWd)	6 65
ROD Storage Site	HANFORD	Template BOL Heavy Metal Mass (MT)	0 000195
		Template Decay Time	35 years

Estimated Canister usage 18"x10'
0 30

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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_n: Nominal Fuel Burnup (MWd)[2]	x_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 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 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	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	Total Photons/sec (bounding)
Avg MeV	
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	[1]Fuel decay start date.	1991
SNF ID #:	10	Estimates as of:	2030
Fuel Units & Descr:	2 - 15 FLAT PLATES	Template:	ATR (Light Water, Alum , 60 to 100% U)
Heavy Metal Mass:	BOL=0.236kg; EOL=0.236kg	[2]Template Burnup(MWd):	367.2
ROD Storage Site:	SRS	Template BOL Heavy Metal Mass (MT):	0 00116689
		Template Decay Time:	35 years

Estimated Canister usage: 18"x10' — 0 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

	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	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 695E-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	Basis for Parameter Differences[1]
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 12714777	60 to 100	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate[1]
Nominal	0 13		Nominal burnup taken directly from SFD (converted to MWd)
Bounding	1.42		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	[1]Fuel decay start date	1985
SNF ID #	15	Estimates as of	2030
Fuel Units & Descr	1576 - 19 CURVED PLATES	Template.	ATR (Light Water, Alum , 60 to 100%, U)
Heavy Metal Mass	BOL=1818 704kg EOL=1313 754kg	[2]Template Burnup(MWd)	367.2
ROD Storage Site	SRS	Template BOL Heavy Metal Mass (MT)	0 00116689
		Template Decay Time	35 years

Estimated Canister usage

18"x10'
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 05E+03	1.61E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 154	60 to 100	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate
Nominal	480,779 86	478,197.82	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	Estimated EOL HM/Given EOL HM
Nominal	0 84	0.99	1 02
Bounding	1 68		

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

[2]Total burnup for all fuel associated with this worksheet must be 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+05
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 98	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+05

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	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2.560002614	0 to 5	

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)	[1]Fuel decay start date	1982
SNF ID #	236	Estimates as of	2030
Fuel Units & Descr	21 - 4 X 4 ROD ARRAY	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=9 196kg EOL=9 192kg	[2]Template Burnup(MWd)	6 65
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0.000195
		Template Decay Time	35 years

Estimated Canister usage

18"x10'
2 63

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_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	1.52E-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	Basis for burnup used in estimate:
Nominal	22 40	4 01	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	9 41	8 02	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
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 559kg
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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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-08	1,115 44	2,230 88	0 00E+00	7 91E-05	1.58E-04
Pb-210	2 2363E-12	1,115 44	2,230 88	0 00E+00	2 49E-09	4.99E-09
Pm-147	4.2296E-07	1,115 44	2,230 88	0 00E+00	4 72E-04	9 44E-04
Pu-238	2 3295E-04	1,115 44	2,230 88	0 00E+00	2 60E-01	5 20E-01
Pu-239	6 6722E-04	1,115 44	2,230 88	0 00E+00	7 44E-01	1 49E+00
Pu-240	8 6556E-05	1,115 44	2,230 88	0 00E+00	9 65E-02	1 93E-01
Pu-241	1 6889E-04	1,115 44	2,230 88	0 00E+00	1 88E-01	3.77E-01
Pu-242	1 9717E-09	1,115 44	2,230 88	0 00E+00	2 20E-06	4 40E-06
Ra-226	4 5740E-12	1,115 44	2,230 88	0 00E+00	5 10E-09	1.02E-08
Ra-228	8 3511E-12	1,115 44	2,230 88	0 00E+00	9 32E-09	1 86E-08
Ru-106	2 0516E-19	1,115 44	2,230 88	0 00E+00	2 29E-16	4.58E-16
Se-79	1 3220E-05	1,115 44	2,230 88	0 00E+00	1 47E-02	2 95E-02
Sn-126	1 1489E-05	1,115 44	2,230 88	0 00E+00	1 28E-02	2.56E-02
Sr-90	6 6872E-01	1,115 44	2,230 88	0 00E+00	7 46E+02	1 49E+03
Tc-99	4 6639E-04	1,115 44	2,230 88	0 00E+00	5 20E-01	1 04E+00
Th-229	2 3727E-11	1,115 44	2,230 88	0 00E+00	2 65E-08	5.29E-08
Th-230	2 7354E-10	1,115 44	2,230 88	0 00E+00	3 05E-07	6.10E-07
Th-232	8 3594E-12	1,115 44	2,230 88	0 00E+00	9 32E-09	1 86E-08
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+06
2 7500	1 275E+06
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 636E+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[1]
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+06
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	[1]Fuel decay start date	1972
SNF ID #	23	Estimates as of	2030
Fuel Units & Descr.	2 - 11 X 11 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=262.681kg EOL=250 073kg	[2]Template Burnup(MWd)	61.92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	11,990.37	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+08
3 5000	9 877E+06
5 0000	4.221E+06
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 %	2 982	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

	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	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	5 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	[1]Fuel decay start date	1972
SNF ID #	27	Estimates as of	2030
Fuel Units & Descr	18 - 9 X 9 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=2443 466kg EOL=2420.588kg	[2]Template Burnup(MWd):	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	7.638E+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	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2 995	0 to 5	

Burnup Summary (MWd)[2]

	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	Estimated EOL HM/Given EOL HM
Nominal	0.34	0 75	1 00
Bounding	0.39	1 29	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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 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	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-08	140,435 08	280,870.16	0 00E+00	3 63E-03	7.26E-03
U-234	5 2665E-05	140,435 08	280,870 16	0.00E+00	7 40E+00	1 48E+01
U-235	-1 4487E-06	140,435 08	0 00	3 47E-01	1 43E-01	3 47E-01
U-236	7 5888E-06	140,435 08	280,870.16	0 00E+00	1 07E+00	2 13E+00
U-238	-2 6129E-07	140,435 08	0 00	1 48E+00	1 44E+00	1 48E+00
Y-90	6 4180E-01	140,435 08	280,870.16	0 00E+00	9 01E+04	1 80E+05
Other Radionuclides					1 34E+05	2 68E+05

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	[1]Fuel decay start date	1973
SNF ID #	1081	Estimates as of	2030
Fuel Units & Descr	4 - 9 X 9 ROD ARRAY	Template	PWR (Light Water, Zirc 0 to 5%, U)
Heavy Metal Mass	BOL=553.686kg EOL=541 107kg	[2]Template Burnup(MWd)	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage
Bare Fuel Transfer

II. Estimates

Radionuclide	m: CI/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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, shipping or other date confirming that irradiation ceased for fuel

[2]Total burnup for all fuel associated with this worksheet must be 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-08	17,236 64	34,473 28	0 00E+00	8.16E-04	1 63E-03
Pm-147	3.2198E-04	17,236 64	34,473 28	0 00E+00	5 55E+00	1.11E+01
Pu-238	-1 1924E+00	17,236 64	0 00	4 75E+04	2 70E+04	4 75E+04
Pu-239	-4 8600E-02	17,236 64	0 00	5 75E+03	4 92E+03	5 75E+03
Pu-240	-3 0127E-01	17,236 64	0 00	7 35E+03	2.15E+03	7.35E+03
Pu-241	-1 2917E+02	17,236 64	0 00	1 89E+06	0 00E+00	1 89E+06
Pu-242	-1 1381E-04	17,236 64	0 00	3 18E+01	2 98E+01	3 18E+01
Ra-226	1 0760E-07	17,236 64	34,473 28	0 00E+00	1 85E-03	3 71E-03
Ra-228	6 0160E-07	17,236 64	34,473 28	0 00E+00	1 04E-02	2 07E-02
Ru-106	1.3388E-13	17,236 64	34,473 28	0 00E+00	2 31E-09	4 62E-09
Se-79	1 9179E-04	17,236 64	34,473 28	0 00E+00	3 31E+00	6 61E+00
Sn-126	1 6669E-04	17,236 64	34,473 28	0 00E+00	2 87E+00	5.75E+00
Sr-90	1.3859E+01	17,236 64	34,473 28	0 00E+00	2 39E+05	4.78E+05
Tc-99	6 7678E-03	17,236 64	34,473 28	0 00E+00	1 17E+02	2.33E+02
Th-229	2.2592E-06	17,236 64	34,473 28	0 00E+00	3 89E-02	7 79E-02
Th-230	7 5955E-06	17,236 64	34,473.28	0 00E+00	1 31E-01	2 62E-01
Th-232	6 0208E-07	17,236 64	34,473.28	0 00E+00	1 04E-02	2 08E-02
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	[1]Fuel decay start date	1974
SNF ID #	30	Estimates as of	2030
Fuel Units & Descr.	13 - 9 X 9 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5% U)
Heavy Metal Mass	BOL=1799 104kg EOL=1756 759kg	[2]Template Burnup(MWd)	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage
Bare Fuel Transfer

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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 46E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

	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	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 5610E-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 8870E-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-08	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)
1.55E+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+05
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	Basis for burnup used in estimate:
Nominal		24 54	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		49 08	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)	[1]Fuel decay start date	1979
SNF ID #	42	Estimates as of	2030
Fuel Units & Descr	10 - CANISTER OF SCRAP	Template	(Worst Case)
Heavy Metal Mass	BOL= , EOL=31 05kg	[2]Template Burnup(MWd)	62.5
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00186865
		Template Decay Time	50 years

Estimated Canister usage

18"x10'
0 08

II. Estimates

	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	7.872E+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	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: 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 (ZIRC)	[1]Fuel decay start date	1979
SNF ID #	858	Estimates as of	2030
Fuel Units & Descr	10 - CANISTER OF SCRAP	Template	(Worst Case)
Heavy Metal Mass	BOL= ; EOL=31 05kg	[2]Template Burnup(MWd)	62 5
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0.00186865
		Template Decay Time	50 years

Estimated Canister usage
18"x10'
0 08

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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	[1]Fuel decay start date.	1981	
SNF ID #: 701	Estimates as of:	2030	
Fuel Units & Descr: 2856 - ROD	Template:	PWR (Light Water, Zirc, 0 to 5%, U)	
Heavy Metal Mass: BOL=6338 892kg, EOL=6144 97kg	[2]Template Burnup(MWd):	61 92	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT):	0 00176911	
	Template Decay Time:	35 years	

Estimated Canister usage
18"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	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	2 631414612	0 to 5	

Burnup Summary (MWd)[2]

	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 %[1]	2 925317534	0 to 5

Basis for Parameter Differences[1]

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)	[1]Fuel decay start date	1973
SNF ID #	47	Estimates as of	2030
Fuel Units & Descr	1 - 6 X 6 ROD ARRAY	Template	PWR (Light Water Zirc, 0 to 5% U)
Heavy Metal Mass	BOL=58 847kg EOL=57.281kg	[2]Template Burnup(MWd)	61.92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage
Bare Fuel Transfer

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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 086E+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	5.39E+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	Basis for burnup used in estimate:
Nominal	823.86	1,489 19	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		2,978.38	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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 6636E-07	833 80	1,563 38	0 00E+00	3 89E-04	7.29E-04
U-232	1 2638E-06	833 80	1,563 38	0.00E+00	1 05E-03	1 98E-03
U-233	5 7451E-10	833 80	1,563 38	0 00E+00	4 79E-07	8 98E-07
U-234	4 3044E-06	833 80	1,563.38	0 00E+00	3.59E-03	6 73E-03
U-235	-7.7765E-09	833 80	0.00	3 39E-05	2.74E-05	3 39E-05
U-236	1 8050E-07	833 80	1,563.38	0 00E+00	1.50E-04	2 82E-04
U-238	-1 7914E-07	833 80	0 00	2 47E-03	2.32E-03	2 47E-03
Y-90	5 0088E-01	833 80	1,563.38	0 00E+00	4 18E+02	7 83E+02
Other Radionuclides					1.18E+03	2 22E+03

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	6.1822E-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-05	4,956 09	12,390 22	1.33E-01	1 89E-01	2.72E-01
Ra-226	7 8524E-12	4,956 09	12,390 22	0 00E+00	3 89E-08	9.73E-08
Ra-228	2 4086E-16	4,956 09	12,390 22	0 00E+00	1.19E-12	2.98E-12
Ru-106	1 5066E-05	4,956 09	12,390 22	0 00E+00	7.47E-02	1 87E-01
Se-79	1 0127E-05	4,956 09	12,390 22	0 00E+00	5 02E-02	1.25E-01
Sn-126	4 3902E-05	4,956 09	12,390 22	0 00E+00	2.18E-01	5 44E-01
Sr-90	5 0088E-01	4,956 09	12,390 22	0 00E+00	2.48E+03	6.21E+03
Tc-99	3 9412E-04	4,956 09	12,390 22	0 00E+00	1.95E+00	4 88E+00
Th-229	2 7219E-12	4,956 09	12,390 22	0 00E+00	1.35E-08	3 37E-08
Th-230	1.0441E-09	4,956 09	12,390.22	0 00E+00	5 17E-06	1 29E-05
Th-232	3 1689E-16	4,956 09	12 390 22	0 00E+00	1 57E-12	3 93E-12
Tl-208	4 6636E-07	4,956 09	12,390.22	0 00E+00	2 31E-03	5 78E-03
U-232	1.2638E-06	4,956 09	12,390.22	0 00E+00	6 26E-03	1.57E-02
U-233	5 7451E-10	4,956 09	12,390.22	0 00E+00	2 85E-06	7.12E-06
U-234	4 3044E-06	4,956 09	12,390.22	0 00E+00	2 13E-02	5.33E-02
U-235	-7 7765E-09	4,956 09	0 00	2 01E-04	1.63E-04	2.01E-04
U-236	1 8050E-07	4,956 09	12,390.22	0 00E+00	8 95E-04	2.24E-03
U-238	-1 7914E-07	4,956 09	0 00	1.47E-02	1.38E-02	1 47E-02
Y-90	5 0088E-01	4,956 09	12,390 22	0 00E+00	2 48E+03	6.21E+03
Other Radionuclides					7 02E+03	1.76E+04

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-08	3,071 54	6,143 08	0 00E+00	7 35E-05	1.47E-04
Pm-147	1 6900E-02	3,071 54	6,143 08	0 00E+00	5 19E+01	1 04E+02
Pu-238	2 9808E+00	3,071 54	6,143 08	0 00E+00	9 16E+03	1 83E+04
Pu-239	4 1648E-01	3,071 54	6,143 08	0 00E+00	1 28E+03	2 56E+03
Pu-240	2 9264E-01	3,071 54	6,143 08	0 00E+00	8 99E+02	1 80E+03
Pu-241	4 8704E+01	3,071 54	6,143 08	0 00E+00	1 50E+05	2 99E+05
Pu-242	2 4560E-03	3,071 54	6,143 08	0 00E+00	7 54E+00	1 51E+01
Ra-226	6 4400E-08	3,071 54	6,143 08	0 00E+00	1 98E-04	3 96E-04
Ra-228	5 9952E-07	3,071 54	6,143 08	0 00E+00	1 84E-03	3 68E-03
Ru-106	8 5526E-07	3,071 54	6,143 08	0 00E+00	2 63E-03	5.25E-03
Se-79	1 9181E-04	3,071 54	6,143 08	0 00E+00	5 89E-01	1 18E+00
Sn-126	1 6671E-04	3,071 54	6,143 08	0 00E+00	5 12E-01	1 02E+00
Sr-90	1 9799E+01	3,071 54	6,143 08	0 00E+00	6 08E+04	1 22E+05
Tc-99	6 7678E-03	3,071 54	6,143 08	0 00E+00	2 08E+01	4 16E+01
Th-229	1.7488E-06	3,071 54	6,143 08	0 00E+00	5 37E-03	1 07E-02
Th-230	5 8704E-06	3,071 54	6,143 08	0 00E+00	1 80E-02	3 61E-02
Th-232	-4 2431E-09	3,071 54	0 00	1 83E-04	1 70E-04	1 83E-04
Tl-208	8 7573E-05	3,071 54	6,143 08	0 00E+00	2 69E-01	5 38E-01
U-232	2 3706E-04	3,071 54	6,143 08	0 00E+00	7 28E-01	1 46E+00
U-233	3 6128E-04	3,071 54	6,143 08	0 00E+00	1 11E+00	2 22E+00
U-234	1.2788E-02	3 071 54	6,143 08	0 00E+00	3 93E+01	7 86E+01
U-235	5.7486E-04	3,071 54	6,143 08	3 89E-03	1 77E+00	3 54E+00
U-236	2.3485E-04	3,071 54	6,143 08	0 00E+00	7 21E-01	1 44E+00
U-238	1.1581E-04	3,071 54	6,143 08	4 84E-04	3 56E-01	7.12E-01
Y-90	1 9804E+01	3,071.54	6,143 08	0 00E+00	6 08E+04	1 22E+05
Other Radionuclides					1 89E+05	3 79E+05

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+06
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 4086E-16	3,998 94	7,997 88	0 00E+00	9 63E-13	1 93E-12
Ru-106	1.5066E-05	3,998 94	7,997 88	0 00E+00	6 02E-02	1.20E-01
Se-79	1.0127E-05	3,998 94	7,997 88	0 00E+00	4 05E-02	8 10E-02
Sn-126	4 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 61E+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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 (Avg MeV)	Total Photons/sec (bounding)
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	Basis for Parameter Differences*
Reactor Moderator*	FAST	FAST	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	13 55265123	10 to 40	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate
Nominal	59 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-06	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-06	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-08	5,444.25	10,888 49	0 00E+00	7 43E-05	1 49E-04
U-233	1.0327E-08	5,444.25	10,888 49	0 00E+00	5 62E-05	1 12E-04
U-234	4 9103E-06	5,444 25	10,888 49	0 00E+00	2 67E-02	5 35E-02
U-235	-2 3191E-06	5,444 25	0 00	7 29E-02	6 02E-02	7 29E-02
U-236	1.2633E-05	5,444 25	10,888 49	0 00E+00	6 88E-02	1 38E-01
U-238	-9 5407E-08	5,444 25	0 00	3 28E-02	3 23E-02	3 28E-02
Y-90	8 4350E-01	5,444.25	10,888 49	0 00E+00	4 59E+03	9 18E+03
Other Radionuclides					5 34E+03	1 07E+04

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)
5.98E+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' 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 69081404	10 to 40

Basis for Parameter Drifferences:

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: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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+06
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 4086E-16	33 98	62.29	0 00E+00	8 18E-15	1 50E-14
Ru-106	1.5066E-05	33 98	62.29	0 00E+00	5 12E-04	9 38E-04
Se-79	1 0127E-05	33 98	62.29	0 00E+00	3 44E-04	6 31E-04
Sn-126	4 3902E-05	33 98	62.29	0 00E+00	1 49E-03	2.73E-03
Sr-90	5 0088E-01	33 98	62 29	0 00E+00	1 70E+01	3 12E+01
Tc-99	3 9412E-04	33 98	62 29	0 00E+00	1 34E-02	2.45E-02
Th-229	2 7219E-12	33 98	62 29	0 00E+00	9 25E-11	1 70E-10
Th-230	1 0441E-09	33 98	62 29	0 00E+00	3 55E-08	6 50E-08
Th-232	3 1689E-16	33 98	62.29	0 00E+00	1 08E-14	1 97E-14
Tl-208	4 6636E-07	33 98	62.29	0 00E+00	1.58E-05	2 90E-05
U-232	1.2638E-06	33 98	62.29	0 00E+00	4.29E-05	7 87E-05
U-233	5 7451E-10	33 98	62.29	0 00E+00	1.95E-08	3 58E-08
U-234	4 3044E-06	33 98	62.29	0 00E+00	1.46E-04	2 68E-04
U-235	-7 7765E-09	33 98	0 00	9.20E-07	6.56E-07	9.20E-07
U-236	1.8050E-07	33.98	62.29	0 00E+00	6 13E-06	1.12E-05
U-238	-1 7914E-07	33.98	0 00	6 70E-05	6 09E-05	6 70E-05
Y-90	5 0088E-01	33 98	62.29	0 00E+00	1.70E+01	3.12E+01
Other Radionuclides					4 81E+01	8 83E+01

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	[1]Fuel decay start date:	1989	Estimated Canister usage
SNF ID #: 86	Estimates as of	2030	18"x15'
Fuel Units & Descr: 1464 - CARBON COATED PART	Template	FSV (Graphite, Graphite, 60 to 100%, Th & U)	292 80
Heavy Metal Mass BOL=15366 583kg, EOL=14725.937kg	[2]Template Burnup(MWd):	1270.275	
ROD Storage Site: FSV	Template BOL Heavy Metal Mass (MT)	0 012702752	
	Template Decay Time:	35 years	

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_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-06	605,875 77	0 00	3 04E+00	1 99E+00	3 04E+00
U-236	8 6281E-06	605,875 77	722,229 41	0 00E+00	5 23E+00	6 23E+00
U-238	-5 6065E-09	605,875 77	0 00	3 02E-02	2 68E-02	3 02E-02
Y-90	1 2667E+00	605,875 77	722,229 41	0 00E+00	7 67E+05	9 15E+05
Other Radionuclides					7 72E+05	9 20E+05

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	Basis for Parameter Differences:
Reactor Moderator	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	93 15	60 to 100	

Burnup Summary (MWd)[2]

	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" 148 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	2.3082E-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 82E+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	8 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	6.59E+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	Basis for burnup used in estimate:
Nominal		145,508 60	Nominal burnup calculated from the heavy metal mass destroyed
Bounding	412 660 86	291,017.20	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	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-08	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	Basis for burnup used in estimate:
Nominal		76.23	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		152 45	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	[1]Fuel decay start date:	2035
SNF ID #	90	Estimates as of	2030
Fuel Units & Descr:	1 - CANISTER OF SCRAP	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=3 851kg EOL=3 071kg	[2]Template Burnup(MWd)	6 65
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT).	0 000195
		Template Decay Time:	5 years

Estimated Canister usage

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	1.641E+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 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	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-08	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-06	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)	[1]Fuel decay start date	1961
SNF ID #	95	Estimates as of	2030
Fuel Units & Descr	1 - CANISTER OF SCRAP	Template	Pathfinder (Light Water SST 60 to 100% U)
Heavy Metal Mass	BOL=0.074kg, EOL=0 074kg	[2]Template Burnup(MWd)	6 01
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00012882
		Template Decay Time	65 years

Estimated Canister usage 18"x10'
0 08

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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 7354E-10	1 40	2 79	0 00E+00	3 82E-10	7 64E-10
Th-232	8 3594E-12	1 40	2 79	0 00E+00	1 17E-11	2 33E-11
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 118E+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	7.542E+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-08	119 03	238 05	0 00E+00	6 91E-06	1.38E-05
Pb-210	1.2985E-12	119 03	238 05	0 00E+00	1 55E-10	3 09E-10
Pm-147	2 2196E-05	119 03	238 05	0 00E+00	2 64E-03	5.28E-03
Pu-238	2 6223E-04	119 03	238 05	0 00E+00	3 12E-02	6.24E-02
Pu-239	6 6739E-04	119 03	238 05	0 00E+00	7.94E-02	1 59E-01
Pu-240	8 6705E-05	119 03	238 05	0 00E+00	1.03E-02	2 06E-02
Pu-241	3 4759E-04	119 03	238 05	0 00E+00	4.14E-02	8.27E-02
Pu-242	1.9717E-09	119 03	238 05	0 00E+00	2.35E-07	4 69E-07
Ra-226	3 0000E-12	119 03	238 05	0 00E+00	3.57E-10	7 14E-10
Ra-228	8.3328E-12	119 03	238 05	0 00E+00	9 92E-10	1 98E-09
Ru-106	6.1464E-15	119 03	238 05	0 00E+00	7.32E-13	1 46E-12
Se-79	1.3221E-05	119 03	238 05	0 00E+00	1 57E-03	3 15E-03
Sn-126	1 1491E-05	119 03	238 05	0 00E+00	1.37E-03	2 74E-03
Sr-90	9 5541E-01	119 03	238 05	0 00E+00	1 14E+02	2 27E+02
Tc-99	4 6656E-04	119 03	238 05	0 00E+00	5 55E-02	1 11E-01
Th-229	1 9085E-11	119 03	238 05	0 00E+00	2.27E-09	4 54E-09
Th-230	2 1913E-10	119 03	238 05	0 00E+00	2 61E-08	5.22E-08
Th-232	8.3478E-12	119 03	238 05	0 00E+00	9 94E-10	1 99E-09
Tl-208	1 8752E-08	119 03	238 05	0 00E+00	2.23E-06	4 46E-06
U-232	5 0782E-08	119 03	238 05	0 00E+00	6 04E-06	1 21E-05
U-233	3.2596E-09	119 03	238 05	0 00E+00	3 88E-07	7 76E-07
U-234	3 9817E-07	119 03	238 05	0 00E+00	4 74E-05	9 48E-05
U-235	-2.7761E-06	119 03	0 00	9 14E-03	8 81E-03	9 14E-03
U-236	1 6190E-05	119 03	238 05	0 00E+00	1 93E-03	3 85E-03
U-238	-2 8547E-09	119 03	0 00	1 05E-04	1 04E-04	1 05E-04
Y-90	9 5557E-01	119 03	238 05	0 00E+00	1 14E+02	2 27E+02
Other Radionuclides					1 45E+02	2 90E+02

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+06
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+00	2.78E+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 %	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 #: 864
Fuel Units & Descr: 12 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=25 088kg, 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-06	4,021 39	8,042 78	0 00E+00	3 05E-02	6 10E-02
U-238	-2 6129E-07	4,021 39	0 00	8.19E-03	7 14E-03	8 19E-03
Y-90	6 4180E-01	4,021 39	8,042 78	0 00E+00	2 58E+03	5 16E+03
Other Radionuclides					3 83E+03	7 66E+03

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 66E-01	1 01E-01	1 66E-01
U-236	1.6701E-05	22,675 71	45,351 43	0 00E+00	3 79E-01	7 57E-01
U-238	-9 4194E-09	22,675 71	0 00	1 92E-03	1 71E-03	1 92E-03
Y-90	9 3439E-01	22,675 71	45,351 43	0 00E+00	2 12E+04	4 24E+04
Other Radionuclides					2 22E+04	4 44E+04

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)
3.56E+02	7.12E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 08510638	40 to 100	

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	3.1981E-08	2,061 43	4,122 86	0 00E+00	6 59E-05	1 32E-04
Th-232	5 3633E-14	2,061 43	4,122 86	0 00E+00	1.11E-10	2.21E-10
Tl-208	3.7406E-08	2,061 43	4,122.86	0 00E+00	7.71E-05	1.54E-04
U-232	1 0134E-07	2,061 43	4,122 86	0 00E+00	2.09E-04	4 18E-04
U-233	9 2892E-09	2,061 43	4,122 86	0 00E+00	1 91E-05	3 83E-05
U-234	6 6403E-05	2,061 43	4,122 86	0 00E+00	1 37E-01	2.74E-01
U-235	-2.8661E-06	2,061 43	0 00	1 51E-02	9.22E-03	1 51E-02
U-236	1 6701E-05	2,061 43	4,122 86	0.00E+00	3 44E-02	6 89E-02
U-238	-9 4194E-09	2,061 43	0 00	1.75E-04	1 55E-04	1.75E-04
Y-90	9 3439E-01	2,061 43	4,122 86	0 00E+00	1 93E+03	3 85E+03
Other Radionuclides					2 02E+03	4 04E+03

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

Burnup Summary (MWd)[2]

	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

Radionuclide	m Cu/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_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	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-08	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+06
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	[1]Fuel decay start date:	1979
SNF ID #	861	Estimates as of	2030
Fuel Units & Descr	14 - CANISTER OF SCRAP	Template	LWBR (Light Water, Zirc, 60 to 100% Th and U)
Heavy Metal Mass	BOL=243 783kg EOL=243 755kg	[2]Template Burnup(MWd):	10269 14
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 45991251
		Template Decay Time	50 years

Estimated Canister usage
18"x10'
1 00

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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 07E+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
Nominal		27.25
Bounding		54 50

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	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)	[1]Fuel decay start date:	1975
SNF ID #:	127	Estimates as of.	2030
Fuel Units & Descr.	4 - 15 X 15 ROD ARRAY	Template:	PWR (Light Water Zirc, 0 to 5%, U)
Heavy Metal Mass.	BOL=814 001kg; EOL=813.286kg	[2]Template Burnup(MWd):	61 92
ROD Storage Site.	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time:	50 years

Estimated Canister usage: 18"x10" 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+06
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	5 02E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents.	U	U	
BOL Enrichment %:	4 047	0 to 5	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	200 85	169 84	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	277 17	339 68	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 03	0 85	1 00
Bounding	0 04	1.23	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name:	LOFT CENTER FUEL MODULE FP-2 REMAINS	[1]Fuel decay start date.	1975
SNF ID #:	923	Estimates as of:	2030
Fuel Units & Descr:	10 - CANISTER OF SCRAP	Template	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass:	BOL=99 951kg, EOL=99 899kg	[2]Template Burnup(MWd).	61 92
ROD Storage Site:	INEEL	Template BOL Heavy Metal Mass (MT)	0.00176911
		Template Decay Time	50 years

Estimated Canister usage
18"x10'
1 00

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	[1]Fuel decay start date	1975
SNF ID #	128	Estimates as of	2030
Fuel Units & Descr	4 - 11 X 11 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5% U)
Heavy Metal Mass	BOL=279 864kg EOL=279 053kg	[2]Template Burnup(MWd)	61.92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage
18"x10'
2 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	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-08	11 83	23 65	0 00E+00	3 31E-07	6 62E-07
Th-232	5 3036E-12	11 83	23 65	0 00E+00	6 27E-11	1.25E-10
Tl-208	1 5136E-07	11 83	23 65	0 00E+00	1 79E-06	3 58E-06
U-232	4 1005E-07	11 83	23 65	0.00E+00	4 85E-06	9.70E-06
U-233	2 5856E-08	11 83	23 65	0.00E+00	3 06E-07	6.12E-07
U-234	5 2665E-05	11 83	23 65	0 00E+00	6 23E-04	1.25E-03
U-235	-1 4487E-06	11 83	0 00	1.32E-04	1.15E-04	1.32E-04
U-236	7 5888E-06	11 83	23 65	0 00E+00	8 97E-05	1.79E-04
U-238	-2 6129E-07	11 83	0 00	6.20E-04	6 17E-04	6.20E-04
Y-90	6 4180E-01	11 83	23 65	0 00E+00	7 59E+00	1.52E+01
Other Radionuclides					1 13E+01	2.25E+01

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 365E+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	[1]Fuel decay start date	1975
SNF ID #.	129	Estimates as of.	2030
Fuel Units & Descr.	4 - 15 X 15 ROD ARRAY	Template	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=815 6kg EOL=813.026kg	[2]Template Burnup(MWd)	61.92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage.
18"x10'
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-08	2,447.37	4,894 74	0 00E+00	6 33E-05	1 27E-04
U-234	5.2665E-05	2,447.37	4,894 74	0 00E+00	1.29E-01	2 58E-01
U-235	-1 4487E-06	2,447.37	0 00	7 05E-02	6 70E-02	7 05E-02
U-236	7.5888E-06	2,447.37	4,894 74	0 00E+00	1 86E-02	3 71E-02
U-238	-2 6129E-07	2,447.37	0 00	2 63E-01	2 63E-01	2 63E-01
Y-90	6 4180E-01	2,447.37	4,894 74	0 00E+00	1 57E+03	3 14E+03
Other Radionuclides					2 33E+03	4 66E+03

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-06	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 608E+14
1.2500	1.598E+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)	[1]Fuel decay start date	1983
SNF ID #	940	Estimates as of	2030
Fuel Units & Descr:	9 - CANISTER OF SCRAP	Template	PWR (Light Water, Zirc 0 to 5%, U)
Heavy Metal Mass:	BOL=161 862kg EOL=154.224kg	[2]Template Burnup(MWd)	61.92
ROD Storage Site:	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	35 years

Estimated Canister usage: 18"x10' — 0 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 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 7684E-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)
1.67E+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 553E+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+06
7 0000	9 593E+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)	[1]Fuel decay start date	1994
SNF ID #	369	Estimates as of	2030
Fuel Units & Descr	1 - UNKNOWN	Template	(Worst Case)
Heavy Metal Mass	BOL= ; EOL=0 12kg	[2]Template Burnup(MWd)	62.5
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00186865
		Template Decay Time	35 years

Estimated Canister usage 18"x10' 0 01

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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	6.0208E-07	114 14	114 14	0 00E+00	6 87E-05	6 87E-05
Tl-208	8.7573E-05	114 14	114 14	0 00E+00	1 00E-02	1 00E-02
U-232	2 3706E-04	114 14	114.14	0 00E+00	2.71E-02	2.71E-02
U-233	3 6128E-04	114.14	114 14	0 00E+00	4 12E-02	4.12E-02
U-234	1 2788E-02	114.14	114 14	0.00E+00	1 46E+00	1.46E+00
U-235	5 7486E-04	114 14	114.14	1.03E-04	6.57E-02	6.57E-02
U-236	2.3485E-04	114 14	114 14	0 00E+00	2.68E-02	2 68E-02
U-238	1 1581E-04	114 14	114 14	1.29E-05	1.32E-02	1.32E-02
Y-90	1 9804E+01	114 14	114 14	0 00E+00	2.26E+03	2.26E+03
Other Radionuclides					7.04E+03	7.04E+03

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 6
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+05
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_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	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-08	4,521 60	9,043.20	0 00E+00	3 78E-04	7 55E-04
Th-232	3 8371E-14	4,521 60	9,043.20	0 00E+00	1 74E-10	3 47E-10
Tl-208	4 0414E-08	4,521 60	9,043.20	0 00E+00	1 83E-04	3 65E-04
U-232	1 0948E-07	4,521 60	9,043.20	0 00E+00	4 95E-04	9 90E-04
U-233	3 6275E-09	4,521 60	9,043 20	0 00E+00	1 64E-05	3.28E-05
U-234	1 8562E-04	4,521 60	9,043.20	0 00E+00	8.39E-01	1 68E+00
U-235	-2 7235E-06	4,521.60	0 00	5 08E-02	3 84E-02	5 08E-02
U-236	1 5493E-05	4,521.60	9,043.20	0 00E+00	7 01E-02	1 40E-01
U-238	-4 2851E-09	4,521 60	0 00	5 49E-04	5 29E-04	5 49E-04
Y-90	1 3475E+00	4,521.60	9,043.20	0 00E+00	6 09E+03	1 22E+04
Other Radionuclides					6.19E+03	1 24E+04

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	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.5	60 to 100	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	4,521 60	3,215.32	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	Estimated EOL HM/Given EOL HM
Nominal	0 57	0 71	0 95
Bounding	1 14		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name	MURR (UALX) COLUMBIA	[1]Fuel decay start date	1985
SNF ID #	962	Estimates as of	2030
Fuel Units & Descr.	24 - 24 CURVED PLATES	Template	ATR (Light Water, Alum , 60 to 100%, U)
Heavy Metal Mass	BOL=18 84kg EOL=16.294kg	[2]Template Burnup(MWd)	367.2
ROD Storage Site	SRS	Template BOL Heavy Metal Mass (MT)	0 00116689
		Template Decay Time	35 years

Estimated Canister usage 18"x10'
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 581E+03
5 0000	2.281E+03
7.0000	2.496E+02
11 0000	2 783E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 828E+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: 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	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	1.35E+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 5661E-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+06
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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 481E+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
Nominal		15 04
Bounding		30 09

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 40	
Bounding	0 81	

Estimated EOL HM/Given EOL HM: 0 98

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

[2]Total burnup for all fuel associated with this worksheet must be 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-08	9,621.24	19,242 47	0 00E+00	4 35E-04	8 71E-04
Pb-210	6 4476E-13	9,621.24	19,242.47	0 00E+00	6 20E-09	1.24E-08
Pm-147	1 1651E-03	9 621.24	19,242 47	0 00E+00	1 12E+01	2 24E+01
Pu-238	2 9517E-04	9,621.24	19,242 47	0 00E+00	2 84E+00	5 68E+00
Pu-239	6 6772E-04	9,621.24	19,242.47	0 00E+00	6 42E+00	1 28E+01
Pu-240	8 6839E-05	9,621.24	19,242.47	0 00E+00	8 35E-01	1 67E+00
Pu-241	7 1514E-04	9 621.24	19,242 47	0 00E+00	6 88E+00	1 38E+01
Pu-242	1 9717E-09	9,621.24	19,242 47	0 00E+00	1 90E-05	3 79E-05
Ra-226	1 7654E-12	9,621.24	19,242 47	0 00E+00	1 70E-08	3 40E-08
Ra-228	8 2928E-12	9,621.24	19,242 47	0 00E+00	7 98E-08	1 60E-07
Ru-106	1 8419E-10	9,621.24	19,242 47	0 00E+00	1 77E-06	3 54E-06
Se-79	1 3223E-05	9,621.24	19,242 47	0 00E+00	1 27E-01	2 54E-01
Sn-126	1 1493E-05	9,621.24	19,242 47	0 00E+00	1.11E-01	2.21E-01
Sr-90	1 3649E+00	9,621.24	19,242 47	0 00E+00	1 31E+04	2 63E+04
Tc-99	4 6656E-04	9,621.24	19,242 47	0 00E+00	4 49E+00	8 98E+00
Th-229	1 4547E-11	9,621.24	19,242 47	0 00E+00	1 40E-07	2.80E-07
Th-230	1 6617E-10	9,621.24	19,242 47	0 00E+00	1 60E-06	3.20E-06
Th-232	8 3361E-12	9,621.24	19,242 47	0 00E+00	8 02E-08	1 60E-07
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	2.581E+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
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	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	8.927E+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	1.04E+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	Basis for burnup used in estimate:
Nominal	809 75	7 493 51	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding	943.26	14 987 01	Bounding burnup assumed to be twice nominal burnup

Checks

	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	Basis for Parameter Differences:
Reactor Moderator	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	93 333	60 to 100	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		176.28	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-05	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+06
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	Basis for Parameter Differences:
Reactor Moderator	GRAPHITE	GRAPHITE	
Fuel Cladding	GRAPHITE	GRAPHITE	
BOL HM Constituents	Th and U	Th and U	
BOL Enrichment %	93.1525882	60 to 100	

Burnup Summary (MWd)[2]

	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
Nominal	0.26	
Bounding	0 31	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 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-208	5 1524E-04	94,003 34	101,007 91	0 00E+00	4 84E+01	5.20E+01
U-232	1.3950E-03	94,003 34	101,007 91	0 00E+00	1.31E+02	1 41E+02
U-233	2 0602E-03	94,003 34	101,007 91	0 00E+00	1.94E+02	2 08E+02
U-234	2 9513E-04	94,003 34	101,007 91	0 00E+00	2.77E+01	2 98E+01
U-235	-1 7343E-06	94,003 34	0 00	2.75E-01	1.12E-01	2 75E-01
U-236	8 6281E-06	94,003 34	101,007 91	0 00E+00	8 11E-01	8 72E-01
U-238	-5 6065E-09	94,003.34	0 00	2 73E-03	2.21E-03	2 73E-03
Y-90	8.8642E-01	94,003.34	101,007 91	0 00E+00	8 33E+04	8 95E+04
Other Radionuclides					8 49E+04	9 13E+04

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)
1.50E+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	[1]Fuel decay start date	1983
SNF ID #	430	Estimates as of	2030
Fuel Units & Descr	1 - EXPERIMENT CAPSULE	Template	Pathfinder (Light Water, SST, 60 to 100%, U)
Heavy Metal Mass	BOL= , EOL=23 628kg	[2]Template Burnup(MWd):	6 01
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00012882
		Template Decay Time	35 years

Estimated Canister usage

18"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 666E+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[1]	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	[1]Fuel decay start date.	1984
SNF ID #	431	Estimates as of:	2030
Fuel Units & Descr:	1 - EXPERIMENT CAPSULE	Template:	Pathfinder (Light Water, SST, 60 to 100%, U)
Heavy Metal Mass:	BOL= , EOL=20 631kg	[2]Template Burnup(MWd):	6 01
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT):	0 00012882
		Template Decay Time:	35 years

Estimated Canister usage, 18"x15': 0 07

II. Estimates

Radionuclide	m: C/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 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+08
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 629E+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	2.18E+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 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 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	9 31	9.31	0 00E+00	2 15E-05	2 15E-05
Am-241	8 4448E+00	9 31	9 31	0 00E+00	7 87E+01	7 87E+01
Am-242m	1 6848E-02	9 31	9 31	0 00E+00	1 57E-01	1 57E-01
Am-243	1 6320E-02	9 31	9 31	0 00E+00	1 52E-01	1 52E-01
C-14	1 2090E-01	9 31	9 31	0 00E+00	1 13E+00	1 13E+00
Cl-36	2 2849E-03	9 31	9 31	0 00E+00	2 13E-02	2 13E-02
Cm-243	8 6624E-04	9 31	9 31	0 00E+00	8 07E-03	8 07E-03
Cm-244	1 6848E-01	9 31	9 31	0 00E+00	1 57E+00	1 57E+00
Co-60	2 8086E+01	9 31	9 31	0 00E+00	2 62E+02	2 62E+02
Cs-134	3 4148E-04	9 31	9 31	0 00E+00	3 18E-03	3.18E-03
Cs-135	4 3976E-04	9 31	9 31	0 00E+00	4.10E-03	4.10E-03
Cs-137	2 1049E+01	9 31	9 31	0 00E+00	1 96E+02	1.96E+02
Eu-154	1.2500E+00	9 31	9 31	0 00E+00	1.16E+01	1.16E+01
Eu-155	6 8986E-02	9 31	9 31	0 00E+00	6 42E-01	6 42E-01
Fe-55	2.9308E-01	9 31	9 31	0 00E+00	2 73E+00	2.73E+00
H-3	2.4311E-01	9 31	9 31	0 00E+00	2.26E+00	2.26E+00
I-129	1.0618E-05	9 31	9 31	0 00E+00	9 89E-05	9 89E-05
Kr-85	5 9882E-01	9 31	9 31	0 00E+00	5.58E+00	5.58E+00
Np-237	1.5668E-04	9 31	9 31	0 00E+00	1.46E-03	1 46E-03
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
U-233	3 6128E-04	9.31	9 31	0 00E+00	3 36E-03	3 36E-03
U-234	1.2788E-02	9.31	9 31	0 00E+00	1 19E-01	1 19E-01
U-235	5 7486E-04	9.31	9 31	8 43E-06	5.36E-03	5 36E-03
U-236	2.3485E-04	9.31	9.31	0 00E+00	2 19E-03	2 19E-03
U-238	1 1581E-04	9.31	9.31	1 05E-06	1 08E-03	1 08E-03
Y-90	1 9804E+01	9 31	9.31	0 00E+00	1 84E+02	1 84E+02
Other Radionuclides					5 74E+02	5 74E+02

Gamma Sources

Photon Energy Group (Avg MeV)	Total Photons/sec (bounding)
0 0150	1 141E+13
0 0250	2.271E+12
0 0375	1.984E+12
0 0575	3 122E+12
0 0850	1.218E+12
0 1250	9.549E+11
0.2250	1 056E+12
0.3750	4 515E+11
0 5750	7.341E+12
0 8500	2.806E+11
1.2500	1 961E+13
1 7500	8 675E+09
2.2500	1 028E+08
2 7500	2.898E+07
3 5000	2 319E+04
5 0000	9 850E+03
7 0000	1 128E+03
11 0000	1.291E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9 18E+00	9.29E+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	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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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-08	54 74	54 74	0 00E+00	1 31E-06	1 31E-06
Pm-147	1 6900E-02	54 74	54 74	0 00E+00	9.25E-01	9 25E-01
Pu-238	-8 6120E-01	54 74	0 00	1 48E+01	0 00E+00	1 48E+01
Pu-239	-4 8440E-02	54 74	0 00	1 79E+00	0 00E+00	1.79E+00
Pu-240	-3 0095E-01	54 74	0 00	2.29E+00	0 00E+00	2.29E+00
Pu-241	-1 0411E+02	54 74	0 00	5 89E+02	0 00E+00	5 89E+02
Pu-242	-1.1381E-04	54 74	0 00	9 90E-03	3 67E-03	9 90E-03
Ra-226	6 4400E-08	54 74	54 74	0 00E+00	3 53E-06	3 53E-06
Ra-228	5 9952E-07	54 74	54 74	0 00E+00	3.28E-05	3.28E-05
Ru-106	8 5526E-07	54 74	54 74	0 00E+00	4 68E-05	4 68E-05
Se-79	1 9181E-04	54 74	54 74	0 00E+00	1.05E-02	1 05E-02
Sn-126	1 6671E-04	54 74	54 74	0 00E+00	9.13E-03	9 13E-03
Sr-90	1 9799E+01	54 74	54 74	0 00E+00	1 08E+03	1 08E+03
Tc-99	6 7678E-03	54 74	54 74	0 00E+00	3.70E-01	3.70E-01
Th-229	1 7488E-06	54 74	54 74	0 00E+00	9 57E-05	9 57E-05
Th-230	5 8704E-06	54 74	54 74	0 00E+00	3.21E-04	3.21E-04
Th-232	6 0208E-07	54 74	54 74	0 00E+00	3 30E-05	3.30E-05
Tl-208	8 7573E-05	54 74	54 74	0 00E+00	4 79E-03	4.79E-03
U-232	2 3706E-04	54 74	54 74	0 00E+00	1 30E-02	1.30E-02
U-233	3 6128E-04	54 74	54 74	0 00E+00	1 98E-02	1.98E-02
U-234	1 2788E-02	54 74	54 74	0 00E+00	7 00E-01	7.00E-01
U-235	5 7486E-04	54 74	54 74	4 96E-05	3 15E-02	3.15E-02
U-236	2 3485E-04	54 74	54 74	0 00E+00	1.29E-02	1.29E-02
U-238	1 1581E-04	54 74	54 74	6 17E-06	6 35E-03	6.35E-03
Y-90	1 9804E+01	54 74	54 74	0 00E+00	1 08E+03	1 08E+03
Other Radionuclides					3 38E+03	3 38E+03

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 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 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 3072E-06	2,318 86	2,318 86	0 00E+00	5.35E-03	5.35E-03
Am-241	8 4448E+00	2,318 86	2,318 86	0 00E+00	1 96E+04	1 96E+04
Am-242m	1 6848E-02	2,318 86	2,318 86	0 00E+00	3 91E+01	3 91E+01
Am-243	1 6320E-02	2,318 86	2,318 86	0 00E+00	3 78E+01	3 78E+01
C-14	1 2090E-01	2,318 86	2,318 86	0 00E+00	2 80E+02	2 80E+02
Cl-36	2 2849E-03	2,318 86	2,318 86	0 00E+00	5 30E+00	5.30E+00
Cm-243	8 6624E-04	2,318 86	2,318 86	0 00E+00	2 01E+00	2 01E+00
Cm-244	1 6848E-01	2,318 86	2,318 86	0.00E+00	3 91E+02	3 91E+02
Co-60	2 8086E+01	2,318 86	2,318 86	0.00E+00	6 51E+04	6.51E+04
Cs-134	3 4148E-04	2,318 86	2,318 86	0 00E+00	7 92E-01	7.92E-01
Cs-135	4 3976E-04	2,318 86	2,318 86	0 00E+00	1 02E+00	1 02E+00
Cs-137	2 1049E+01	2,318 86	2,318 86	0 00E+00	4 88E+04	4 88E+04
Eu-154	1 2500E+00	2,318 86	2,318 86	0.00E+00	2 90E+03	2 90E+03
Eu-155	6 8986E-02	2,318 86	2,318 86	0 00E+00	1 60E+02	1 60E+02
Fe-55	2 9308E-01	2,318 86	2,318 86	0 00E+00	6 80E+02	6 80E+02
H-3	2 4311E-01	2,318 86	2,318 86	0 00E+00	5 64E+02	5 64E+02
I-129	1 0618E-05	2,318 86	2,318 86	0 00E+00	2 46E-02	2.46E-02
Kr-85	5 9882E-01	2,318 86	2,318 86	0.00E+00	1 39E+03	1.39E+03
Np-237	1.5668E-04	2,318 86	2,318 86	0 00E+00	3 63E-01	3 63E-01
Pa-231	2 8656E-06	2,318 86	2,318 86	0.00E+00	6 64E-03	6 64E-03
Pb-210	2.3918E-08	2,318 86	2,318 86	0 00E+00	5 55E-05	5.55E-05
Pm-147	1 6900E-02	2,318 86	2,318 86	0.00E+00	3 92E+01	3 92E+01
Pu-238	-8 6120E-01	2,318 86	0 00	6.27E+02	0 00E+00	6.27E+02
Pu-239	-4 8440E-02	2,318 86	0 00	7.59E+01	0 00E+00	7.59E+01
Pu-240	-3 0095E-01	2,318 86	0 00	9 69E+01	0 00E+00	9 69E+01
Pu-241	-1 0411E+02	2,318 86	0 00	2.49E+04	0 00E+00	2 49E+04
Pu-242	-1 1381E-04	2,318 86	0 00	4 19E-01	1 56E-01	4 19E-01
Ra-226	6 4400E-08	2,318 86	2,318 86	0 00E+00	1 49E-04	1.49E-04
Ra-228	5 9952E-07	2,318 86	2,318 86	0.00E+00	1 39E-03	1.39E-03
Ru-106	8 5526E-07	2,318 86	2,318 86	0 00E+00	1 98E-03	1.98E-03
Se-79	1 9181E-04	2,318 86	2,318 86	0 00E+00	4 45E-01	4.45E-01
Sn-126	1 6671E-04	2,318 86	2,318 86	0 00E+00	3 87E-01	3.87E-01
Sr-90	1 9799E+01	2,318 86	2,318 86	0.00E+00	4 59E+04	4 59E+04
Tc-99	6 7678E-03	2,318 86	2,318 86	0 00E+00	1 57E+01	1.57E+01
Th-229	1 7488E-06	2,318 86	2,318 86	0 00E+00	4 06E-03	4 06E-03
Th-230	5 8704E-06	2,318 86	2,318 86	0 00E+00	1 36E-02	1.36E-02
Th-232	6 0208E-07	2,318 86	2,318 86	0 00E+00	1 40E-03	1.40E-03
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

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg MeV	
0 0150	2 842E+15
0.0250	5 655E+14
0 0375	4 939E+14
0 0575	7 772E+14
0 0850	3 034E+14
0 1250	2.378E+14
0.2250	2 628E+14
0.3750	1 124E+14
0 5750	1.828E+15
0.8500	6 985E+13
1.2500	4 883E+15
1 7500	2 160E+12
2.2500	2 561E+10
2 7500	7.216E+09
3.5000	5 775E+06
5 0000	2 452E+06
7 0000	2.808E+05
11.0000	3 214E+04

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)
6 06E+02	6 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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-06	52.27	52.27	0 00E+00	1 50E-04	1 50E-04
Pb-210	2 3918E-08	52 27	52.27	0 00E+00	1 25E-06	1.25E-06
Pm-147	1 6900E-02	52.27	52.27	0 00E+00	8 83E-01	8 83E-01
Pu-238	-8 6120E-01	52 27	0 00	1.41E+01	0 00E+00	1 41E+01
Pu-239	-4 8440E-02	52.27	0 00	1.71E+00	0 00E+00	1 71E+00
Pu-240	-3 0095E-01	52.27	0 00	2.18E+00	0 00E+00	2 18E+00
Pu-241	-1 0411E+02	52 27	0 00	5 62E+02	0 00E+00	5 62E+02
Pu-242	-1 1381E-04	52 27	0 00	9 45E-03	3 51E-03	9 45E-03
Ra-226	6 4400E-08	52.27	52.27	0 00E+00	3 37E-06	3 37E-06
Ra-228	5 9952E-07	52.27	52.27	0.00E+00	3 13E-05	3 13E-05
Ru-106	8 5526E-07	52.27	52.27	0 00E+00	4 47E-05	4 47E-05
Se-79	1 9181E-04	52.27	52.27	0 00E+00	1 00E-02	1 00E-02
Sn-126	1 6671E-04	52.27	52.27	0 00E+00	8 71E-03	8 71E-03
Sr-90	1 9799E+01	52.27	52.27	0 00E+00	1 03E+03	1 03E+03
Tc-99	6.7678E-03	52.27	52.27	0 00E+00	3 54E-01	3 54E-01
Th-229	1.7488E-06	52.27	52.27	0 00E+00	9 14E-05	9 14E-05
Th-230	5 8704E-06	52.27	52.27	0 00E+00	3 07E-04	3 07E-04
Th-232	6 0208E-07	52.27	52.27	0 00E+00	3 15E-05	3 15E-05
Tl-208	8.7573E-05	52.27	52.27	0 00E+00	4 58E-03	4 58E-03
U-232	2.3706E-04	52.27	52.27	0 00E+00	1 24E-02	1.24E-02
U-233	3 6128E-04	52.27	52.27	0 00E+00	1 89E-02	1 89E-02
U-234	1.2788E-02	52.27	52.27	0 00E+00	6 68E-01	6 68E-01
U-235	5 7486E-04	52.27	52.27	4.73E-05	3 01E-02	3 01E-02
U-236	2.3485E-04	52.27	52.27	0 00E+00	1 23E-02	1.23E-02
U-238	1.1581E-04	52.27	52.27	5 89E-06	6 06E-03	6 06E-03
Y-90	1 9804E+01	52.27	52.27	0 00E+00	1 04E+03	1 04E+03
Other Radionuclides					3 22E+03	3.22E+03

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 4148E-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-08	57 02	57 02	0 00E+00	1.36E-06	1 36E-06
Pm-147	1 6900E-02	57 02	57 02	0 00E+00	9 64E-01	9 64E-01
Pu-238	-8 6120E-01	57 02	0 00	1.54E+01	0 00E+00	1 54E+01
Pu-239	-4 8440E-02	57 02	0 00	1 87E+00	0 00E+00	1 87E+00
Pu-240	-3 0095E-01	57 02	0 00	2 38E+00	0 00E+00	2 38E+00
Pu-241	-1 0411E+02	57 02	0 00	6 13E+02	0 00E+00	6 13E+02
Pu-242	-1.1381E-04	57 02	0 00	1 03E-02	3 82E-03	1 03E-02
Ra-226	6 4400E-08	57 02	57 02	0 00E+00	3.67E-06	3 67E-06
Ra-228	5 9952E-07	57 02	57 02	0 00E+00	3 42E-05	3 42E-05
Ru-106	8 5526E-07	57 02	57 02	0 00E+00	4 88E-05	4 88E-05
Se-79	1 9181E-04	57.02	57 02	0 00E+00	1 09E-02	1.09E-02
Sn-126	1 6671E-04	57 02	57 02	0 00E+00	9 51E-03	9 51E-03
Sr-90	1 9799E+01	57 02	57.02	0 00E+00	1.13E+03	1.13E+03
Tc-99	6 7678E-03	57 02	57.02	0 00E+00	3 86E-01	3 86E-01
Th-229	1 7488E-06	57 02	57.02	0 00E+00	9 97E-05	9 97E-05
Th-230	5 8704E-06	57 02	57.02	0 00E+00	3 35E-04	3 35E-04
Th-232	6 0208E-07	57.02	57.02	0 00E+00	3 43E-05	3 43E-05
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-08	132 10	132 10	0 00E+00	3 16E-06	3.16E-06
Pm-147	1 6900E-02	132 10	132 10	0 00E+00	2 23E+00	2.23E+00
Pu-238	-8 6120E-01	132 10	0 00	3 57E+01	0 00E+00	3 57E+01
Pu-239	-4 8440E-02	132 10	0 00	4 32E+00	0 00E+00	4.32E+00
Pu-240	-3 0095E-01	132 10	0 00	5 52E+00	0 00E+00	5 52E+00
Pu-241	-1 0411E+02	132 10	0 00	1 42E+03	0 00E+00	1 42E+03
Pu-242	-1 1381E-04	132.10	0 00	2.39E-02	8 86E-03	2.39E-02
Ra-226	6 4400E-08	132 10	132 10	0 00E+00	8 51E-06	8.51E-06
Ra-228	5 9952E-07	132 10	132 10	0 00E+00	7 92E-05	7 92E-05
Ru-106	8 5526E-07	132 10	132 10	0 00E+00	1 13E-04	1.13E-04
Se-79	1 9181E-04	132 10	132.10	0 00E+00	2 53E-02	2.53E-02
Sn-126	1 6671E-04	132 10	132.10	0 00E+00	2.20E-02	2.20E-02
Sr-90	1 9799E+01	132 10	132 10	0 00E+00	2.62E+03	2 62E+03
Tc-99	6 7678E-03	132 10	132 10	0 00E+00	8 94E-01	8.94E-01
Th-229	1 7488E-06	132 10	132 10	0 00E+00	2 31E-04	2.31E-04
Th-230	5 8704E-06	132 10	132 10	0 00E+00	7.75E-04	7.75E-04
Th-232	6 0208E-07	132 10	132.10	0 00E+00	7 95E-05	7.95E-05
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 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	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-08	65 57	65 57	0 00E+00	1.57E-06	1 57E-06
Pm-147	1 6900E-02	65 57	65 57	0 00E+00	1.11E+00	1 11E+00
Pu-238	-8 6120E-01	65 57	0 00	1.77E+01	0 00E+00	1 77E+01
Pu-239	-4 8440E-02	65 57	0 00	2.15E+00	0 00E+00	2 15E+00
Pu-240	-3 0095E-01	65 57	0 00	2.74E+00	0 00E+00	2 74E+00
Pu-241	-1 0411E+02	65 57	0 00	7 05E+02	0 00E+00	7 05E+02
Pu-242	-1 1381E-04	65.57	0 00	1 19E-02	4 40E-03	1 19E-02
Ra-226	6 4400E-08	65.57	65.57	0 00E+00	4.22E-06	4 22E-06
Ra-228	5 9952E-07	65 57	65.57	0 00E+00	3 93E-05	3 93E-05
Ru-106	8 5526E-07	65 57	65 57	0 00E+00	5 61E-05	5 61E-05
Se-79	1 9181E-04	65 57	65.57	0 00E+00	1.26E-02	1.26E-02
Sn-126	1 6671E-04	65 57	65 57	0 00E+00	1 09E-02	1 09E-02
Sr-90	1.9799E+01	65 57	65 57	0 00E+00	1 30E+03	1.30E+03
Tc-99	6 7678E-03	65 57	65 57	0 00E+00	4 44E-01	4 44E-01
Th-229	1.7488E-06	65 57	65 57	0 00E+00	1.15E-04	1.15E-04
Th-230	5 8704E-06	65.57	65.57	0 00E+00	3 85E-04	3 85E-04
Th-232	6 0208E-07	65.57	65.57	0 00E+00	3.95E-05	3 95E-05
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 (Avg MeV)	Total Photons/sec (bounding)
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 46E+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 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	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-08	330 72	330 72	0 00E+00	7 91E-06	7 91E-06
Pm-147	1 6900E-02	330 72	330 72	0 00E+00	5 59E+00	5 59E+00
Pu-238	-8 6120E-01	330 72	0 00	8 94E+01	0 00E+00	8 94E+01
Pu-239	-4 8440E-02	330 72	0 00	1 08E+01	0 00E+00	1 08E+01
Pu-240	-3 0095E-01	330 72	0 00	1 38E+01	0 00E+00	1.38E+01
Pu-241	-1 0411E+02	330 72	0 00	3 56E+03	0 00E+00	3.56E+03
Pu-242	-1 1381E-04	330 72	0 00	5 98E-02	2.22E-02	5 98E-02
Ra-226	6 4400E-08	330 72	330 72	0 00E+00	2.13E-05	2.13E-05
Ra-228	5 9952E-07	330 72	330 72	0 00E+00	1.98E-04	1 98E-04
Ru-106	8 5526E-07	330 72	330 72	0 00E+00	2 83E-04	2 83E-04
Se-79	1 9181E-04	330 72	330 72	0 00E+00	6.34E-02	6.34E-02
Sn-126	1 6671E-04	330 72	330 72	0 00E+00	5 51E-02	5.51E-02
Sr-90	1 9799E+01	330 72	330 72	0 00E+00	6 55E+03	6 55E+03
Tc-99	6.7678E-03	330 72	330 72	0 00E+00	2 24E+00	2 24E+00
Th-229	1 7488E-06	330 72	330 72	0 00E+00	5 78E-04	5 78E-04
Th-230	5 8704E-06	330.72	330.72	0 00E+00	1 94E-03	1 94E-03
Th-232	6 0208E-07	330.72	330.72	0 00E+00	1 99E-04	1 99E-04
Tl-208	8 7573E-05	330.72	330 72	0 00E+00	2 90E-02	2 90E-02
U-232	2 3706E-04	330 72	330 72	0 00E+00	7 84E-02	7 84E-02
U-233	3 6128E-04	330 72	330 72	0 00E+00	1 19E-01	1 19E-01
U-234	1.2788E-02	330.72	330 72	0 00E+00	4 23E+00	4 23E+00
U-235	5 7486E-04	330 72	330 72	2 99E-04	1 90E-01	1 90E-01
U-236	2 3485E-04	330 72	330 72	0 00E+00	7 77E-02	7.77E-02
U-238	1 1581E-04	330 72	330 72	3 73E-05	3 83E-02	3 83E-02
Y-90	1 9804E+01	330 72	330 72	0 00E+00	6 55E+03	6 55E+03
Other Radionuclides					2 04E+04	2.04E+04

Gamma Sources

Photon - Energy Group	Total Photons/sec (bounding)
Avg MeV	
0 0150	4 053E+14
0 0250	8 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 080E+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_n: Nominal Fuel Burnup (MWd)[2]	x_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	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: 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:	PULSTAR - BUFFALO (6%RODS)	[1]Fuel decay start date:	1978
SNF ID #:	174	Estimates as of	2030
Fuel Units & Descr:	24 - CANISTER OF RODS	Template:	PWR (Light Water, Zirc, 0 to 5%, U)
Heavy Metal Mass:	BOL=254 671kg; EOL=252.202kg	[2]Template Burnup(MWd):	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT):	0 00176911
		Template Decay Time:	50 years

Estimated Canister usage 18"x10" 2 00

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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-08	2,348 47	2,546 71	0 00E+00	6 07E-05	6 58E-05
U-234	5 2665E-05	2,348 47	2,546 71	0 00E+00	1.24E-01	1 34E-01
U-235	-1 4487E-06	2,348 47	0 00	3 30E-02	2.96E-02	3 30E-02
U-236	7 5888E-06	2,348 47	2,546.71	0 00E+00	1.78E-02	1 93E-02
U-238	-2 6129E-07	2,348 47	0 00	8 05E-02	7.98E-02	8 05E-02
Y-90	6 4180E-01	2,348 47	2,546.71	0 00E+00	1 51E+03	1.63E+03
Other Radionuclides					2 24E+03	2 43E+03

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+06
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 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	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)	[1]Fuel decay start date:	1965
SNF ID #:	176	Estimates as of:	2030
Fuel Units & Descr:	996 - ROD	Template:	PWR (Light Water, Zirc 0 to 5% U)
Heavy Metal Mass:	BOL=537 541kg; EOL=499 992kg	[2]Template Burnup(MWd):	61 92
ROD Storage Site:	INEEL	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)
5.24E+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	5.696E+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	Total Photons/sec (bounding)
Avg MeV	
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)
5.65E+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-06	3 54E-06
Se-79	3 5417E-05	50,103.24	88,060 24	0 00E+00	1.77E+00	3 12E+00
Sn-126	3 9848E-05	50,103.24	88,060 24	0 00E+00	2 00E+00	3 51E+00
Sr-90	1 4928E+00	50,103.24	88,060 24	0 00E+00	7.48E+04	1 31E+05
Tc-99	3 2525E-04	50,103 24	88,060.24	0 00E+00	1 63E+01	2 86E+01
Th-229	6 4582E-05	50,103.24	88,060 24	0 00E+00	3.24E+00	5 69E+00
Th-230	1 1432E-06	50,103 24	88,060.24	0 00E+00	5 73E-02	1 01E-01
Th-232	-9 0328E-08	50,103 24	0 00	4 01E-01	3 96E-01	4 01E-01
Tl-208	1 3964E-02	50,103 24	88,060.24	0 00E+00	7 00E+02	1.23E+03
U-232	3.7822E-02	50,103 24	88,060.24	0 00E+00	1 90E+03	3 33E+03
U-233	-3 3244E-03	50,103 24	0 00	1 35E+03	1 18E+03	1 35E+03
U-234	8.1769E-04	50,103 24	88,060.24	0 00E+00	4 10E+01	7.20E+01
U-235	5.7813E-08	50,103.24	88,060.24	2 76E-04	3.17E-03	5 37E-03
U-236	1.3273E-07	50,103 24	88,060.24	0 00E+00	6 65E-03	1 17E-02
U-238	-3 1121E-10	50,103.24	0 00	1 76E-04	1 61E-04	1 76E-04
Y-90	1.4928E+00	50,103.24	88,060 24	0 00E+00	7 48E+04	1.31E+05
Other Radionuclides					8 36E+04	1 47E+05

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 908E+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 %	0.089989331	60 to 100

Basis for Parameter Drifferences:

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	50,103.24	39,413 10	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	88 060.24	78 826 19	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
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 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	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 0831E-08	64,290 45	110,212.20	0 00E+00	2 63E-03	4.50E-03
Ra-226	2 1423E-08	64,290 45	110,212 20	0 00E+00	1.38E-03	2.36E-03
Ra-228	4 6236E-06	64,290 45	110,212 20	0 00E+00	2 97E-01	5 10E-01
Ru-106	4 0208E-11	64,290 45	110,212 20	0 00E+00	2 58E-06	4 43E-06
Se-79	3 5417E-05	64,290 45	110,212 20	0 00E+00	2 28E+00	3 90E+00
Sn-126	3 9848E-05	64,290 45	110,212 20	0 00E+00	2 56E+00	4 39E+00
Sr-90	1.4928E+00	64,290 45	110,212.20	0.00E+00	9 60E+04	1 65E+05
Tc-99	3.2525E-04	64,290 45	110,212.20	0 00E+00	2 09E+01	3 58E+01
Th-229	6 4582E-05	64,290 45	110,212.20	0 00E+00	4 15E+00	7 12E+00
Th-230	1 1432E-06	64,290 45	110,212.20	0 00E+00	7.35E-02	1.26E-01
Th-232	-9 0328E-08	64,290 45	0 00	4 62E-01	4 56E-01	4 62E-01
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 (Avg MeV)	Total Photons/sec (bounding)
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	2.98E+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 66	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-08	129,014 55	221,167 80	0 00E+00	1 84E-03	3 15E-03
Pm-147	2 6224E-04	129,014 55	221,167 80	0 00E+00	3 38E+01	5 80E+01
Pu-238	4.2477E-04	129,014 55	221,167 80	0 00E+00	5 48E+01	9 39E+01
Pu-239	2 7519E-05	129,014 55	221,167 80	0 00E+00	3 55E+00	6 09E+00
Pu-240	1 6184E-05	129,014 55	221,167 80	0 00E+00	2 09E+00	3 58E+00
Pu-241	1 4695E-03	129,014 55	221,167 80	0 00E+00	1.90E+02	3.25E+02
Pu-242	4 0831E-08	129,014 55	221,167 80	0 00E+00	5.27E-03	9 03E-03
Ra-226	2 1423E-08	129,014 55	221,167 80	0 00E+00	2 76E-03	4 74E-03
Ra-228	4 6236E-06	129,014 55	221,167 80	0 00E+00	5 97E-01	1 02E+00
Ru-106	4 0208E-11	129,014.55	221,167 80	0 00E+00	5 19E-06	8 89E-06
Se-79	3 5417E-05	129,014.55	221,167 80	0 00E+00	4 57E+00	7.83E+00
Sn-126	3 9848E-05	129,014 55	221,167 80	0 00E+00	5 14E+00	8.81E+00
Sr-90	1 4928E+00	129,014.55	221,167 80	0 00E+00	1 93E+05	3 30E+05
Tc-99	3 2525E-04	129,014 55	221,167.80	0 00E+00	4 20E+01	7 19E+01
Th-229	6 4582E-05	129,014 55	221,167.80	0 00E+00	8 33E+00	1 43E+01
Th-230	1 1432E-06	129,014 55	221,167.80	0 00E+00	1 47E-01	2.53E-01
Th-232	-9 0328E-08	129,014 55	0 00	9 27E-01	9 15E-01	9 27E-01
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
Nominal	129 014 55	73,600 31
Bounding	221,167 80	147,200 62

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 66	0 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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 (Avg MeV)	Total Photons/sec (bounding)
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	1.50E+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	25,281 52	97.22
Bounding	51,712.20	194 44

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 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 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	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 (Avg MeV)	Total Photons/sec (bounding)
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 663E+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	Basis for burnup used in estimate
Nominal		10 315 62	Nominal burnup calculated from the heavy metal mass destroyed
Bounding	166 981.81	20 631.25	Bounding burnup taken directly from SFD (converted to MWd)

Checks

	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-08	1,654.38	13,061 64	0 00E+00	2 36E-05	1 86E-04
Pm-147	2 6224E-04	1,654.38	13,061 64	0 00E+00	4 34E-01	3 43E+00
Pu-238	4.2477E-04	1,654.38	13,061 64	0 00E+00	7 03E-01	5 55E+00
Pu-239	2.7519E-05	1,654 38	13,061 64	0 00E+00	4 55E-02	3 59E-01
Pu-240	1 6184E-05	1,654 38	13,061 64	0 00E+00	2 68E-02	2 11E-01
Pu-241	1 4695E-03	1,654 38	13,061 64	0 00E+00	2 43E+00	1 92E+01
Pu-242	4 0831E-08	1,654 38	13,061 64	0 00E+00	6.75E-05	5 33E-04
Ra-226	2 1423E-08	1,654 38	13,061.64	0 00E+00	3.54E-05	2 80E-04
Ra-228	4 6236E-06	1,654 38	13,061 64	0 00E+00	7 65E-03	6 04E-02
Ru-106	4 0208E-11	1,654 38	13,061 64	0 00E+00	6 65E-08	5 25E-07
Se-79	3 5417E-05	1,654 38	13,061 64	0 00E+00	5 86E-02	4 63E-01
Sn-126	3 9848E-05	1,654 38	13,061 64	0 00E+00	6 59E-02	5 20E-01
Sr-90	1 4928E+00	1,654 38	13,061 64	0 00E+00	2 47E+03	1.95E+04
Tc-99	3 2525E-04	1,654 38	13,061 64	0 00E+00	5 38E-01	4.25E+00
Th-229	6 4582E-05	1,654 38	13,061 64	0 00E+00	1 07E-01	8 44E-01
Th-230	1 1432E-06	1,654 38	13,061 64	0 00E+00	1 89E-03	1 49E-02
Th-232	-9 0328E-08	1,654 38	0 00	2 58E-02	2 57E-02	2 58E-02
Tl-208	1 3964E-02	1,654 38	13,061 64	0 00E+00	2.31E+01	1 82E+02
U-232	3 7822E-02	1,654 38	13,061 64	0 00E+00	6.26E+01	4 94E+02
U-233	-3 3244E-03	1,654 38	0.00	8 69E+01	8 14E+01	8 69E+01
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	3.51E+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	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	[1]Fuel decay start date	1982
SNF ID #	380	Estimates as of	2030
Fuel Units & Descr	12 - 619 ROD HEX ARRAY	Template	LWBR (Light Water, Zirc, 60 to 100%, Th and U)
Heavy Metal Mass	BOL=5218 3kg EOL=5110 5kg	[2]Template Burnup(MWd)	10269 14
ROD Storage Site	INEEL	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

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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	[1]Fuel decay start date	1974
SNF ID #	192	Estimates as of	2030
Fuel Units & Descr	17 - 17 FLAT PLATES	Template	PWR (Light Water Zirc, 0 to 5%, U)
Heavy Metal Mass	BOL=1323 635kg EOL=1038.999kg	[2]Template Burnup(MWd)	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT):	0 00176911
		Template Decay Time	50 years

Estimated Canister usage
18"x15'
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	Basis for Parameter Differences
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ZIRC	ZIRC	
BOL HM Constituents	U	U	
BOL Enrichment %	0 71	0 to 5	

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate
Nominal	18,892.25	270 675.47	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	Estimated EOL HM/Given EOL HM
Nominal	5 84	14 33	1 17
Bounding	11 69		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[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_n: Nominal Fuel Burnup (MWd)[2]	x_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	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	Total Photons/sec (bounding)
Avg MeV	
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+06
2.7500	1 038E+06
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	[1]Fuel decay start date:	1969	Estimated Canister usage	
SNF ID #	195	Estimates as of	2030	18"x15'	
Fuel Units & Descr	19 - 19 FLAT PLATES	Template	Pathfinder (Light Water, SST, 60 to 100%, U)	19 00	
Heavy Metal Mass	BOL=343.226kg EOL=220 031kg	[2]Template Burnup(MWd):	6 01		
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00012882		
		Template Decay Time	50 years		

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_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	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	8 07E-03	7.74E-03	8 07E-03
Y-90	9 5557E-01	116,375 01	232,750 02	0 00E+00	1.11E+05	2.22E+05
Other Radionuclides					1.42E+05	2 84E+05

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_n: Nominal Fuel Burnup (MWd)[2]	x_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	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	1.0835E-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 (Avg MeV)	Total Photons/sec (bounding)
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)
1.55E+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_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 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 456E+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	[1]Fuel decay start date	1981
SNF ID #	352	Estimates as of	2030
Fuel Units & Descr	20 - ROD	Template	(Worst Case)
Heavy Metal Mass	BOL=4.2kg EOL=3 968kg	[2]Template Burnup(MWd)	62.5
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00186865
		Template Decay Time	35 years

Estimated Canister usage 18"x10'
0 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	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:** 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
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-08	62.56	125 11	0 00E+00	1 50E-06	2 99E-06
Pm-147	1 6900E-02	62.56	125 11	0 00E+00	1 06E+00	2 11E+00
Pu-238	-8 6120E-01	62 56	0 00	8 04E+02	7 50E+02	8 04E+02
Pu-239	-4 8440E-02	62.56	0 00	9 73E+01	9 42E+01	9 73E+01
Pu-240	-3 0095E-01	62.56	0 00	1 24E+02	1 05E+02	1 24E+02
Pu-241	-1 0411E+02	62.56	0 00	3.20E+04	2 55E+04	3 20E+04
Pu-242	-1 1381E-04	62 56	0 00	5 38E-01	5 31E-01	5 38E-01
Ra-226	6 4400E-08	62 56	125 11	0 00E+00	4 03E-06	8 06E-06
Ra-228	5 9952E-07	62 56	125 11	0 00E+00	3 75E-05	7 50E-05
Ru-106	8 5526E-07	62 56	125 11	0 00E+00	5 35E-05	1 07E-04
Se-79	1 9181E-04	62 56	125 11	0 00E+00	1.20E-02	2 40E-02
Sn-126	1 6671E-04	62 56	125 11	0 00E+00	1 04E-02	2 09E-02
Sr-90	1 9799E+01	62 56	125 11	0 00E+00	1 24E+03	2 48E+03
Tc-99	6 7678E-03	62 56	125 11	0 00E+00	4.23E-01	8.47E-01
Th-229	1 7488E-06	62 56	125 11	0 00E+00	1 09E-04	2.19E-04
Th-230	5 8704E-06	62 56	125 11	0 00E+00	3 67E-04	7.34E-04
Th-232	6 0208E-07	62 56	125 11	0 00E+00	3.77E-05	7.53E-05
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	Basis for burnup used in estimate:
Nominal	62.56	-1,022 96	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		125 11	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 (ORME)
SNF ID # 208
Fuel Units & Descr: 1 - FLAT PLATES IN CAN
Heavy Metal Mass: BOL=2.39kg EOL=2.39kg
ROD Storage Site: INEEL

[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 0860E-19	45 43	90 86	0 00E+00	1 40E-17	2 80E-17
Se-79	1.2533E-05	45 43	90 86	0 00E+00	5 69E-04	1 14E-03
Sn-126	1.1393E-05	45 43	90 86	0 00E+00	5 18E-04	1 04E-03
Sr-90	6.3033E-01	45 43	90 86	0 00E+00	2 86E+01	5.73E+01
Tc-99	4.3527E-04	45 43	90 86	0 00E+00	1 98E-02	3 96E-02
Th-229	5.2893E-12	45 43	90 86	0 00E+00	2 40E-10	4 81E-10
Th-230	4 6820E-10	45 43	90 86	0 00E+00	2 13E-08	4 25E-08
Th-232	5 1647E-14	45 43	90 86	0 00E+00	2 35E-12	4 69E-12
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 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 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	2.550E+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	[1]Fuel decay start date:	1979
SNF ID #	228	Estimates as of	2030
Fuel Units & Descr	1 - CANISTER OF SCRAP	Template	PWR (Light Water, Zirc 0 to 5% U)
Heavy Metal Mass	BOL=0 032kg EOL=0 032kg	[2]Template Burnup(MWd)	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage: 18"x10' — 0 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	Basis for burnup used in estimate:
Nominal		0 19	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		0 38	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-08	274,985 09	549,970 18	0 00E+00	7 11E-03	1.42E-02
U-234	5.2665E-05	274,985 09	549,970 18	0 00E+00	1 45E+01	2 90E+01
U-235	-1 4487E-06	274,985 09	0 00	4 50E+00	4 10E+00	4 50E+00
U-236	7 5888E-06	274,985 09	549,970 18	0 00E+00	2 09E+00	4 17E+00
U-238	-2 6129E-07	274,985 09	0 00	2.69E+01	2 68E+01	2 69E+01
Y-90	6 4180E-01	274,985 09	549,970 18	0 00E+00	1.76E+05	3 53E+05
Other Radionuclides					2 62E+05	5 24E+05

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	2.266E+08
5 0000	9 686E+07
7 0000	1 116E+07
11 0000	1.281E+06

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)	[1]Fuel decay start date	1979
SNF ID #	229	Estimates as of	2030
Fuel Units & Descr	2 - DEBRIS	Template	PWR (Light Water Zirc, 0 to 5% U)
Heavy Metal Mass	BOL=19 08kg, EOL=19 01kg	[2]Template Burnup(MWd)	61 92
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 00176911
		Template Decay Time	50 years

Estimated Canister usage: 18"x15' — 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-08	66 57	133 13	0 00E+00	1 72E-06	3 44E-06
U-234	5.2665E-05	66 57	133 13	0 00E+00	3 51E-03	7 01E-03
U-235	-1 4487E-06	66 57	0 00	1.29E-03	1 19E-03	1.29E-03
U-236	7.5888E-06	66 57	133 13	0 00E+00	5 05E-04	1 01E-03
U-238	-2 6129E-07	66 57	0 00	6.21E-03	6 19E-03	6.21E-03
Y-90	6 4180E-01	66 57	133 13	0 00E+00	4.27E+01	8.54E+01
Other 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	[1]Fuel decay start date:	1962	Estimated Canister usage: HIC
SNF ID #: 230	Estimates as of:	2030	3 65
Fuel Units & Descr: 146 - CANISTER OF SCRAP	Template:	HFBR (Heavy Water, Alum 40 to 100% U)	
Heavy Metal Mass BOL=48 647kg EOL=48 647kg	[2]Template Burnup(MWd):	164 6	
ROD Storage Site: INEEL	Template BOL Heavy Metal Mass (MT):	0 000377	
	Template Decay Time:	65 years	

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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-08	896 18	1,792 36	0 00E+00	3 70E-05	7 39E-05
Th-232	6.5978E-14	896 18	1,792 36	0 00E+00	5 91E-11	1 18E-10
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 890E+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+06
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	[1]Fuel decay start date	1964	
SNF ID #	231	Estimates as of	2030	
Fuel Units & Descr	655 - CANISTER OF SCRAP	Template	HFBR (Heavy Water, Alum , 40 to 100% U)	
Heavy Metal Mass	BOL=59 081kg EOL=59 081kg	[2]Template Burnup(MWd)	164 6	
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 000377	
		Template Decay Time	65 years	

Estimated Canister usage
18"x10'
13 10

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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-08	3 61E-08
Pm-147	5 9856E-04	783 73	1,567.46	0 00E+00	4 69E-01	9 38E-01
Pu-238	2 0029E-02	783 73	1,567.46	0 00E+00	1 57E+01	3 14E+01
Pu-239	2 8836E-02	783 73	1,567 46	0 00E+00	2 26E+01	4 52E+01
Pu-240	2.2802E-02	783 73	1,567.46	0 00E+00	1 79E+01	3 57E+01
Pu-241	6 1020E-01	783 73	1,567 46	0 00E+00	4 78E+02	9 56E+02
Pu-242	1 4526E-05	783 73	1,567.46	0 00E+00	1 14E-02	2 28E-02
Ra-226	9 7701E-11	783 73	1,567 46	0 00E+00	7 66E-08	1 53E-07
Ra-228	1 1068E-14	783 73	1,567.46	0 00E+00	8 67E-12	1 73E-11
Ru-106	5 9224E-10	783 73	1,567.46	0 00E+00	4 64E-07	9 28E-07
Se-79	1 0899E-05	783 73	1,567.46	0 00E+00	8 54E-03	1 71E-02
Sn-126	0 0000E+00	783 73	1,567.46	0 00E+00	0 00E+00	0 00E+00
Sr-90	8.4899E-01	783 73	1,567.46	0 00E+00	6 65E+02	1 33E+03
Tc-99	3 6494E-04	783 73	1,567.46	0 00E+00	2 86E-01	5 72E-01
Th-229	1.2928E-12	783 73	1,567.46	0 00E+00	1 01E-09	2 03E-09
Th-230	1 6293E-08	783 73	1,567.46	0 00E+00	1 28E-05	2 55E-05
Th-232	1 6451E-14	783 73	1,567.46	0 00E+00	1 29E-11	2 58E-11
Tl-208	3.4382E-15	783 73	1,567.46	0 00E+00	2 69E-12	5 39E-12
U-232	0.0000E+00	783 73	1,567.46	0 00E+00	0 00E+00	0 00E+00
U-233	9.9425E-10	783 73	1,567.46	0 00E+00	7 79E-07	1 56E-06
U-234	6.5575E-05	783.73	1,567.46	0 00E+00	5 14E-02	1 03E-01
U-235	-1 2944E-06	783 73	0 00	3 13E-02	3 02E-02	3 13E-02
U-236	1.1951E-05	783 73	1,567.46	0 00E+00	9 37E-03	1 87E-02
U-238	-3 0619E-07	783 73	0 00	3 94E-04	1 54E-04	3 94E-04
Y-90	8 4928E-01	783.73	1,567 46	0 00E+00	6 66E+02	1 33E+03
Other Radionuclides					8 98E+02	1 80E+03

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+06
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	[1]Fuel decay start date	2025
SNF ID #	1039	Estimates as of	2030
Fuel Units & Descr.	3 - ELEMENT	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=0 48kg EOL=0 472kg	[2]Template Burnup(MWd)	6 65
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 000195
		Template Decay Time	5 years

Estimated Canister usage

18"x10'
0 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-08	7 73	0 00	1.29E-04	1.29E-04	1.29E-04
Y-90	2 6060E+00	7 73	15 46	0 00E+00	2 02E+01	4 03E+01
Other Radionuclides					2 79E+01	5.58E+01

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 084E-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	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 9	10 to 20 1	

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-08	3 73	7 47	0 00E+00	6 33E-08	1 27E-07
U-232	4 8737E-08	3 73	7 47	0 00E+00	1 82E-07	3 64E-07
U-233	1.2203E-07	3 73	7 47	0 00E+00	4 56E-07	9 11E-07
U-234	1 5925E-07	3 73	7 47	0 00E+00	5 95E-07	1 19E-06
U-235	-2 6194E-06	3 73	0 00	1 66E-04	1 56E-04	1 66E-04
U-236	1.2693E-05	3.73	7.47	0 00E+00	4 74E-05	9 48E-05
U-238	-3 6331E-08	3 73	0 00	1 03E-04	1 03E-04	1 03E-04
Y-90	2 6060E+00	3 73	7.47	0 00E+00	9 73E+00	1 95E+01
Other Radionuclides					1 35E+01	2 69E+01

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	[1]Fuel decay start date:	2010
SNF ID #:	480	Estimates as of:	2030
Fuel Units & Descr:	182 - ELEMENT	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20% U)
Heavy Metal Mass:	BOL=48 357kg; EOL=48 23kg	[2]Template Burnup(MWd):	6 65
ROD Storage Site:	INEEL	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-08	455 87	911.73	0 00E+00	7.21E-06	1 44E-05
U-232	4 2647E-08	455 87	911.73	0 00E+00	1 94E-05	3 89E-05
U-233	1 2211E-07	455 87	911.73	0 00E+00	5 57E-05	1.11E-04
U-234	1 9955E-07	455 87	911.73	0 00E+00	9.10E-05	1 82E-04
U-235	-2 6194E-06	455 87	0 00	2 08E-02	1 97E-02	2 08E-02
U-236	1 2693E-05	455 87	911.73	0 00E+00	5.79E-03	1.16E-02
U-238	-3 6331E-08	455 87	0 00	1 30E-02	1.30E-02	1 30E-02
Y-90	1 8241E+00	455 87	911.73	0 00E+00	8 32E+02	1.66E+03
Other Radionuclides					8 78E+02	1 76E+03

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_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 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-06	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+06
0 0250	0 000E+00
0 0375	4 000E+03
0 0575	2.436E+03
0 0850	3 418E+05
0 1250	6 747E+05
0.2250	2 388E+06
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-06	4 98E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding	SST	SST
BOL HM Constituents	U	U
BOL Enrichment %	19.88316824	10 to 20 1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal	0.00	
Bounding		

Basis for burnup used in estimate:

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

Checks

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

Estimated EOL HM/Given EOL HM: 1 00

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

[2]Total burnup for all fuel associated with this worksheet must be divided 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	[1]Fuel decay start date:	1999
SNF ID #	1077	Estimates as of	2030
Fuel Units & Descr	75 - ELEMENT	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=14 7kg EOL=14 445kg	[2]Template Burnup(MWd):	6 65
ROD Storage Site	INEEL	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	Basis for Parameter Differences
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	19 898	10 to 20 1	

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-08	13 46	26.92	0 00E+00	2.28E-07	4.56E-07
U-232	4 8737E-08	13 46	26 92	0 00E+00	6 56E-07	1.31E-06
U-233	1 2203E-07	13.46	26 92	0 00E+00	1 64E-06	3.29E-06
U-234	1 5925E-07	13.46	26.92	0 00E+00	2 14E-06	4.29E-06
U-235	-2 6194E-06	13.46	0 00	8 43E-05	4 90E-05	8 43E-05
U-236	1.2693E-05	13.46	26.92	0 00E+00	1 71E-04	3 42E-04
U-238	-3 6331E-08	13.46	0 00	5 24E-05	5 19E-05	5.24E-05
Y-90	2 6060E+00	13.46	26.92	0 00E+00	3 51E+01	7.02E+01
Other Radionuclides					4 85E+01	9 71E+01

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
Nominal	2.85	13 46
Bounding		26 92

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2 02	4 72
Bounding	4 05	

Estimated EOL HM/Given EOL HM: 1 00

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

[2]Total burnup for all fuel associated with this worksheet must be divided 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	[1]Fuel decay start date	1996
SNF ID #	819	Estimates as of	2030
Fuel Units & Descr	4 - ELEMENT	Template	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass	BOL=0 583kg EOL=0 556kg	[2]Template Burnup(MWd)	6 65
ROD Storage Site	INEEL	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'
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-08	4,143 00	8,285 99	0 00E+00	6 55E-05	1.31E-04
U-232	4 2647E-08	4,143 00	8,285 99	0 00E+00	1 77E-04	3 53E-04
U-233	1 2211E-07	4,143 00	8,285 99	0 00E+00	5 06E-04	1 01E-03
U-234	1 9955E-07	4,143 00	8,285 99	0 00E+00	8.27E-04	1 65E-03
U-235	-2 6194E-06	4,143 00	0 00	2.18E-02	1 10E-02	2.18E-02
U-236	1 2693E-05	4,143 00	8,285 99	0 00E+00	5.26E-02	1 05E-01
U-238	-3 6331E-08	4,143 00	0 00	1.35E-02	1 34E-02	1 35E-02
Y-90	1 8241E+00	4,143 00	8,285 99	0 00E+00	7.56E+03	1 51E+04
Other Radionuclides					7.98E+03	1 60E+04

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+06
3.5000	3 665E+04
5 0000	4 336E+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	Total Photons/sec (bounding)
Avg. MeV	
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	Basis for burnup used in estimate:
Nominal	1,118 57	137 46	Nominal burnup taken directly from SFD (converted to MWd).
Bounding		2,237 14	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 080E+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 46E+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 05
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-06	84 97	0 00	1 62E-03	1 39E-03	1 62E-03
U-236	1 3576E-05	84 97	169 94	0 00E+00	1 15E-03	2 31E-03
U-238	-2.2698E-08	84 97	0 00	1 07E-04	1 05E-04	1 07E-04
Y-90	1.2563E+00	84 97	169 94	0 00E+00	1 07E+02	2 13E+02
Other Radionuclides					1 15E+02	2 30E+02

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+00	3 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 %	70.2247191	60 to 100

Basis for Parameter Drfferences:

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)	[1]Fuel decay start date	1994
SNF ID #	884	Estimates as of	2030
Fuel Units & Descr	61 - ELEMENT	Template	TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
Heavy Metal Mass	BOL=10 858kg EOL=10 602kg	[2]Template Burnup(MWd)	66.52
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT)	0 000196
		Template Decay Time	35 years

Estimated Canister usage 18"x10' 0 55

II. Estimates

Radionuclide	m: C/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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+06
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	[1]Fuel decay start date:	2025
SNF ID #.	702	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 64kg; EOL=0 617kg	[2]Template Burnup(MWd):	66.52
ROD Storage Site·	INEEL	Template BOL Heavy Metal Mass (MT)·	0.000196
		Template Decay Time.	5 years

Estimated Canister usage 18"x10' 0 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	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 %	69 9	60 to 100	

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	Estimated EOL HM/Given EOL HM
Nominal·	0 10	3.59	1.00
Bounding·	0.20		

[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: TRIGA (FLIP) FFCR SO KOREA
SNF ID #: 733
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass BOL=0 638kg EOL=0 561kg
ROD Storage Site INEEL

[1]Fuel decay start date 1997
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'
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-08	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
Nominal	30 07	73 37
Bounding		146 74

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.34	2 44
Bounding	0 68	

Estimated EOL HM/Given EOL HM: 1 00

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

[2]Total burnup for all fuel associated with this worksheet must be divided 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"x10'
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-06	281 70	563 41	0 00E+00	1 52E-03	3 05E-03
U-235	-2.6572E-06	281 70	0 00	7 54E-03	6 79E-03	7.54E-03
U-236	1 3576E-05	281 70	563 41	0 00E+00	3 82E-03	7.65E-03
U-238	-2.2698E-08	281 70	0 00	5 03E-04	4 97E-04	5 03E-04
Y-90	1 5935E+00	281 70	563 41	0 00E+00	4 49E+02	8.98E+02
Other Radionuclides					4 77E+02	9 54E+02

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)
5.57E+01	1 11E+02
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 %	70	60 to 100	

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"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	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	[1]Fuel decay start date	2035	Estimated Canister usage
SNF ID #	241	Estimates as of	2030	18"x10'
Fuel Units & Descr	96 - ELEMENT	Template	TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100% U)	0 86
Heavy Metal Mass	BOL=16.819kg, EOL=14 63kg	[2]Template Burnup(MWd)	66 52	
ROD Storage Site	INEEL	Template BOL Heavy Metal Mass (MT):	0 000196	
		Template Decay Time	5 years	

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_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	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 %	70 00179205	60 to 100	

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	Estimated EOL HM/Given EOL HM
Nominal	0.36	2 62	1 00
Bounding	0 73		

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

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